**Interviewer:** And of course, I’m going to record this for transcribing. Do you need an NSD approval from me or?

**Interviewee:** No.

**Interviewer:** Okay. So yeah. Can you tell me a bit more about X and what is the core product and service that you are offering with that?

**Interviewee:** Yeah, Marcus Slogan is company that has started just before we left our mother company. We were an offspring separated out from Y utility, and then, the wind energy or wind consultancy group, or separated out as an independent consultancy.

In this process, I acquired software that we had developed in-house and I acquired the intellectual property rights and the commercial rights for that software.

So that was the the purpose of the whole company was to continue developing and commercializing the software while I was still working 60% in the outsourced, the separated company as an energy consultant.

**Interviewer:** When was this established? What year was it?

**Interviewee:** That was in summer of 2012.

**Interviewer:** Okay. That’s good. And originally, where are you located and where were you located from before?

**Interviewee:** I was located in Kristiansand just this reason, and that was favorable both with respect to the Innovation Norway support and public funding for startups and of course I had my work there. Now in this phase, I’m located to Kristiansand

**Interviewer:** Yeah. What is the ecosystem you’re working in or what was the previous system, at least that you were working in originally? Like was it incubator or accelerator?

**Interviewee:** If you mean by ecosystem for not for the winning energy consultancy, but for the facilitating startups, we were located at X Center, Kristiansand offers a lot of consulting services for startups that try to stimulate, and so, Ava Centra was the most low level actually center so it had the basics. It had what we needed, an office space and that’s pretty much it. And we were basically at affordable costs, so that was basically it. We also met other people, startups and so on, so it was an atmosphere for that.

There were other incubators like inventors which was more advisers and consultants and more pricey office basis, but not very costly. But they were more, these advisers wanted to charge money for startups and so on.

So and also, I didn’t like them. I think they were not very good advisors. So I prefer to stay out of this constants flow, dealing with all these advisors and so on.

**Interviewer:** So, how many employees have you been in the start?

**Interviewee:** At the most, it’s been two employees, two full-time employees, engineers, that I knew through summer jobs. I hired them for summer jobs in previous job. But now at the moment, I’m almost not working a lot to myself in the company. I earn my money on all the consultancies, but I’m planning to make a push now because I haven’t explored or exploited all the innovation Norway support mechanisms yet, but I need to earn money enough to- I need some equity to put in order to also to have fundings and obtain fundings.

**Interviewer:** How about the other boss? You were all male or female?

**Interviewee:** Yeah. The general balance in the company has been good. I mean, there was one girl, her name is Z and W from India. W, he came later and then W came first and she worked for two years. Z also worked for 2-3 years, and then she went to Canada later. X is still working in Norway. He made a startup also. So yeah, and I’m in contact with both also now. So, the board executive is Y a friend of mine from back from school. So it’s all there including the board member. There are 50% in the board are female and 30% or 33% were women in the company at its peak.

**Interviewer:** Yeah. I think you’ll have some more information on the website that we can check later. So I’m going to stop this part and continue with the next part, which is a bit more focused on software engineering practices. Thanks X.

**Interviewer:** Here we are again. Can you tell me about the software engineering practices that you have used, like agile practices or scrum practices or whatever you had in mind when you developed the company first, and what kind of tools and technologies you have been adopting? Technological stuff you’ve been adopting within?

**Interviewee:** Yeah. I developed some practice when I was working in the company before leading up to my own company, Martin Sullivan. So scrum is a practice that I’ve been trying to implement and use. It’s not, I mean, I try to use it and I see the value of it, but I’m not really the best person to follow it up tightly. But that has been there. When you’re speaking of other practices?

**Interviewer:** Yeah, agile, kanban or you did some, eventually to management tools, sorry, tool management for agile practices or project management.

**Interviewee:** Yeah. For scrum is the development. It’s the development for the management practice I’ve been using. I’ve been using, looking for software that supports the scrum. I think because sometimes we are working with people like from other countries or some external developers so we need to do it cloud-based or on the internet. We can’t have on table board just there because we’re not in office always. So, the clockwise one was scrum-wise I used. That paper use and that’s I think is the best, but it’s also cost a bit.

Then, I use Google, about the Google cloud solutions, Google apps, Google G-Suite so this has to be in all the facilitating the organization at the whole time. The Google G-Suite and Google--

**Interviewer:** Yeah. When it comes to the product that you’re developing wind farm designs, what are the most important quality measures that, or attributes that you have taken into account like security UX, user interface or usability, or have you thought about quality attributes in general?

**Interviewee:** No. As a startup, quality attributes, that’s more or less we’re just trying to solve the problems at hand. We of course, we try to make it more robust when we see that, okay, here’s something we need to fix, some things like that. And we also had some you know-- I’ve been careful by--

Not very careful but of course, I realized some of the protecting the court’s intellectual property of the court. So I’ve been not been showing the core algorithms to people or external collaborators, only the ones I really trust, and be careful not to publish anything. So, that’s my protection, yeah.

**Interviewer:** How about testing? Do you do any testing for verifying, validating what you’re doing? Like unit testing or integration testing, or functional testing? I don’t know.

**Interviewee:** Yeah, we started, you know, I know I would really like to move from programming or from doing the development programming to having more, you know, trying more to manage or to specify and outsource some programming and spend more time on developing tests to sending more testing. So that switched from doing all the coding ourselves to more outsourcing the code.

It’s being more specifying what needs to be done, stitch it together and doing testing on the code. That’s the goal but so far, we have just-- It’s under development. We’re doing iteratively - we test the program, we find some problems when it occurs, and we try to fix it. Not more complex than that because we’re just a few people.

**Interviewer:** Yeah. When it comes to documentation, have you done any documentation on the code or do you document the code in general?

**Interviewee:** Yeah, we see the value of documenting the code. So far, it’s been code that we inherited. Well, not inherited, but I’ve been developing the code in my previous job, but together with consultants, external consultants.

The external consultant was actually very good in keeping a code tidy and understandable and so it was not difficult to understand. He was actually very good in writing a code with some explanation, but I think the documentation of the code is more in a structured, that you don’t write messy with the code but you write in a consistent way. That makes it easier to understand.

And then of course, if you need to know the core idea, you need to know the parameters specifying the core principles or the core algorithms, but the QE, the user interface, many of these implementations, I also need to understand from the consultants.

So, but for me, I’ve been understanding every aspect or every part of the code even though I haven’t programmed it myself. So I’ve been through the low level, the C code that makes it run faster at some critical points. But it’s been important for me because I’m the owner of the projects, I need to know and it’s me that-- The consultants may come and go, but you’re screwed if they know more than you and what the code. So, I need to know the code if not being able to program everything in details myself, I need to know how the code works.

**Interviewer:** So when it comes to technical debt, have you heard about that before? I guess, what do you think about it? Do you think there is a lot of technical debt in your products or if there is, how do you cope with it?

**Interviewee:** I just assume the definition of technical debt is technical complexity or technical?

**Interviewer:** No, it’s actually, it’s like when you have to develop things, either you choose best practices in software engineering, or you take shortcuts because you want to finish it earlier whatever things has to be implemented. You might have some deadline and you want to get it done.

But you find a shorter solution, which might be a bad solution for the moment, but it might have higher impact later on, like you have to throw away this version and then restart from scratch everything or. That is the debt, sort of the debts that you have to pay later on.

**Interviewee:** Oh! The debt in terms of like financial depth, right? Not debt in terms of product.

**Interviewer:** It’s for software in this case, what it means is that--

**Interviewee:** But is it debt?

**Interviewer:** No, not depth, debt. Like financial debt.

**Interviewee:** Like the deep or like mortgage?

**Interviewer:** Mortgage, yeah, like that.

**Interviewee:** Okay, then I understand. Okay. Now I understand what you mean. Okay. The technical dept is I’m struggling with this now because I think along the way we took some consideration of it, but the fact now is that, okay, it was developed fast, fairly fast with an external consultant, but we used high level language with a compiler that costed money. We use MATLAB with compiler, and it has its limitations.

**Interviewer:** Yes.

**Interviewee:** And it’s not open source. And it depends on the functionality and features that you have in this product releases. So, this is on Achilles now because we need to transfer the code to what we chose is Python. So that’s one, that’s the hardest technical debt we have, I think.

So now, we are maintaining one code in purely MATLAB, one code in- we’re building a code in a Python and also this is cloud-based or we want to have cloud based also. So but yeah, I think that’s the main thing is that technical debt. That’s the main example of we haven’t considered or we-- Then, I don’t think there are any other technical debt that we have thought about now. We always use best approaches, although we accept that we cannot achieve perfect software without exceeding deadlines.

**Interviewer:** Well, you mentioned this a bit but when it comes to protecting your technology, what measures do you take? Like for coding, for the code, for the algorithms, how do you protect them? Do you keep them private? If yes, how? Intellectual property rights, how do you tackle them? Because it’s still hard, all these things.

**Interviewee:** I think the way I protect this, that I don’t show it to somebody else and people are, make sure they don’t have access to it and everybody else and the people I really trust, so.

**Interviewer:** But when you store the code, you store it somewhere, so?

**Interviewee:** Yeah. I store the code in GitHub and because I think, you know, so now I store-- The code is available on GitHub and I have also my local development server where I need to run the development software that the court order the most, and that one I want to protect the most. But of course this is not safe. With the development server, I haven’t taken all the steps necessary to make sure it’s very safe on the development server, it’s a window’s server.

And then the GitHub in the cloud, I think is of course, it’s not an open repository of course, it’s repository, but I haven’t taken more steps than whatever GitHub can offer on the protection side. But I also consider that I can all of a sudden lose things on my local computer or things like that, so I actually prefer to have things in the cloud to be sure. Also, servers can also really be captured on or something can happen to them as well.

**Interviewer:** How about being goal or resource-driven? Have you thought about this? Like are you goal-driven with a startup or are you resource-driven? Or maybe both, I don’t know. So when I say goal-driven, it’s like you have a final goal and you put in the resources as much as possible to achieve that or?

**Interviewee:** What is the resource-driven?

**Interviewer:** Resource-driven is that you change your goals based on the resources you have and what you have at your disposal and you change the goal instead of.

**Interviewee:** Okay. I think I must say then first goal-driven and then resource-driven. Because resource, I need to, it’s more or less, I have the same goal, but the goal has been delayed so to say. I can’t work through the goal without having enough resources and resources has--

**Interviewer:** But you didn’t modify the goal along the way? It’s that same goal.

**Interviewee:** No. Yeah, no. I’ve been pivoting the goal, but the overarching goal is more or less the same, but the strategy has changed so that which customer segment to target and how the final product should be. Should it be an API, shouldn’t be a descrip application, should be a call based version? This has changed over time. So, but still the goal of providing optimized layouts all over the world for wind turbines, that’s the goal. But the execution of it is being up and down because lack of resources. Yeah.

**Interviewer:** Yeah. So unless you have final remarks, I don’t have more questions because also I’m bit short on time. So, do you have anything to comment upon them that I might forgotten or things that you want to mention?

**Interviewee:** No. Yeah. What is your- just want to understand, what is the overall goal with your research or with this **[inaudible 00:15:02]**?

**Interviewer:** The objective is to make a semi-structured interview where this is a methodology actually, to collect some data where I understand how the startups are developing their products. And in terms of software engineering practices, in terms of other issues like testing or quality assessment, or if they do actually, or if they are aware of technical debt in general, and how do they tackle it?

It is supposed to be for startups that are a bit at the later stage, not very early stage, so they have developed a product, they have tried out and so on, so or service. So basically, it’s to understand their perception of how they are doing their practices and later on to compare with other samples **[crosstalk 00:15:52]**.

**Interviewee:** So, then it’s maybe a little bit worthwhile to explain about my skills and my background, because I’m not a programmer, I’m an engineer by profession, PhD in electrical engineering and a master in mechanical engineering. So I’ve been using programming, I’ve been coding but just like an engineer. Like for whenever that is needed, I do coding calculations using MATLAB high-level languages just to get the results.

And so for that reason, I think that I participate in the engineering code, but I don’t have been focusing on it. That’s more than enough from me than starting to go beyond that and focusing which practice and testing and all these more and more or less skills or things you do for professional code development, software development.

But my goal is that I can learn or know enough of these practices in order to be able to hire- that I hire experts or programmers, and also are able to manage and to manage a full stack clouds based software knowing enough how to chop this up in pieces and manage and outsource it and also stitch this together and be able to have a full more or less full overview of the whole system.

**Interviewer:** Yeah. Thank you so much, X. Yeah, it has been quite interesting to hear your insights.