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I'm sitting here with Professor Tyrväinen from University of Jyväskylä, a very well-known professor in the field of software business. The purpose of this podcast is to talk about something we haven't touched upon previously during this course. That is how to make money with software, either building it or by selling it. First of all, thank you very much for agreeing to do this podcast.

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Thank you for the invitation. Let's start talking about making money with software. How can you do that? You can do the software for the companies or do something for the individuals. And the tradition has been that money has been made by selling software to companies. That means companies who do not make the software they are using by themselves need software made by somebody else.

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Then you sell the software or do it for the companies. But if you do the software for the purposes of one single company on behalf of the company, then we speak about bespoke software. If you do software that multiple companies can use or multiple individuals, then we speak about product software, that is, copies of the same software delivered to multiple persons or multiple companies.

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Examples of that would be products like Microsoft Office, Microsoft Office or customer relationship management software, ERP systems, and so forth. You sell it directly to the companies, or you use third parties as the channel for selling the software. Is software big business? That depends on where you compare it. If you speak about the product software, then it's around €300 billion or trillion US dollars.

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If we speak about bespoke software, then it's something like €900 billion or trillion US dollars. That's pretty large number. But in the bespoke software, it's not all about developing the software. It's also consulting the business processes of the customers and doing other activities related to the operations of the customer organization. But major part of that is developing the software.

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Globally, software business is big business. Yes, at least the numbers are pretty large to me. What about in Finland? Finnish software market is pretty large. Also, the product software market is more than €1 billion and the bespoke software market is over €3 billion. In Finland, there's roughly 50 60,000 persons who are doing software, and out of those, roughly half, close to 30,000 persons are doing software for other companies, either bespoke or product software.

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How does it compare to other industries in the IT domain? The largest business is telecom services. That is more than double computer software market. If you compare global marketing like versus marketing items on behalf of other companies, that's roughly in the same order of magnitude. That leads to the conclusion that you cannot sell all the software by selling ads.

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You need also other income, which means businesses purchasing the software as such. We all know about the big companies in Finland. Companies like if security at all. We know about the global companies like Google, Microsoft. Huge businesses. But me as a student, I'd be interested in doing the next Skype or Instagram. So how can I, with having only a few tens of people sell my company for $1 billion?

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Do you have any get rich quick scheme? If you wish to get rich, you need to add value to somebody. You can either add value to one company, but you need to be very precise for that company and it's pretty difficult. It's easier to add value to millions and millions of individuals in the cloud markets. If you find a application that is valuable for 1 billion persons, and you are able to reach 1 billion users for a software, then you certainly are worth lots of money.

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You can count how many customers you have for a service, and then multiply that with a certain number of dollars, like $10 or $50, and that might be close to the valuation of your company. So the question is, how do get 100 million users for your cloud service? And what is the thing that the person would like to do with a new service in social media or other domains?

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So we will look at some examples of companies that have made it big in Finland. We might think of companies of course, like F-Secure, but then more and more and things like we have the game companies like Rovio. Rovio is a good example of the recent generation of software companies. They are not selling software to a large extent.

00;04;32;05 - 00;04;56;05

You can buy the games, but what is more important, they provide a service on the cloud and they find other means to generate revenue. What about supercell? The key there is to have a large number of customers, and you always tend to find some means to generate revenue based on that.

Either by selling toys with Angry Birds or doing something else, or doing a marketing and throw that marketing channel.

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So the quick tip is to first get a load of users, then make money, right? The threshold for reaching the customers is getting down. Say 30 years ago, if you wanted to do business with software, you had to invest half a million to get started. Nowadays, if you wish to make a service available for the users in the web, then it's a few thousand that you can start with.

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Just get your computers open a service on top of a platform provided by somebody else. You mentioned these categories of bespoke development, product, business and more and modern ways of making business. Let's start by looking a bit on the bespoke software business. You said that was a very big part of the global software business market. Yes, that's the largest part in the history.

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Typically, it has been the enterprises who purchased the software and who spent money on that. Basically software or software services for one company has been the major market. So it's the monster. The individual customers do not spend that much money on software. Majority of the software goes to the enterprises who wish somebody to do software for themselves. Based on this, most of the software is developed for the needs of enterprises.

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Big companies like banks, insurance companies, governments, and so forth. So all the new technology developed for software has been developed for large enterprises. And also the tools used for that and the tools developed for the developers have been developed for developing enterprise software. And only recently there has been more emphasis on tools for developing software for individuals and cloud services, and that has had impact on the tools market also.

00;06;29;28 - 00;06;51;25

For example, any sort of analysis and design tools, if you look at those tools and those have been targeted for large organizations and large groups of persons, and if you speak about enterprise of the, you also have to separate the application software and the infrastructure software. In an enterprise, you typically have back office applications systems that run with the servers.

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And in addition you have the hardware, the software, the networks, the systems needed for ID management, for management of other users, and so on. So the application software and the

infrastructure software are pretty different. Also from the developer perspective. Typically when you develop the application software, you wish to get deep customized learning on what the customers want and do iterations on the software and try to get feedback as much as possible as soon as possible, and provide software that matches the needs of the customers and the processes of the target organizations.

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The infrastructure you focus more on long term development. You need to do software that is valid for tens of years. So there's also now this person is maintaining updating infrastructure software that was developed in the 70s or 80s. You need to figure out how to do software that is well maintainable, reliable, which will support the future standards, be modular, reusable and so forth.

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How do you get your bespoke customer to pay for adding these kinds of qualities? Most of the smaller enterprises do not want to pay for the maintainability and so forth, and therefore those who develop the application software, they purchase the infrastructure software from companies doing those as products and developing those as the internal activity. Then the large customers which have in-house systems that there is to maintain, like governmental organizations, they have seen the problem caused by badly maintainable software, and they see the value of producing high quality software that is maintainable.

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So you need to figure out the time each of the customer organization, you know, to figure out whether you wish to include just applications for this month or next few months, or whether you wish to create maintainable infrastructure. Don't do infrastructure for SMEs. Sell them products from the infrastructure developing companies and do all the applications. Would SAP SAP be an example of this, or is it more of an example of a product or service in a category in between the product and software is what we call enterprise systems.

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In enterprise systems, you have a large bulk of product software, but even larger effort needed for tailoring it for the customers. If you purchase enterprise systems like SAP, you'll be roughly 20% for the licenses and 80% for customizing, tailoring, and integrating with other systems. This hybrid model is very dangerous for the software companies because they try to create cost of products by taking a custom made software made for one customer.

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Try to generalize that gradually, but that's very difficult. And not not many succeed on that. You typically have a small number of customers, so you are not able to separate the products out and get

enough volume for developing it. You need to have multiple companies. So for example, in some examples that we have been calculating in the Telecom operator software market, we noticed that you need at least 40 customers in order to have a product or two, which you add on the customer specific parts and on to the data.

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That means if you have for the customers, you cannot serve them by yourself. You need other companies will serve the customers on doing the customer specific parts, which means you need to have an ecosystem where you will have the product ownership you develop, and you will provide business opportunity for other companies for your customers. In the model was this 2080.

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So 80% of the revenue goes to the company for the customer specific tasks, which means that a typical Finnish company trying to the same model should give 80% of the revenue for the other company. And they are hesitating to do that. One part of that is that the market in Finland is pretty limited. So in order to find for the customers, you have to go abroad.

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If you stay within Finland, you want to get as much revenue as possible. Don't hesitate to give the percent away. But going abroad is a big jump for these traditional product based software companies. Many of the large software companies in Finland are these kind of companies. They have both the product core and then they do the best for both, both sides by themselves.

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For example, which is the largest companies, is well known in the area. The other large ones also Exynos, they apply the same model. Depending on the market segment, they might have more product offering, or they might use third party product offering. In some areas they do only tailoring. So depending on the market segment they are serving with the railway ticketing system, the healthcare, the upper tier system, the examples of these kind of bespoke projects.

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Yes, they are made for the purposes of one single organization and for that purpose there is no product software available, but any of these systems uses underlying products and infrastructure software. And the question is to what extent you are able to utilize the products of the infrastructure level and, products and related to database management and then other tools to help you in creating the customer specific parts.

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How is it possible that you can get numbers like €1 billion for a healthcare system for the Helsinki region? Do you have any comment? Taking a software business perspective, any large organization has a large number of business processes and is for each of the business processes, you have to do some specific software for that organization. Then you typically end up with high number of applications.

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For example, if we take an example of the telecom, mobile or the software domain, the telecom operators who sell you the connections, they have a standard model created by a standards consortium that market and either standard model, they have tens of areas for software that are specific for telecom market. In addition, they have tens of areas where they are general enterprise systems functionality and tens of models where there are human resource management, infrastructure management with to facilities and so on, different areas.

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So you end up easily with hundreds of different software applications within one large organization. Each of the applications takes certain effort, and you multiply it with a number of 500. For example, you end up with pretty large figures, and in addition, you need to have an infrastructure for connecting these together, but more or less centralized data management for managing the much needed or management for the user security and so forth.

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The reason behind the big budget is that it's a very complex and large undertaking that you typically don't see in the popular press. One final question about bespoke software business. How do you see the future of this bespoke software development? Is it going away soon or will it continue to be? Let's see. If not the largest, a major part of global software business?

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There are different factors that push into different directions. If you look at cloud software providing software as a service, which is sort of emerging market, we did some analysis on the role of bespoke. So in context of cloud applications and cloud services, the findings indicate that the integration and other effort needed in cloud market compared to the traditional software market, you need only one third of the bespoke an integration.

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Therefore, in the cloud domain, if you provide a very standard software as a service through the network to large numbers of customers, there's a limited number of applications that each use. Pretty recent standards. Then there's a limited number of combinations of software that you can

integrate, and you pretty easily can do three integrated packages because the major software packages have already been integrated.

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So the effort needed for customer integration is becoming smaller. So you see a trend towards these kinds of solutions. Yes. That's one of the trends. Another trend to the other direction is that the computing capacity is increasing even further. So compared to any other market, the power of computers and software is increasing extremely fast. So if you now have computers that are 3000 times as powerful as supercomputers in the 70s in your pocket, in your iPad or PC or phone, then there are certainly are much more areas where you can apply computers more effectively and more cost efficient.

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That means there will be new areas to which you need to develop some software. There's all the time new software needed for new areas. You need to do new software, which means you have new interfaces, new components to be integrated in an enterprise all the time. You need more software. Let's move on to product. Software used to be called shrink wrap software.

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What's that all about? Software means the customer does not specify what kind of software is needed. The software is prepared by the software company based on the expected use of the software. Word processing systems used to be one good example of spreadsheets and other similar software that is used by multiple persons, typically for productivity of individuals and also for enterprise purposes.

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SMEs. Small and medium enterprises use such software. They are unwilling to pay for tailoring the software. Also, products cannot be customers by the customer, by use of programing for macros and so on, integrated and so forth. But that market is pretty limited compared to the other markets at the moment. The trend is that instead of delivering the software in CD-ROMs or other physical media, you start to deliver the software through the net and even further, you don't install the software to the consumer or use computers or PCs, you run it on the servers.

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And this model is called the cloud software model. The software market is roughly one third of the bespoke software market, €300,000 million. Whenever some software has been created for some customer use, you typically end up with a situation that multiple users, multiple organizations or individuals used to have the change of add somebody. It takes effort of standardizing the functionality, doing a bit higher quality, generalizing it to packaging as a pre-made package sold as a

copy, and the price of such software is much smaller for the customer compared to the bespoke software.

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Pricing is feasible even individual users, not only for their enterprises. There are various models for charging in the private space. Yes, the traditional charging for the enterprises is that you will purchase the software license, which enables you for using that software, typically for one user. Also, the number of users, typically the license is valid from the state of purchasing the software own, and you will have to pay extra for upgrading the software.

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Very often you also pay a fee for maintenance, which includes the upgrades and the maintenance fees, something like 15 to 30% of the original license price. There are also other models like floating licenses in the network, so it's such the number of parameter users who can use the software and so forth. But these pricing models have been an area of research, and it seems that whenever the customers are in developed countries, the customers prefer on newer licenses or monthly licenses, instead of paying a number of users, that is increasing or decreasing all the time.

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So we can see a trend towards subscription business models. Yes, fixed price for the certain size of site for certain period of time. That's the typical model you already mentioned. Cloud software. So what's that all about and what's cloud software business cloud software combat certain elements. One is that you don't operate the software at your premises. Somebody else takes care of operating the software and operating, managing and maintaining the infrastructure needed for operating the software.

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Earlier, there was a model called ASP Application Service Provisioning, which meant that an external organization was operating a software for you, but that was personally just for your organization or your personally. And in that case, the license cost needed for running the software, maintaining the service and other was SaaS from your or your organization. In the cloud model, this is extended in a way that the very same software is used by multiple organizations or multiple users.

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Instead of operating one software for you. The cloud service provider operates software for many users, which use the very same software, and only the data for each customer has been disclosed. For that specific customer, that is a way of operating or delivering software from the software provider perspective and from the user perspective. It's more like outsourcing the infrastructure maintenance to a external body.

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What are the benefits both from the providers and the clients point of view? Why would we like to use cloud software from the provider's perspective, you get rid of lots of the eternal costs related to distributing and maintaining operating the software. If you are the software developer, you maintain only one copy of the software. You will support only one hardware, you support only one operating system release.

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And whenever you release a new version of the software and some of the customers report a bug, you can fix it. And surprisingly, in the next moment, in the next release, it's available for all the customers. So the customers are much happier when the updates are coming by themselves. The bugs found by others are fixed for you, and you wouldn't have to worry about upgrading the software and so forth.

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From the customer perspective, you typically get rid of investment costs. You don't have to pay for the servers, you don't have to pay for the cooling systems on premises. For the servers, you wouldn't have to have stuff maintaining and upgrading the software and the hardware. On the downside, you have to pay a bit higher your monthly fee or some other fee for using the software, and it's pretty difficult to tailor the software for your purposes because it's it's the very same for each and every customer.

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How big is cloud software business these days? At the moment, if we consider all internet mediated or cloud businesses together, it's it's around €80 billion or €80,000 million. Out of that 30 billion public cloud run on private cloud, which means using the same model within a large corporation. It's more than half of that. And in addition, the outsourcing of business processes like marketing through Google is sometimes calculated within those figures and sometimes not.

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And if it's calculated as in these figures, then it's close to half of the total figures. So at the moment, Google AdWords is roughly half of the volume of the cloud business. If we look at the cloud based now, then it's about a little less than a 10th of bespoke software development. And what a quarter of the private business.

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How is the trend for cloud business? Is it a fast growing segment? Yes, it's growing pretty fast. So the percentage is something like between 30 and 60%. So the 35% annually is the typical growth person with this new business, or is it eating up of the other parts of software business? It's characterized as a disruptive change. It's more like offering less expensive, less functional versions of software to the market segments that have not been able to use such software.

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You, for example, if you wish to use 3D design software, have not been able to purchase the expensive licenses for your PC, then you can use that software through the native form of cloud services. And if you wish to use office tools, for example, students very often use Google's Office Tools or Microsoft Office tools, which are much less expensive in the cloud version compared to the PC versions.

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But the disruptive technology there is at least the potential of overtaking or even cannibalizing the existing other models. Right? It's not a radical innovation in the sense that it would replace all the previous knowledge on how to do software and so forth, but it's disruptive, meaning it will take over at least half of the product business as it is nowadays.

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Not all. There will be places where you wish to run the software in the traditional model, but more than half cloud software is either pretty similar to the traditional software market in the way that instead of selling the software, you only use it through the net. There are also lots of services that are enabled by the cloud that would not have been possible without the cloud and operated by one organization.

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So, for example, in case of Google, the Google word processing functionality, for example, is a replacement of Microsoft Office but yours through the. Net. While Google AdWords is functionally that used to be a traditional process taking place earlier in a offline mode, but nowadays it's enabled by the software of Google. But it's not software business in the traditional form of selling software, rather than a software based service business process as a service.

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Also, if you look at Amazon, which is doing retail business enabled by the cloud approach rather than selling software shots, what about Amazon Web Services? Amazon is providing infrastructure services, which is replacement for purchasing hardware and operating by yourself. You use the EC2 or other Amazon services instead of operating your own infrastructure. That's pretty much of the idea.

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That came as a sort of spin off from the availability of capacity at Amazon by themselves. Amazon is in the retail market, where you have extensive usage of retail services just before Christmas. And if you wish to purchase all the hardware needed for serving that high capacity time, then in January you are left with lots of computers in your showroom without any use for those.

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And what Amazon did was that they started to sell the capacity at the price, which gave them revenue higher than that, the electricity cost. So they did net profit compared to having the service shut down in the server rooms utilizing the extra capacity they have full service. The other companies was the sort of easy way to get started with the infrastructure.

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As a service business for Amazon, you can buy processing capacity, storage capacity and also communication capacity. Those are the basic factors. Storage capacity is not that extensive in that market. What you typically purchase or emphasizes the computing capacity that is used when you have a specific need for a short term of unusual or daily extensive load, and used for that purpose in a typical server room of a Australian Commonwealth Bank, they had the server capacity something like 7 or 8% in use.

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The rate of utilization of the server captured in the database service was less than 10%. When they used internal cloud, they were able to utilize the server capacity up to 70%, which means the number of physical hardware was limited to one tenth. The number of Oracle licenses they purchased for of running the database service was dropped down to one tenth, and so forth.

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There are potentially huge benefits to using cloud technologies also inside companies in the so-called private cloud, not only the public cloud go to half of the cloud business is purchasing software and hardware specialized for internal clouds of larger companies. What do you see as potential or real drawbacks of the cloud model? The main concerns that companies and individuals have in using cloud services are security, privacy, availability of data.

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Ability to integrate applications. If you cannot trust the provider with the services, you have problems. When the service is not available. If your connection is war, if your service provider is not able to maintain the consistent consistency of the data and so forth, you will run into problems. If the provider has the data stored in location outside Finland, you may have problems if you maintain health related information because that needs to be stored within Finland.

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If you operate a telecom network, the data has to be stored within Finland, so forth. And further, if you wish, not the NSA or other external, authorized or non authorized parties to access your data, then you might be considered on having the data outside Finland. Also, there are different concerns related to the different companies, SMEs who typically are worried about finding and the salary money for the employees for the next three months are not that concerned about the data potentially being being lost after six months or 12 months.

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But larger organizations are reluctant to give the data outside the borders of the company and the in-house data storage. There has been some speculation about a new spring for Finnish and European cloud businesses, based upon the revelations of a foreign agency being very intimately to some cloud data in the US. How do you see this? There has been some indication from the market that, at least in short term, the interest to use national service providers has been increasing in Finland but also in different European countries.

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And that is, I believe, a slightly increasing trend. There's also some concern about the different software used in the cloud data warehouses. There is a strong tendency towards using open source software in the infrastructure for cloud services, in order to be able to detect any backdoors and other security issues before sites have been utilized. The server software is going towards open source software for two reasons for security and also for zero license costs.

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I think that's the key. And the infrastructure like the open source. Can you and if so, how can you make money with open source software setting open source software is a sort of pretty limited segment. If you wish to sell open source software, you need to use the licensing. That means that you develop the software in-house and media two version one is proprietary version, another is a open source version.

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If you then do projects for customers, bespoke and projects, they wish to have this proprietary version and are willing to pay for it. You look at it for example, it's using this kind of model, MySQL. Also, many of the open source space developing organizations or capstone organizations on on the community developing should an open source are using this model.

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But typically, if you wish to use open source, you wish to use license models that enable to do some business with the open source and one way to do the business is to provide services based on open source, because in some of the licensed models, you are allowed to develop one on top of open source without releasing the extensions you have made for it.

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If you are providing services on top of it. The other way is that you simply separate the open source part and then do other development that is interfacing with the open source and make your business with that. The usual model is to do consultants, bespoke software or different customers to add extensions needed or the specific needs they have.

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Would it be correct to say that open source software is more important as components and parts of services than a business model of its own? Correct. So it's a component of cloud services, and it can be used as a part of other activity, but you cannot charge for making the copies. That's the core of traditional product business. So you kind of do that of open source.

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How do you see the future of software business? Is it going to be growing, or will people be willing to spend less and less money on software? Will it be commoditized? Some estimates from years back stated that in Europe, 60 or even 70% of software development effort was made by companies not in the software business. For example, companies developing telecom devices, mobile phones, elevators, control systems and others.

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I think that activity will be playing a major role also in the future. Another trend is these software based services providing services that you operate yourself or use a third party, or the operations there therefore is not selling the software rather than a service or even a business process on top of the service. Purchasing doesn't focus on the software rather than the value that the customer wants.

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That is not software. Nobody wants to own software. They just want to have some value that is created by software, and whether that's a service or whether that's a device doing something useful for you, or whether it's capacity of something, depends on your need. But the software is typically embedded into the ecosystem, selling some kind of service for the customer.

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The separation of software business from other business has been very difficult and will be very difficult. The thing that the customer base for is not necessarily software, but the buyer has in the past been and in the future will in many cases will be another business needing software to provide services for their customers. Finding the businesses or companies that want to use software is key also in the future, but in the future also, individual persons will utilize software mainly in the form of services like the cloud services or accounting services or whatsoever services that they purchase.

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And you will sell software as a service for the customer. Although you will walk ratings of their products operated on your server, for example delivery mode and channel. How to market the software are in a continuous flux, and for that reason it has been and will be difficult to define what software, business and software markets. Exactly. what about the future?

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In Finland, there have been some major changes in the Finnish corporate landscape recently. We have a sale of Nokia and we have also in the telecom segment, we see big layoffs both in the network side. And what does this mean for Finland? At the moment we are living in an interesting time because there is no one single dominate market or market segment.

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The competence of the person who used to be working for the mobile phone business is available for the market. There has been lots of activity, lots of creation of new ideas, innovation, lots of start ups coming up and finding new areas where to target different. I see to at least three different main trends that are going on. One is that with Rovio and others, the game segment is going strong and the number of strong game companies is increasing.

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The investment to finish game industry has been increasing, and if you look at the most loaded apps in different app stores, you notice that there's lots of Finnish names on those based on the games. That's an important area of gamification. Serious gaming I do. Applying the gaming ideas to different targets has been one of the key areas in other is this rise of new software companies, based on the ideas and the competencies of the persons coming from the Nokia mobile business segment.

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Added. On the other is that Finland has been known for engineering capacity, which means software creation for different purposes. The engineering capacity of software domain is strong in Finland and that's also visible and that is attracting different companies. Welcome to the business Nokia mobile business sales to Microsoft. That's bringing Microsoft here. That's bringing new infrastructure capacity here and so on.

00;31;00;02 - 00;31;22;28

The going will be a sort of extending set of companies having their offices here, which means lots of new ideas from different companies and lots of small companies having vertical exchange from other companies. And that's that's very encouraging. There are lots of opportunities for the business in Finland also in the future. Yes. And now the future of the software industry looks much better than 3 or 5 years ago now.

00;31;22;28 - 00;31;41;03

Now it's going strong. If I want to start a software business, what should I worry about first? You shouldn't worry about so much about worrying with a colleague from Aalto University. You see how we were discussing about the potential pitfalls for a software company, and he had a listing of 600 or more areas that make for a software company to fail.

00;31;41;05 - 00;32;05;26

When they looked at successful software companies, they noticed that many of those had problems in multiple areas that were considered critical for software companies, but they were still alive and kicking and growing fast. So it's important to notice that you may not focus on your shortcomings rather than your strengths. So that's the first thing. If you know how to generate value for some individuals or companies and you are able to execute it, then then just do it earlier.

00;32;05;26 - 00;32;25;13

The funding used to be a problem, but nowadays the threshold, the funds needed for setting up activities is pretty low. So the funding is no longer that critical factor anymore. So the most critical factor have something that provides value, be able to execute it. And don't worry. Yes, I think that's a very good point at which to end this podcast.

00;32;25;13 - 00;32;34;19

Thank you very much for your valuable insights and your time. Thank you.