**Key Message:**

Today technology is growing at unprecedented rates. The Moore Law, which predicted the cost per calculation of computers is now being challenged by the pace of innovation. These has several implications in our life. An economic growth is expected from the efficiency of computers, and second, technologies will be even more embedded in our daily lives. For example, the IoT technology could transform the way we do things a home, we don't have to make a list of what is missing, our house will make the grocery list and even buy for us or as we will discuss further today, they way we have been using money will change. Countries as Sweden are already transforming into cashless society, I live in Malmö and here you can't use notes or coin to pay for something as basic as a bus ticket.

This technological embeddedness is coming, but us citizens, users, and consumers have we ever stopped and reflect on the values this technologies embed? What are we accepting every time we use Bitcoin? what are the implications of being cashless?

In order to achieve or even make progress towards Agenda 2030, we must discuss our societal and economic systems, including currencies. Our society is built on our existing financial systems, with their own inherent value and belief systems. But, which values are they upholding? Do these values prioritise environmental or social sustainable? Happiness? Well this is what I would like to invite you to think with me today.

## BLOCK THREE: Introducing Concepts for the Episode

**Sofie**: Once again, thanks to Kristina for joining us on the podcast. If you want to learn more about the graduate school, visit their website. You can find it at sustainability.lu.se. There, you have access to their blog, operated by the PhD students part of the graduate school. While there, learn more about the ongoing work at Lund University on sustainability.

**Steven:** The graduate school is seen as a facilitator among Lund University staff, students, and external parties who wish to advance Agenda 2030. They invite anyone at Lund University, in Sweden, or abroad to get in touch. Because, as we often say on the podcast, collaboration across disciplines and sectors is the only way to advance sustainable solutions.

**Sofie**: But, we wish to say a little more about Agenda 2030. The term may be more or less familiar to you, flying around in the social debate, at your workplace, or around your dinner table. Agenda 2030 is the United Nations' blueprint to achieve a better and more sustainable future for all by the year 2030. The full name of the Agenda is Transforming Our World: The 2030 Agenda for Sustainable Development, it was adopted in September 2015 by 193 UN member states, and comes with 17 Sustainable Development Goals, the SDGs, which we mention quite often here in the podcast.

**Steven**: The former UN Secretary-General Mr. Ban Ki-moo's described the Agenda 2030 as "*a roadmap to ending global poverty, building a life of dignity for all and leaving no one behind".* And, also, "*a clarion call to work in partnership and intensify efforts to share prosperity, empower people's livelihoods, ensure peace and heal our planet for the benefit of this and future generations,"*. The 17 Goals focus on a range of systems which are crucial for supporting sustainable development, including action for climate, for clean energy, clean water, for peace and justice, and against poverty and famine.

**Sofie**: To continue discussing these systems and their underlying values, we focus on Goal Number 8, decent work and economic growth, and its impacts and implications for sustainable and just development.

**Steven**: The goal aspires to promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all. Of course, this sounds admirable. However, some have argued that the explicit target of 7% economic growth annually in less-developed countries promotes unsustainable resource use incompatible with the other goals part of Agenda 2030.

**Sofie**: We typically measure economic growth using GDP - or gross domestic product. This is a monetary measure of the market value of all the final goods and services produced in a specific time period, typically over the course of a year. It does not distinguish between good or bad growth. So, for example, goods and services associated with horrible things are included in our calculation of economic growth. This includes rebuilding after natural disasters or extreme weather in addition to healthcare services during the coronavirus pandemic.

**Steven**: One area where we are seeing some good news in relation to Goal #8 - access to finance is on the rise globally. This is largely because of the growing use of technology. So, for example, from 2010 to 2017, the number of ATMs grew by close to 50 per cent globally, and from 2.3 to 5.8 in the least developed countries. And, more people have access to digital banking solutions.

**Sofie**: This is where we want to turn our discussion next. With more people gaining access to finance and banking solutions, more are able to participate in our current economic system. But, are these systems - as they are currently - compatible with Agenda 2030? Now, we sit down with Juan Ocampo to discuss his research on digital financial inclusion and the role of complementary currencies to incentivise more sustainable economic transactions.

**BLOCK FOUR: Introducing Juan**

Steven: Hi Juan! Thanks for joining us on today's episode. Why don't you introduce yourself to our listeners.

Juan: Hi. I am a PhD student in the Agenda 2030 Graduate School at LU, I am based in the Economic Department and the Entrepreneurship Center. Specifically, my research is focusing on alternative financial inclusion mechanisms, with an special focus on Complementary Currencies. I am an Engineer, with a Social Science master degree in Organisational Innovation and have worked as a governance consultant for the World Bank, advisor for the Public Sector in my home country Colombia, and have practical experience in technology projects implementation and sensemaking in both large and small organisations. This interdisciplinary background allows me to have an holistic perspective into my current research.

Sofie: How did you get interested in this?

There are two main reasons I got interested in complementary currencies. The first the inequality of my country. It was frustrating to see how different were people valued based on their economic, education and social background, even though in most of the cases this was out of peoples control. I was constantly unsettled by these tensions, and still are, so I am constantly looking for different alternatives in which people's lives could be enhanced. Later I found CC through the movie "Tomorrow", which is a documentary that highlights solutions to complex problems. The point is that this movie showed the potential that alternative economic systems could have in the social transformation I was looking for. if you haven't seen it, and you are interested in looking at solutions to some of the most relevant problems in regard to sustainability it might be worth checking it out.

After watching Tomorrow, I spend the next couple of weeks trying to understand how these "Complementary Currencies" worked. I have to admit that until that moment I have never reflected on money and this movie was challenging my beliefs and understandings of what money was or could be.

Steven: Always keen on a good movie suggestion. But, you mentioned a second reason for your interest in CCs?

Yeah, When thinking in monetary systems, there are several topics that need to be discussed. Governance, Markets, Legitimacy, Trust, Reliability and the list keeps going. This was the second reason for my interest in Complementary Currencies: the complexity of monetary systems. And then the equation gets even more complex, with the increase of technology development, globalisation, and interconnected systems

We should also remember that talking about monetary systems would take many podcasts, and perhaps goes beyond the thematic scope of this podcast. We could talk about

economic, social, philosophical, political layers, but today I thought we could focus on the embedded values of money.

Have you ever thought about how our monetary system works?..... well today most of the money we use is based on the assumption of a constant economic growth, and reserve banking and credit is the way of achieving this.

Steven: Why might this be a problem? That our underlying economic systems are built on constant economic growth?

Well, unlimited economic growth on a planet with finite resources can be problematic, but it's hard to tell how this will turn out. I am positive and I hope we will find our ways to handle it. Some talk about Degrowth, but we have to remember that globally not everybody has achieved a basic, or even bearable, life standard, so we have to look for ways that allows developing countries to grow, but under sustainable frameworks.

he current economic financial systems also have challenges related to justice and inequality. Think about this… if you wanted to start or develop a business, where would you go for some seed capital? Well probably many of us would have to go to a bank for a loan.. but what happens if you don't have a credit record? or you have  just graduated and don't have collateral? well banks are are for-profit and they need to assure their investors returns. So probably you will not get a loan, or if you do you would have to pay a high interest rate. This is just how the "game" works..

And this could get worse. Many of us listening to this podcast might certainly know or have been in a bank and can somehow access some of those financial instruments like saving accounts, loans.

But there are places in the world where there are no banks, and the opportunities for people getting access to these financial instruments are even worse….this increases inequality which I believe is quite problematic.

And, when looking at such inequalities, for example, it is also clear that monetary systems built on growth are not really in line with the Sustainable development goals.

Steven: Right, and you are doing your PhD as part of the Agenda 2030 Graduate School here at Lund, how do you see your PhD contributing to advancing the sustainable development goals?

Well the tension between economic growth, sustainability and my interest in monetary theory is what motivated me to embrace the opportunity that the Agenda 2030 Graduate School offered.

Financial Inclusion is an important component of the sustainable development goals. An example of this is how in several goals an indicator of accomplishment is based on the number of accounts and loans people have. The World Bank has defined financial inclusion

as “individuals and businesses having access to useful and affordable financial products and services that meet their needs – transactions, payments, savings, credit and insurance – delivered in a responsible and sustainable way. In consequence, governments, banks, multilaterals and the private sectors are discussing how to develop “financial inclusion” mechanisms/products to allow people to access the financial system.

And very important to our case [of what], organisations are leveraging technology to tackle the challenges that financial inclusion generates. With the emergence of Blockchain - the digital structure that is now widely used for for example the cryptocurrencyBitcoin), the monetary and financial world was certainly shocked (some would even say disrupted).

Steven: Yeah, and maybe here we just clarify that a cryptocurreny is a digital asset, that in many ways is used just like ordinary money, but is not physical.

Juan: Yes, exactly. And before the creation of Bitcoin, society trusted its transactions and monetary endeavours to banks. But what Blockchain allowed was for a world in which trust could be decentralized and a new way of thinking about money could be developed. Since 2008 Cryptocurrencies have been emerging around the world. The market intelligence company Statista calculated that by 2019 the Cryptomarket has a value of 250 Billion dollars bringing the attention of regulators around the world. This demonstrates the legitimacy this technology is acquiring and is one of the reasons nowadays some argue that Blockchain may be a technological opportunity for supporting Financial Inclusion.

Another trend that we see is that the world is moving into a cashless society where the use of digital money is growing. For example, here in Sweden the Central Bank has estimated that by 2010, 40% of all transactions were made with cash. Can you guess what the number was in 2018? (Pause 2 sec) 13%! Less than half!

This has made the Swedish government develop a project called the e-krona in which they are researching and discussing how to develop a digital currency and reflecting on its impact on the swedish economy. In the United States the case is different, where cash is mostly still king . Another example is Kenya, which has been at the front of mobile money development, and where transactions made through digital applications grew from 1% in 2016 to 10% by 2017.Even companies like Facebook are interested in this topic, as they areinvesting time and economic resources in creating its own cryptocurrency called Libra. However, it is still to be seen if this will be accepted by the world economic and political forces.

But, again talking about supporting the SDGs, we need to talk about Digital Financial Inclusion and making sure that people worldwide have the same access to these different technologies.

**Digital financial inclusion, has a potential impact on the SDGs. according todifferent UN agencies such as UNCDF and** The UN Secretary-General’s Special Advocate for Inclusive Finance for Development has been studying the Digital financial inclusion can have in the SDG. In the report pathways to a better life, the UNCDF has identified 5 cases in which digital financial inclusion can have an effect in the SDG.

- MANAGE Stretch money during the short-term (<2 months)
- PROTECT Retain a sum of money; have the opportunity to receive a usefully large lump sum
- PAY Make bill payments, send money to another person, make a purchase
- INFORM Check a balance, access customer support to help use this instrument to oversee finances
- GET Receive a payment (i.e. salary, remittance, government payment, insurance payout)
- GROW Increase assets by having the capability to save up or pay down

And this technological development has also impacted the Sustainable Development, specifically in the Digital Financial Inclusion agenda.

There are several examples of how Digital Financial Inclusion is being done in practice. One example is services that provide micro loans to people through a smartphone app. Such loans may range from $10 to $500", and decisions on loan applications are made through algorithms, and as such not made by humans per se. This, in itself, comes with some ethical consideratios since these algorithms will draw data from your phone to inform the decision!

Anyway, at a first glance, this may seem amazing: a way to support people getting loans and achieving their dreams. This is what Financial Inclusion is about, isn't it? Well,as with many things in life, this has a dark side as well, as reports by for example Zeke Faux shows how people become locked in a debt loop in which they are borrowing more and more to pay the interest rates, and with little regulation to protect them. This is definitely not the type of inclusion we should promote if we really want people to thrive.

I think this example demonstrates that Financial Inclusion mechanisms have sometimes detrimental impacts in the developing world; they promote an embededness of technologies in our lives, and and it also makes me reflect onon the values and behaviour that these technologies are using tobase their  decisions on.

Steven:  Yeah, these are some critical concerns you are raising here.. So where do Complementary Currencies relate to Digital Financial Inclusion?

Well, maybe a brief word about what CC are. Complementary Currencies are used as complementary tokens to the National Currency.
Complementary currencies can be seen as a mechanism to improve and promote financial inclusion, since they offer communities the possibility to create their own "money" in a decentralized and autonomous way. This allows them to access liquidity in moments of scarcity of national currencies and promote community transactions that could empower their local economic growth. At the same time avoiding debt loops that endangers their economic development.

CC have been used for many years; there are documented examples from the 1930s in Europe, with hundreds more sprouting around the world (e.g. Portugal, USA, Asia, LAC, Africa)!  The flexibility of CC enables the promotion of different types of practices of values beyond profit, for example, community development, trust creation, and collaboration, etc.

But,there is still a lack of general understanding on how these CC are governed and how we can create accountability mechanisms for these economic instruments.

Sofie: Okay, and since we are talking about digital financial inclusion, How do you see the role of technology in facilitating CCs?

You can find CC in paper, digital databases or as is some cases where a level of transparency and accountability is needed, in the Blockchain.

I believe that we are in a very interesting point in our society, since:

- technologies are empowering communities to create their own complementary tokens, that increase transparency, decreases transaction costs, and allows us to think about financial services beyond the traditional banking system.
- Citizens are now more aware of digital money which gives legitimacy and credibility to the extent that now governments and private companies are researching ways of making sense of this trends

But we need to get a deeper discussion in regard to the technology. We have to start questioning the values and ideologies that lay behind these technologies. I am not sure that poverty is going to be solved merely with just giving poor people access to “electronic loans” or by easing the process of credit score ranking of traditional banks by allowing banks to trace and analyze people's transaction patterns.

This said, I believe that is the citizens’ right (and responsibility) to start thinking about the values that this new financial mechanisms embed.

Steven: Ok. That is a big idea. What do you mean about values that are embedded in financial systems?

This is a great question. Let's build on the example of the Loans and Credit Scores.

As some of you should know, every time you apply for a credit you are being evaluated based on several paraments, these could change in every country but usually variables as wage, properties, age, working status, or your banking history are assessed in order to approve or disapprove your credit. Or in the case I just mentioned, data from your phone concerning for example the web pages you visit, the apps you buy or you Facebook network are now being used.

Basically, what the organisations providing the loans do is that they evaluate some variables based on a risk-parameters and based on the results of this calculation you will or will not get your Loan.

So, basically, those that provide financial loans commonly consider your. economic status, your spending behaviour, your credit history or your social references. these are variables that are relevant for banks or Insurance companies who are interested in economic return

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But, let's ask ourselves: , what would happen if we started valuing other things, perhaps more sustainable values? For example, what if you could get loans (or even tax exemptions) based on your Co2 emission impact which can now be calculated based on your credit card consumption, or based on the time you spend in voluntary associations that are accredited as sustainable? In this hypothetical scenario the value is not in how much you can pay, but is about the impact we as citizens are having in the world.

Here the variables we want to measure, the data we need to gather and the algorithm that needs to be developed must be thought from a different perspective

Sofie: OK. We see how a value system can impact our financial systems. But, how are these values embedded into complementary currencies, if at all?

Well let's look at 2 "extreme" examples of communities that have developed their own currencies and the different values they embrace and the implications they might have. We've already mentioned Bitcoin, and it is the most….

- It is the most famous currency, and lets says the lead token in the crypto market.
- It has a market cap of almost 100 Billion. However, its value is is not based in any specific real asset;
- Cambridge University estimated in 2017 that Bitcoin energy consumption was greater than Switzerland's energy consumption (yes the country consumption).
- The creation of Bitcoin is based on competition, so whoever has the better hardware, has more power and this translates into more money that you earn, whcih you can invest in new hardware to get more Bitcoins, thus there is an incentive of investing more money in equipment, which means that the people with better access to resources will probably earn more Bitcoins. Therefore, inequality is being reinforced.
- There is no centralized governance who is accountable for the development of the token

Then we have FairCoin:

- "FairCoin is the means of exchange used by several confederated collectives. Our aim is to create an innovative glocal economic system from the bottom up in favor of an alternative and post-capitalist model, paving the way for a collective change towards a life based on values in common.

- Cooperation, ethics, solidarity and transparency are key factors to create a value exchange system for everyone. The development and use of powerful interconnected global digital tools and regional hubs are crucial for our success".
- Even Though they are based in the same technology as Bitcoin (Blockchain) they use different protocols to validate the transactions, in this case they work through consensus and not competition. What these means in practical sense is that the energy consumption is much lower that Bitcoin, more transparent since it the cooperative knows who is validating the transactions and the validators get paid a fee for the energy consumption of enabling the system to operate.
- The governance is, in principle, more democratic but as more people get involved the challenges of aligning and coordinating actions becomes an issue to consider
- If you want to learn more about FairCoin and the organisation behind it, I just published a teaching case about it and it's available for free in The Case Center webpage.

Behind these two currencies there are values operating at different levels:

1. Economic: Competition vs Cooperation: And this makes a great difference in regard to energy consumption and thus their impact on sustainability.
2. Market: Speculation vs Circular Economy; BitCoin, is based on price speculation and its price is based on demand for the coin, and the uses of the BitCoin are not necessarily transparent, they tend to be used for illegal or unethical online transactions. FairCoin, on the other hand,only allows you to sell in their market if your product has a social or ecological positive?? impact and they aim to develop a circular economy.
3. Governance: Faricoin has a more centralized decision making, meaning there is an implicit leader, whereas bitcoin is decentralized, developed and created by anyone.

Now, This is not a discussion about good or bad, but what I want to highlight are the several values that are behind a currency and that we might want to start reflecting upon. Governments and International Organisations (e.g. UN) are now evaluating and defining the policies that will probably rule complementary currencies, thus it is worth reflecting on the values that we want for shaping this new financial systems.

Sofie: Yeah, and in discussions with you, Juan, we have learned that there are many other examples of complementary currencies as well. As an example, One that caught my attention is the Art-money in Denmark, *which actually builds on people being able to make transactions with art instead of money!*

Juan: Yes, that is a good one! And The examples I gave are only two of thousands of complementary currencies that are being developed around the world. Each currency has different objectives, stakeholders and ideologies behind.

Sofie: So, what can we learn from these examples?

Yes, each of these currencies is promoting different values, some economic growth, other social impact, other civil disobedience etc. and that as a consequence shapes the type of actors that participate and the markets that evolve around those systems. This is actually what I focus on in my research: learning how Complementary Currencies, as Social Constructions are embedding different values and how their technological platforms operationalize these values.

Steven: Okay, so let's bring all these insights back to supporting sustainable development: How does all of this relate to the SDGs?

This is very relevant! if you look at the SDGs at least 4 of them have financial inclusion embedded in their targets. For example SDG 8 has financial inclusion even as one of its indicators (# of ATM's per habitants). But what does a community that is struggling with starvation going to do with an ATM? Do you think they even have a credit card?

This is where CC is making a difference. CC allows its designer to define amongst other things: how money is created and the rules that control its distribution and circulation. There is an organisation I am collaborating with called Grassroot Economics. This NGO has been working in something called Community Inclusion Currencies (CIC) for many years now in Kenya, and what they are now implementing is CC based on the blockchain and uses a mathematical formula that allows for exchange amongst different tokens. It's an organisation definitely worth looking at.

I was doing fieldwork last year in Kenya for 2 weeks and I was able to see how these CIC were being used by small saving groups, to save money, give loans, and even help people that were in need.This CIC, is a great alternative to getting high interests loans and promote collaboration, cooperation and real economy, which are values more aligned to the African Culture and perhaps a more holistic approach to Sustainable Financial Inclusion. However, these CICs are not perfect and they are still in the process of development so it's exciting to follow their process.

Sofie: This is really interesting. And now I'm curious about your work! As a researcher in the AGenda 2030 graduate school here at LU, how does this relate to your research? What are you working on now?

Today technology is growing at unprecedented rates. The Moore Law, which predicted the cost per calculation of computers is now being challenged by the pace of innovation. These have several implications in our life. Economic growth is expected from the efficiency of computers, and second, technologies will be even more embedded in our daily lives.

This technological embeddedness is coming, but us citizens, users, and consumers have we ever stopped and reflected on the values this technologies embed? What are we accepting every time we use our mobile phone instead of cash? What are the implications of being cashless?

In order to achieve or even make progress towards Agenda 2030, we must discuss our societal and economic systems, including currencies. Our society is built on our existing financial systems, with their own inherent value and belief systems. But, which values are they upholding? Do these values prioritise environmental or social sustainability? Happiness? Well this is what I would like to invite you to think about with me today. Moreover, we can't forget that every culture has its different modes of exchange which are based on economic, cultural, moral or philosophical principles.

At the moment this is what I am researching about. How there in a market are different modes of exchange, and how these different approaches have impacts on the overall welfare of the community. To do these I am building a computational model that uses the same exchanges protocols that are being used in the Grassroot Economic CIC, and creating decision making rules based on economic theories. The objective of this model is to understand the effect of having different economic personalities in a market and the impact that modifying the currency creation parameters have in the behavior of the system.

This is relevant for financial inclusion since it will allow us to simulate different scenarios for digital financial inclusion, and evaluate the possible effects the technologies have in the welfare of a community. But this is just the start, since my objective is to get a more in depth understanding into how the stakeholder (communities, NGO, scholars, development agencies) affect and are being affected by the technology development. So really looking forward to what the future will bring.

Some interesting links:

https://www.grassrootseconomics.org/

http://artmoney.org/

https://juanocampo.weebly.com/research.html

https://www.bloomberg.com/news/features/2020-02-12/tech-startups-are-flooding-kenya-with-apps-offering-high-interest-loans

https://www.riksbank.se/en-gb/payments--cash/e-krona/