**Interviewer:** So good morning, we are here with X from Startup 6, and we’ll start our interview regarding the company. And the first question is, what are your products or services and when did you start actually?

**Interviewee:** Okay. Our product is analytics platform for all companies. That’s anything with the commercial real estate. So, whether it’s real estate developers or brokers or firms that deliver office appliances to offices that need to know new projects that they can deliver clients to. So, it’s a hub to find information really. The second part was?

**Interviewer:** When was the company established and when did you start?

**Interviewee:** Yeah, we started in early 2018, but I can take the history if you want? Yeah?

**Interviewer:** Please.

**Interviewee:** Okay. So, we started a little earlier with my history so I can start there. I educated as economist and started in our firm called Econ Consulting Group. So, I started as a consultant in economics within the oil industry. But that was in 2015 and oil wasn’t very lucrative at that point so that firm didn’t do very well. But we had one section that had just started the working on the commercial real estate, but from a consultant point of view, so we had projects where we delivered information to customers, but we started formalizing these projects or consolidating them into products. And in 2018, we separated this product into a separate firm or company, and from there, we hired you to develop our first application to where we used the Power BI technology to make these dashboards really well with the information.

**Interviewer:** Yeah, that sounds very cool. Where are you located right now?

**Interviewee:** Right here.

**Interviewer:** Is it in Oslo**?**

**Interviewee:** It’s in Oslo but we have offices in Oslo and in Estonia. So we are four people in Oslo and we are four people in Estonia.

**Interviewer:** That’s cool. So how many employees?

**Interviewee:** We’re yeah, eight, if you add the…

**Speaker:** If you add me.

**Interviewee:** No, we are four in Oslo and four in Estonia. So we are two developers here, me and Y. We have two sales people in Oslo and in Estonia, we have two people working on administration. And administration work regards collecting information about real estate. And the CEO is in Estonia and we have one extra sales person in Estonia, so eight in total.

**Interviewer:** Eight, yeah, that’s very good. What is the average age you know and the gender balance?

**Interviewee:** Okay. Gender balance, in the Oslo, there’s three males and one female. And Estonia, it’s 50/50, so two female and two male. So it’s for our business, that’s actually really good balance because commercial real estate is usually just males.

**Interviewer:** Yeah, it could be. And so how about regarding the age, average age?

**Interviewee:** Yeah age. Okay me and Y, we are, I’m 32, Y is 28. Salespeople here are around 50. Estonia, they are late 40s, two people in the late 40s and two people in the early 40s.

**Interviewer:** Okay, that’s cool. Okay. I think this is it for the first part. There are a couple of questions, but you answered during the process, I think. You have everything on your website I guess, all this information, or is it some lacking?

**Interviewee:** It’s some lacking because one thing is to develop a website that should look good and look them and be easy to find information of all the parties actually creating the information and the right wording. That takes time and we really don’t focus that much on it because our sales team is traveling around and informing everyone in the business. It’s commercial real estate, it’s--

**Interviewer:** It’s a niche market.

**Interviewee:** Yeah, it’s niche market. Yeah. So if there isn’t that many people to actually inform.

**Interviewer:** Yeah, that’s good. So, I’m going to stop this part and then we start with the next one which is more for software dedicated questions.

**Interviewer:** We are here with the second part of the interview, and we are going to talk about testing and documentation in your company and also software development. So what are the current practices that you use and tools that you are using for the company to develop your product or service you mentioned earlier?

**Interviewee:** Practices is horrible.

**Interviewer:** You understand it’s more project management practices in this case. More related to software engineering.

**Interviewee:** Yeah. Okay. So for a long time from 2015, maybe 2016 when we sort of started the product tie. Can you say that?

**Interviewer:** Yeah.

**Interviewee:** It was only me that did sort of development, creating databases and stuff. So everything was really adhoc. And I never thought about product management because I was still in the person doing development.

**Interviewer:** Yeah. But you have Y now.

**Interviewee:** Now we have Y. Y, she started earlier this year and yeah, started the becoming better at the actually organizing our work but we don’t follow any forum or like--

**Interviewer:** No agile or no?

**Interviewee:** I will say we are agile in the sense that we only do-- Okay, I don’t know all the agile, I haven’t read their manifests, but we only develop small pieces that our customer needs. We don’t plan very far ahead, then create monstrous approaches just for the fun of it, but no--

**Interviewer:** Do you have customer and developer interaction?

**Interviewee:** Yeah. We are often in meetings with our customers, discussing what they need and if they have any suggestions for improvements.

**Interviewer:** Is it the like weekly routines?

**Interviewee:** Oh, it’s often when, okay, it’s two parts though because our sales team, mainly this two people here, they often get suggestions when they are in meetings and they are often meetings with new customers and they have followup meetings with the existing customers, and they often come back with feedback.

But sometimes they have more specific feedbacks that are a little more larger than they can understand, so then may go out and talk to them. But I will say we are maybe out in the- I’m maybe out in the customer and meetings, maybe every second month or something like that.

**Interviewer:** Do they keep track of this stuff? Do you have some tools or technologies or?

**Interviewee:** We have started using Trello, but as of now, we are in the process of moving our service from servers, from Starla old style file server, office 365 for, and then we’ve started using the Microsoft teams, some Microsoft planner and, but the that’s early stages and started using that the last week. It has really help writing things down in tools like Trello and there’s Kanban like tools, like drag your cards from to-do to in progress and done.

**Interviewer:** Yeah. That’s quite interesting. How about technologies, development tools? Do you have anything special?

**Interviewee:** Yeah, we started with as you know, we started in Python, Django CMS, and that was because I wanted it. Python was the programming language I knew at that point. But when we needed some extra hands that was a year ago, we couldn’t find any more Python people so then decided, okay, we switch to C# and .net because in Norway, it seems like everyone is doing .net.

So then we found some consultants which help me make some tools for loading a personal data into our software from Excel worksheets.

And I can tell you about our experience if you like, that was [laughs].

**Interviewer:** Yeah, don’t worry, don’t worry. I’ve got more questions. I see you get a bit anxious with all this – okay, where is it going. For your current product let’s say that you have I know it’s a bit like you’re using Power BI, cloud version in order to distribute it properly to the clients and so on.

But did you think about quality attributes when you were developing this stuff? Meaning that what were you focused on the usability of the code, were you focused on security, were you focused on other cordial performance for instance? Do you ask how the interface looked like, so what was the most important one?

**Interviewee:** In the start, the most important thing was getting it out as fast as possible. And the UX as you mentioned was mainly done by myself and our CEO and we don’t know that much about UX. So when we looked back at how the tools looked for a year and a half ago, it looks terrible. But we have learned become better ourselves and Y is educated in user experience design so that has helped a lot, so I think now it’s looks really good. Again, I will say you UX part, you mentioned?

**Interviewer:** Security.

**Interviewee:** Security. In the start, we didn’t care that much because if something went wrong, we don’t really store any data on our users, so that was okay. If we leak data, it’s just our own data. Okay that sucks but it doesn’t harm anyone. But a year ago when we started taking in customer data and we hired the consultants, we started caring because that may store other people’s data.

So that was really big focused stressed hard on the consultant to make it secure. So, and the Power BI has built-in security features like your role level security, so we can isolate the thing to call it tenants based on filters. You filter out data based on the customer IDs.

**Interviewer:** Do you do any testing by the way? Do you validate and verify what you’re doing?

**Interviewee:** I wish I could say so. I really, really want to do uni testing and integration testing, and functional testing, all that stuff, but it takes time.

**Interviewer:** Yeah, it does.

**Interviewee:** And that’s a really bad excuse, but our app isn’t that big yet so clicking through that and making sure that everything works, it doesn’t take a whole lot of time, so I can actually do it maybe half a day. So it’s a tradeoff and yeah, I should be doing testing.

**Interviewer:** But it’s developer-based testing. Like developer develop something and then tests the functionalities, I think.

**Interviewee:** Yeah and checked out haven’t broken anything, but of course, I don’t think we can check everything by manually clicking through that, so we should start doing it, but that was also one of the things that I tried to make the consultants do. Please do testing, but they didn’t. So in my head, I really want to start from scratch, build everything again, do testing. What do you call it? More not necessarily a test even though, but to make sure that we have a good courage.

**Interviewer:** Yeah. That’s good. I know that this next question wouldn’t improve much. But do you do documentation? How do you do the documentation if you do it at all so?

**Interviewee:** Okay [exhales].

**Interviewer:** You weren’t expecting such tough questions?

**Interviewee:** No, I wasn’t expecting this. No, we don’t do any documentation. I write comments somewhere. Usually, I comment stuff that isn’t obvious, what they call this, do some loose comments to remind myself what this is, but I don’t have any separate documentation or I don’t use any documentation framework to scrape out comments from the gold.

**Interviewer:** Yeah. From previous experiences, I’ve heard that they use this approach of writing readable code. That code that if you handed it over to somebody else, he can still read and you don’t have to document a lot. Is it the case here as well or?

**Interviewee:** The case is that like I said before, it’s been mainly myself doing stuff, so I know pretty much all of the codes. So, but we are starting to become a better at it because we are now starting to document internal processes; how we not necessarily do the development work, but how we are creating new customers, how we load new data into the-

**Interviewer:** How many customers do you have right now?

**Interviewee:** I don’t remember customers but I remember users. We have around 400 users. But there are some companies that have many users and some companies has a couple of users. So how many paying customers we have, I don’t remember exactly but--

**Interviewer:** This is more for the scale of the company, has it grown from the beginning, did you have fewer customers, it has grown fast? I don’t know.

**Interviewee:** We are growing really fast. So a year and a half ago when you helped us, we had the-- I don’t remember maybe five customers.

**Interviewer:** Now, it’s 140.

**Interviewee:** Not that many. If I were to guess, I would guess maybe around 50, 50 companies.

**Interviewer:** Yeah, but it’s still 10 times more. That’s a good rate. Yeah, that’s good. Have you heard about technical debt before?

**Interviewee:** Oh, don’t mention it.

**Interviewer:** I should mention it. My previous paper was on technical debt. So I think it’s a pretty interesting, but I think you know about it since.

**Interviewee:** Yeah, I feel like everything you ask me and goes under, uh, technical debt. We did no documentation, no testing and uh, in some cases, uh, sort of down to the shortcuts. At early times we should have used better interfacing and stuff like that.

**Interviewer:** But what do you do eventually? What do you think you’re going to do about it?

**Interviewee:** In my dreams, I really hope I get time to fix it. That’s the problem. Right? Because I want to go back and start over and structure everything, make it nice and clean and pretty and all that. But every week, we get new feedback. This feed will be to develop.

**Interviewer:** Are you pressured from deadline with the customer or when you make decisions?

**Interviewee:** Yeah, we don’t have any strong deadline, but we set the deadlines for ourselves and we sort of value new features higher than--

**Interviewer:** Also how you develop them? Do you choose the best practices or sometimes, okay, this is too hard, now I need to take a shortcut for instance, instead of doing it the right way, I start fixing it first and then think about it later?

**Interviewee:** Yeah. Okay. So when the new features comes, we should of course see that’s okay it’s time to refactor. Let’s say we have made the shortcut two or three times earlier before, so okay now it’s time to refactor, but it’s easier to make it just another shortcut again, so that, I do a lot of shortcuts. I have to admit that. Don’t say it to anyone or our customers.

**Interviewer:** No don’t worry, this is going to be anonymized anyways. If I write these things on the paper, nobody names or eventually whatever you do is not reported. Don’t worry about that. I want you to be honest, because this is for, as I said, for research purposes and we need to understand; what are the statuses of startups that are growing fast, for instance, or companies that are growing fast and how they are dealing with this kind of challenges.

Because many, they have the same challenges I think and even worse, they don’t even think about it, that there is a technical debt that they might be facing. So, it’s good that you know about it first of all, and then maybe later stage, you can address it properly.

**Interviewee:** The worst part about the technical debt is it’s stressing. I’m a bit, I like things to be tidy. Not necessarily physical things around me need to be tidy but in my head, things should be tidy. And call this living in the head. Okay, it’s on the screen but the IDs is living in the brain and when the technical debt is building up, it gets real messy and that’s stressing and I don’t like it.

**Interviewer:** Yeah, that’s an interesting point. I didn’t quite hear this before, but I think it’s interesting to observation about technical debt. Like okay, it’s not just about the software, but also about the stressing of the solutions that you are getting as a developer. And yeah, that’s quite interesting.

Do you throw a lot of the previous features, like the things that you did before, have you thrown them away and started over still in the technical debt context? Like if the first version I developed maybe didn’t quite fit the needs, then you throw that away and then you start it over everything or you used something.

**Interviewee:** Yeah. Okay. So, when we switched from Python to C#, then we sort of, okay we had to throw away the code but the IDs are still there.

**Interviewer:** Okay. You had two parts. One was in Python from that and there was a backend with Power BI.

**Interviewee:** Yeah. Okay. The Power BI part is still the same. Yeah. So mostly the same. We are continuously developing it, making it pretty and more optimized. When I sometimes get the time to fix stuff, I throw things away and create-

**Interviewer:** From scratch?

**Interviewee:** Yeah. But yeah, if some algorithm, for example, doesn’t work as nice as I would like it to or it’s slow, I am usually there just scrap it and create it again.

**Interviewer:** I see. Do you protect your technology somehow or do you protect, you mentioned this a bit, but?

**Interviewee:** Protect in what way?

**Interviewer:** Like the code you’re writing, do you protect it? Like nobody has access or is this implementations?

**Interviewee:** It lives in a private GitHub repository, so--

**Interviewer:** Okay that’s one way.

**Interviewee:** But I don’t know any other way [laughs].

**Interviewer:** Meaning that for instance, if you have a solution, a very interesting solution you’re developing, it might not be the case because you are doing the service mainly and relying on other people’s libraries and so on.

But if you have a very interesting solution or algorithm or something you have developed, I think it is a good idea to protect also from the property rights level, like IPs or intellectual property protection or this kind of thing. Maybe it’s not the case, but-

**Interviewee:** Yeah. I don’t think it applies. I don’t know, but I don’t think it applies because we don’t develop software for a software case. It’s a product and the software is sort of for our customers, so it really doesn’t matter.

**Interviewer:** Yeah. I understand. It’s the infrastructure that you are developing for them. Yeah. So maybe the data is more important than the software in this case.

**Interviewee:** Yeah, that’s true. And we don’t, earlier we protected the data and this is our data and you can only look at the data from the dashboard, look at the pretty graphs and stuff like that.

But a couple of months ago, we decided that okay, let’s just open it, give it away because that was a strong feedback from our customers that they wanted the data, so they can take the data into Excel and do what business people do. They open Excel and make some line charts and whatever, so that gave them new value that they could find the information that easy in our system. But when we hadn’t the creators or access graph that they needed, or they need a graph in their own reports or something like that, they can take it out and create it on their own.

And then it doesn’t matter that much that we give the data away because the data is new every month. Not all the way it’s new, but it’s a lot of things that happens in the real estate market. People sell real estate to each other and every month, we have, I don’t remember the exact number, but it’s quite a large number of transactions every month. So if you want to follow what’s happening, you have to download the data again next month so.

**Interviewer:** Yeah, that’s the way. When I ask this, it’s a bit maybe strange, but are you goal or resource driven? Like for your company, is it like you have a certain goal that you have to deliver the service and then you spend whatever maximum resources you have for that? Or do you optimize the resources and maybe adapt to the goals based on the resources you have at hand?

**Interviewee:** Yeah, we are.

**Interviewer:** Or maybe you are, I don’t know.

**Interviewee:** No, and mainly we are goal-oriented because as I said before, our customers don’t care what’s lies behind the facade or what do you call it? Yeah, so, that’s then again from the developer point of view, we like here to play with technology. We want to try new stuff so we want to focus on the resources, but that comes in the second place.

**Interviewer:** Yeah. That’s true. So do you have any final remarks? Because we are almost over. I think you have told me a lot of things, interesting stuff. Do you have anything that you want to mention regarding the company or the product or the service or the practices you are using?

**Interviewee:** Yeah, I don’t, I can’t think of anything. No. Okay, unless you have any specific questions.

**Interviewer:** Yeah. I can have some specific questions, but this is semi-structured meaning that depending on what you say, I asked also the questions. I could ask you about metamorphic testing, but I’m pretty sure you are not going to mention anything about that.

**Interviewee:** I don’t know what that is so.

**Interviewer:** I can take it off the record. It’s very interesting testing approach. You know, this Tesla cars Teslas? Those vehicles. There are some scenarios where they crash against something like a big track with a white face because they think it’s the sky, you know, it’s the recognition part. And there is this metamorphic testing. Eventually, the ones that produce the cars, they should test this scenarios, but those are difficult to test.

So metamorphic testing is a sort of testing that you put a threshold to something, to a value, and then you think, okay, if values are falling on the right side of this threshold, then maybe most probably things are okay. If they are falling on this other side then maybe most probably something is wrong.

So it’s like in adoptive testing based on some values that you get, so it tries to be a bit more intelligent than the actual unit testing that you mentioned earlier. Like you put this value, you know the exact output. But how do you know that?

This is difficult, the Oracle. We call it Oracle in software engineering. So metamorphic testing, you are able to sort of, you don’t need an Oracle and then the exact Oracle telling you the value, but you can have guess estimates that okay, something is wrong, that is these values being produced are wrong.

**Interviewee:** Yeah. Now that you mentioned it, we do that.

**Interviewer:** You do?

**Interviewee:** Yeah, but not in a software point of view, it’s on our data because we place tenants in buildings, but there isn’t any formal or official registry that says that these companies live here and these companies live here. So, but it’s all based on addresses and that addresses are typed manually and manual typing is often wrong. So we have some algorithms that tries to correct typos and everything, and the place tenants the right places.

But when yeah, to try to test, to check that they have the correct number of tenants in a building, we check the number of employees in the company and sum up the number of employees in all the companies in the building and check with the square meters of that building and check if the number of the square meters per employee is way off or-

**Interviewer:** Yeah, I understand.

**Interviewee:** -and so if you have a-

**Interviewer:** 200 employees in 10 square meters.

**Interviewee:** Yeah exactly. That’s the point and then we can go in and check, do some manual checking. Okay, this is something wrong here, we have to look it up. And then our administration team goes in and start looking at the buildings and the tenants on that. So that’s not as sophisticated as the Tesla.

**Interviewer:** No, it’s not. I’ll mention the solution to this actually, but it’s very interesting point, I think.