

Building blocks for the future

TALKS FROM BIN@PORTO 2021

SOCIETY · CIRCULARITY · HEALTH AND WELL-BEING

Building blocks for the future

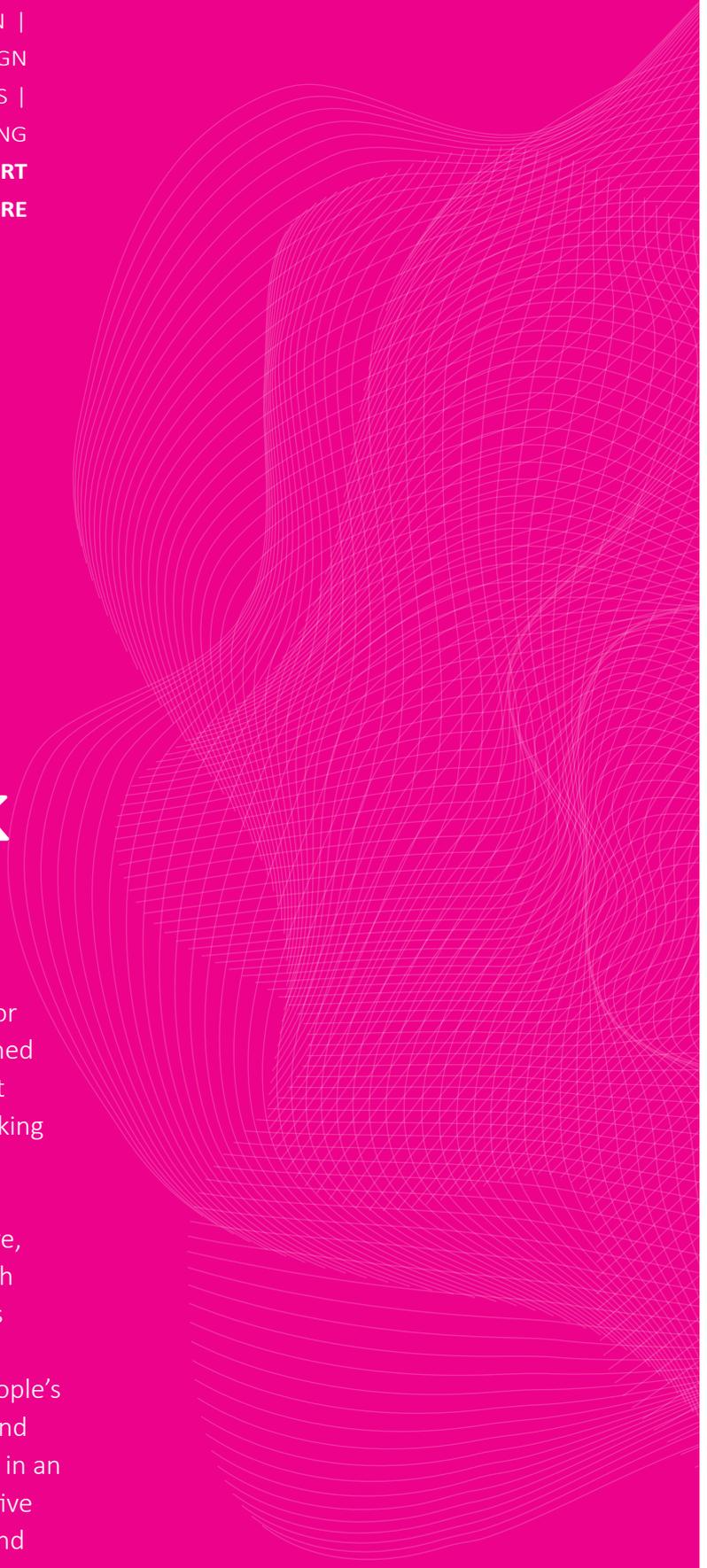
TALKS FROM BIN@PORTO 2021

SOCIETY · CIRCULARITY · HEALTH AND WELL-BEING

STRATEGIC DESIGN | ORGANIZATIONAL
ALIGNMENT | IDEATION | PRODUCT DESIGN |
INDUSTRIAL DESIGN | UX/UI | SERVICE DESIGN
| MECHANICAL ENGINEERING | FEA ANALYSIS |
PROTOTYPING | DESIGN FOR MANUFACTURING
**HEALTH | MOBILITY | SMART HOMES | SMART
CITIES | AUTOMOTIVE | SPORTS | LEISURE**

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KNOWLEDGE TRANSFER OPPORTUNITIES |
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THE INTERNATIONALIZATION OF SMES | ENGAGE
WITH INDUSTRY | INCREASE POTENTIAL FUNDING
OPPORTUNITIES | SUPPORT REGIONAL AGENDA
| DEVELOP INTERNATIONAL PARTNERSHIPS |
SUPPORT WIDER ENTREPRENEURSHIP AGENDA

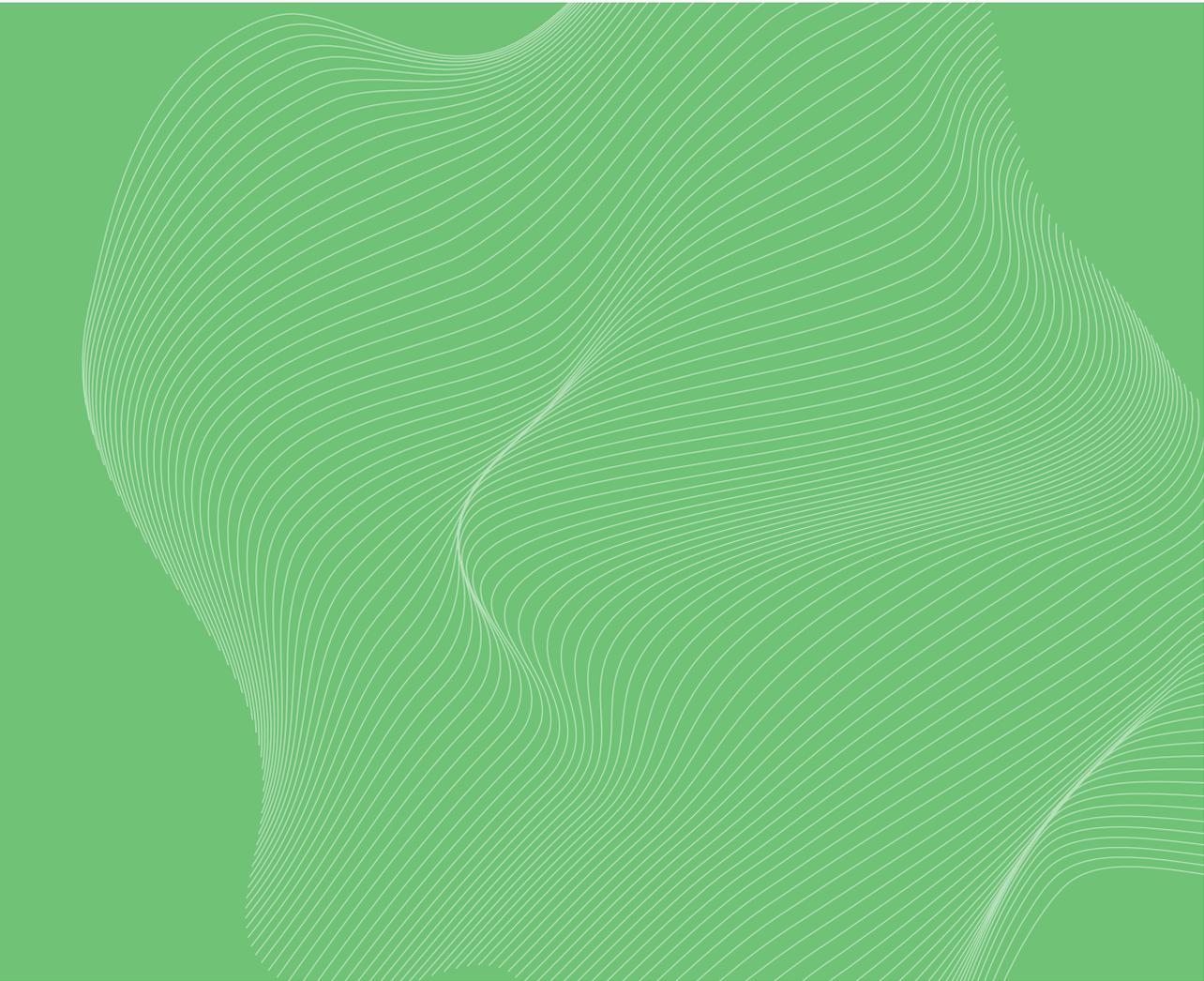


BIN@TM
BUSINESS & INNOVATION NETWORK

Open Innovation in the making!

Business and Innovation Network is an informal international network of academic and industry partners engaged in supporting the creation of a sustainable forum for sharing good practices and opportunities in innovation.

BIN@ promotes a set of activities ranging from brokerage events to soft landing opportunities for start-ups. BIN@ has currently around 4500 delegates worldwide and so far has held 15 international events in Portugal, UK, Brazil, Romania, Poland and in the Netherlands. More about our activities on the official website: www.businessandinnovation.net.



Society

17 Leonardo Ortega
Attracting and Retaining Talent

21 Robert Krimmer
Ecosystem Approach to e-Governance

29 Glenn Cezanne
Transformative Economy

Circularity

43 Violeta Bulc
Human Centric Civilisation

55 Ladeja Kosir
Circular Change

65 Beatriz Luz
Future Proof Present

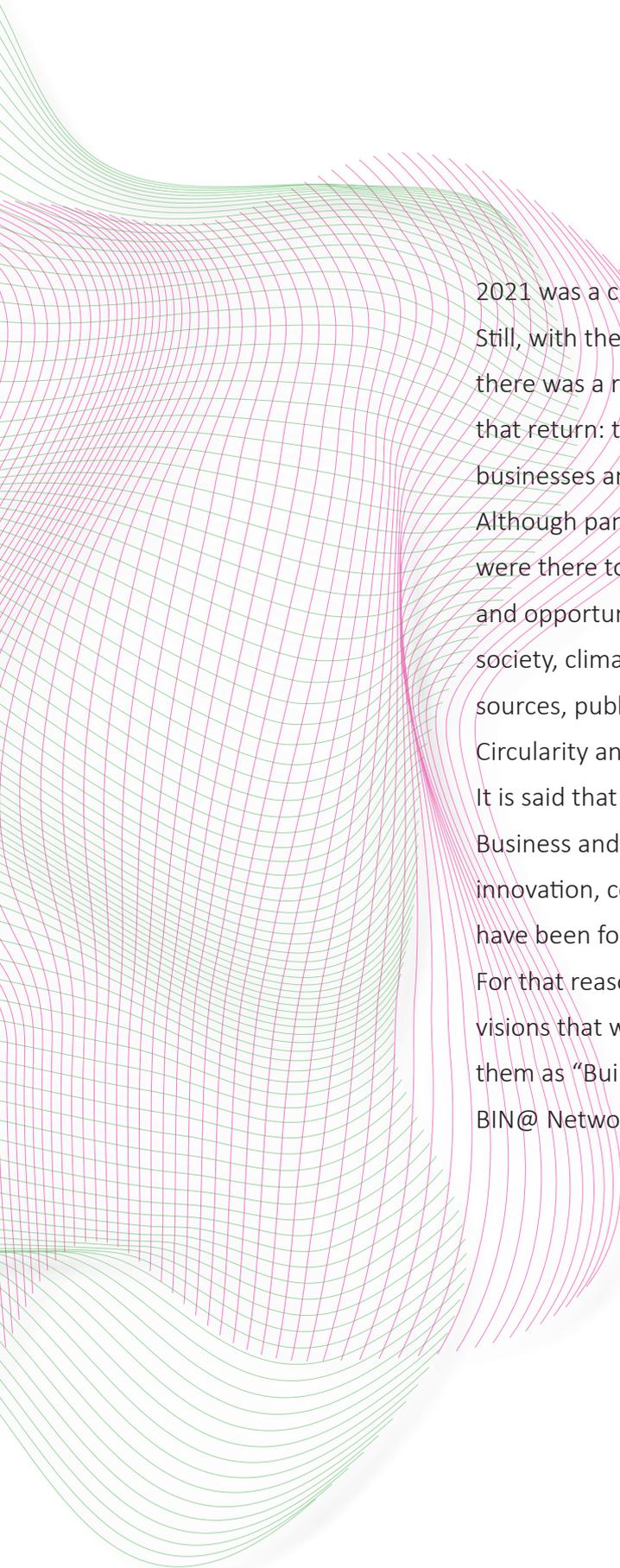
Health and Well-being

81 Terry Huang
Translating Systems Thinking into Public Health Innovations

91 João Transmontano
Healthy Ageing

103 Ana Correia de Barros
Human Centered Design for Living and Ageing with Data





2021 was a challenging year.

Still, with the recent past very present and the future urging ahead, there was a return to a new normality, and BIN@Porto2021 was part of that return: three days of debates, learnings, experiences, networking, businesses and innovation.

Although pandemics was in the order of the day, participants and guests were there to remember the reality beyond CoViD-19. Other challenges and opportunities should not be forgotten: unstoppable growth of digital society, climate changes clashing with Humanity, new resources from old sources, public health endeavours, or, in three pillars: Society, Circularity and Health & Well-Being.

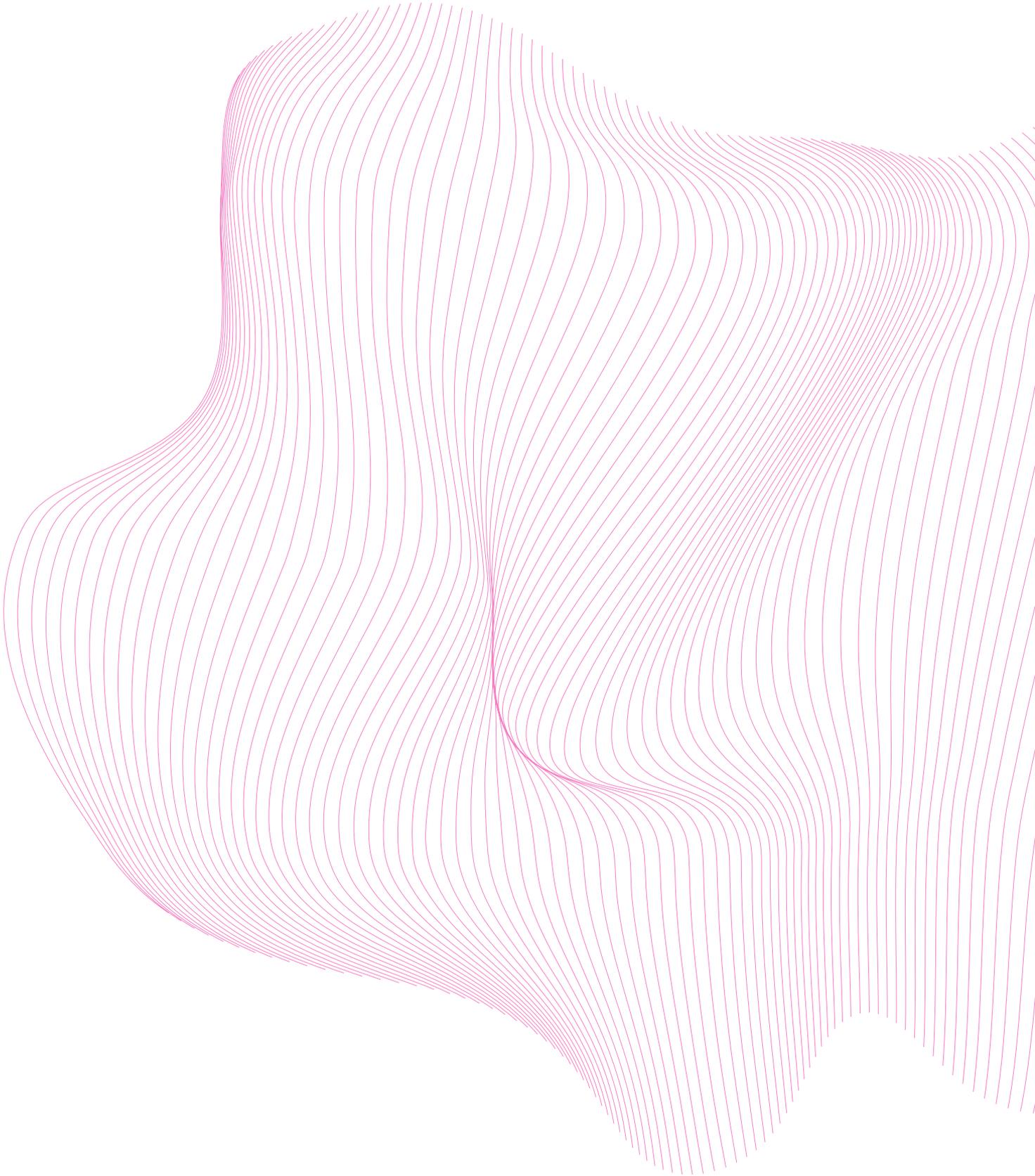
It is said that “the best way to predict the future is to create it”. We at the Business and Innovation Network believe in the creative power of open innovation, confirmed time and again in the communities of interest we have been fostering within the network over the past years.

For that reason, we have decided to evolve from the knowledge and visions that we have been discussing in our networking event, sharing them as “Building Blocks for the Future”, in a collaboration between BIN@ Network and Everythink.

Pillar 1

Society

Building
blocks for
the future





Verifiable trust is essential.

Our three invited speakers on this pillar, Leonardo Ortega, Robert Krimmer, and Glenn Cezanne, unanimously embraced an ecosystem approach towards a digital society, where responsible citizens share their talent in a transformative economy, under trustable e-Governance.

The European context regarding digitalization was one of the main topics, considering its challenge aggregating 27 States with 27 different markets, that compares with the single market all around the 52 states of the US. There is still a long way to go, to raise the relevance of people in a human centric digital construction of Europe. And Germany, considered as one of the least digitised countries in the EU, may be an inhibitor to faster this evolution.

Digital adoption should be service and content driven, based on convenience, usefulness and availability, and this mostly relies on digital education for the people. In this sense, there should be connectivity all around, including rural areas, and a strong campaign for kids, adults of tomorrow, to use digital the right way, not only spending screen time. Pensioners should also be included, because they have time to learn, to explore and to provoke demand for needs.

GDPR, simultaneously a barrier and a fantastic enabler, shows up as a massive money burner for states and companies. But, we need public regulation to ensure data exchange in a transparent way in the EU. Verifiable trust is essential.



BIN@PORTO

HUMAN-CENTERED INNOVATION



SOCIETY



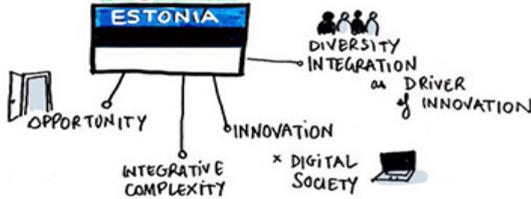
PILAR #1



Leonardo Ortega
 It's always an issue to decide who is a talent



Why choose?



★ Marketing Campaigns

★ JOINT recruitment Campaigns

★ International TECH CONFERENCES

RECEPTION

x partners
INTERNATIONAL HOUSE of ESTONIA SERVICES

REPUTATION



WHAT TALENTS WANT?

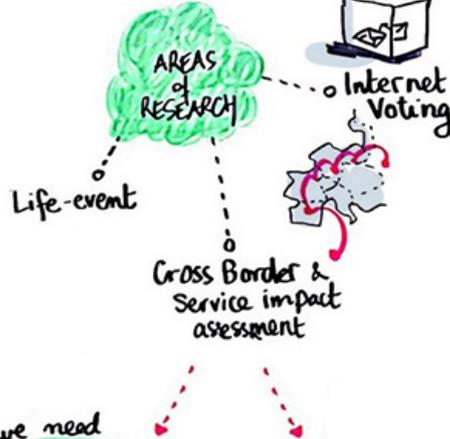
DIGITAL REVOLUTION in the PUBLIC SECTOR

it's an ambitious European Goal
Robert Krimmer

DIGITAL FUTURE SERVICES INFRASTRUCTURE

DIGITAL as a SOCIAL RIGHT

What is TRANSFERABLE



we need LEGAL regulation



DIGITAL SINGLE MARKET? Organizational & Technological COMPLEXITY

TRANSFORMATIVE ECONOMY

Innovation is not a natural behavior
we have a necessity of mindset foundation
Flaviano Celaschi

CHANGE
NATURAL SOCIAL TECHNOLOGICAL

ANTICIPATION
URGENT EMERGING ... the future is COLLECTIVE

what do we know about the FUTURE

ADVANCED DESIGN

we need a VISION but we can't PREDICT

INNOVATION is ARTIFICIAL

EUROPE capability to SET STANDARDS GLOBAL



Credits: Photo by Hans Markus Antson - Brand Estonia

Attracting and Retaining Talent

We focus on four different pillars. The first one is attracting, more on a marketing side, letting people know that Estonia is an option for professional development with a very good quality of life. The second pillar is reception, providing a soft-landing so when people come to Estonia they know they made a good choice. And for that there is an International House where personal attention is provided and they get different state services in a single place. The third pillar is integration, related with a long-term adaptation, once they have solved the basic questions of the place to live. They can perhaps learn the language,

and integrate themselves into the society, being active citizens. Then, the last part of the model is reputation. If we have done the other three parts right, then these people are happy and with a very positive experience. If they actually go back to their countries, they will recommend Estonia as a place for working and living to other ones. So that's always like a staple, because that positive reputation will in turn attract more people to Estonia. We do this process on a city basis, but also on a country wide basis. The International House of Estonia is based in the capital Tallinn, although we work for all internationals living in Estonia.



A conversation with
Leonardo Ortega, Enterprise Estonia

Leonardo Ortega, is the head of the International House of Estonia, which is part of the Work in Estonia program, hosted at Enterprise Estonia. Coming from Mexico, he arrived to study in Estonia nine years ago, then worked in a private firm and in an NGO, before serving in the public sector. This background and very wide working spectrum helps him empathize a lot with the different situations, as he tries to improve the user experience for the internationals that are coming to work and live in Estonia.

‘Coopetition’ for international talent

There is a balance for the cooperation between countries and cities, while they are in competition for the best talent. A good thing in terms of competition is that the models are not always replicable. For instance, one city might have EU money, which comes with a lot of strings. Another city may be politically very active in terms of attracting internationals. A very important factor is the specific target audience you are looking for. For example, we know that Copenhagen is receiving a lot of nurses or medical workers. In Estonia, we are more in need of ICT talents. In that sense, it's not that much a direct competition, as each of the countries is a bit more specialized on particular sectors and industries.

The European Union should have a policy across all member states in the future, one common face between regions trying to cooperate in order to attract international talent that they need to be ahead. We are already doing some cooperation with other regions. We have a network of different cities from Copenhagen to Berlin, who are also engaging and do not see us as competitors, as we have been mostly like the past few years. We see ourselves as operators and enablers of talent attraction, because the EU itself is in the look for talents of other countries and regions, from Africa to Latin America, or even the United States.

What we do at Work in Estonia is trying to bring a people strategy into the country. There are also the marketing campaigns that we have done in some



other countries. Once we did a campaign where we invited people not to specific positions, but actually to work for Estonia. Of course, behind it were several companies ready to recruit these specialists - from which the best were selected. We hope to see some sort of people strategy at the EU level, where people can move freely between the member states and work. They wouldn't be constrained to one single state with the EU Blue Card, that hasn't been a success so far.

Digital society

Six years ago, when we were trying to decide whether we should open the International House, the discussion was if it was going to be physical or digital. We thought that digital ...would be very time and resource consuming to achieve what we needed, so we decide to start with something physical, because there was a connection, there was a physical point of contact. Maybe most internationals do not trust data services, or perhaps they just want to talk to someone. So a physical point in Estonia was a positive argument, and we opened it in 2018, and it worked well. And then, with the pandemic, we had to move



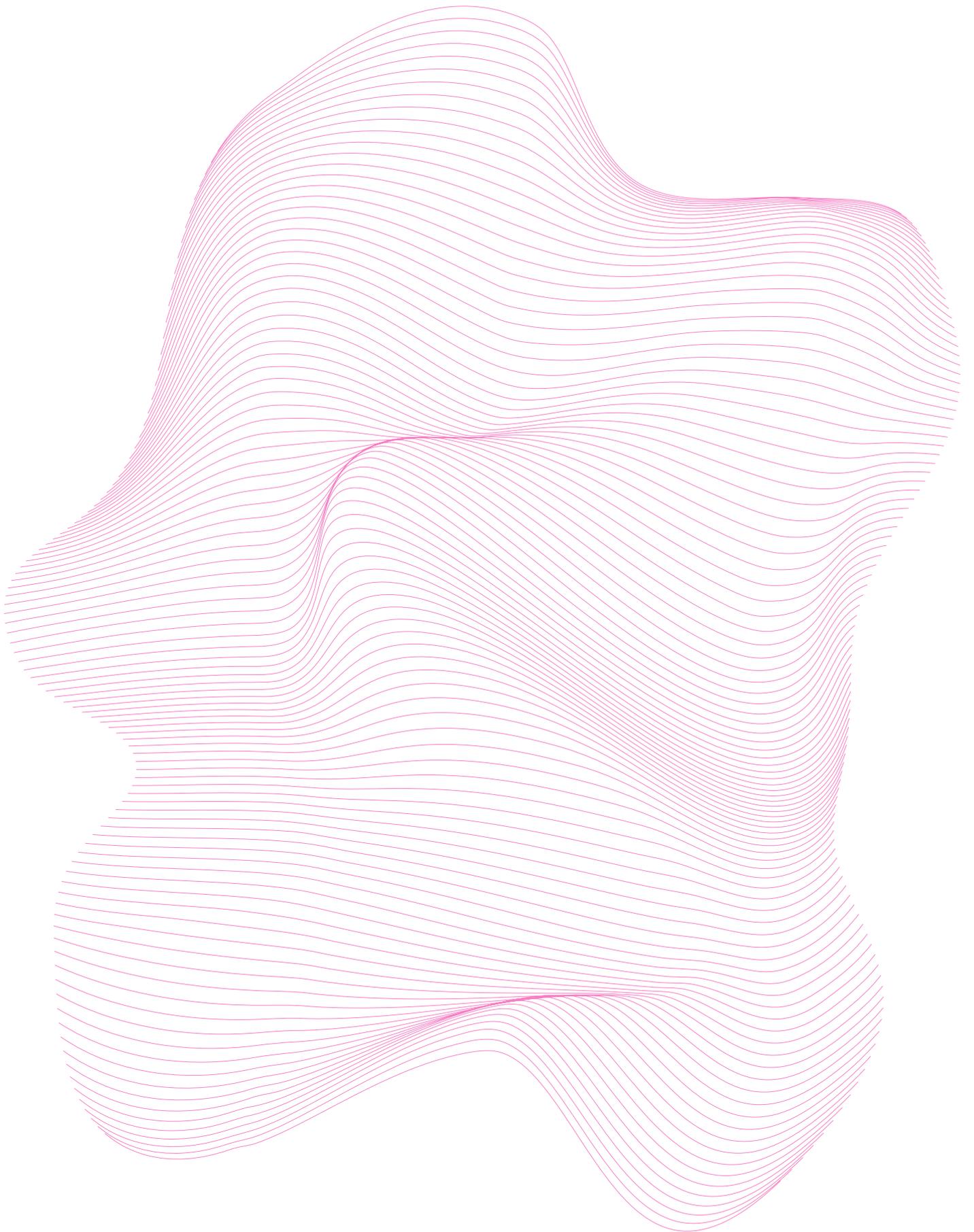
Credits: Photo by Gen Vagula - Brand Estonia

all services online and everything is now digital. We were ourselves amazed that we managed to keep all the services running. So actually, all of the consultations from the Police and Border Guard, to the government and city government area, and then all other services are still functioning online. We are seeing a lot of people asking questions about taxes, pensions and every sort of support. But they still don't have a connection, they just got work. The idea is to work and live in Estonia, because you cannot separate one from the other, you have to be integrated in the community. At the moment, we have a our services in a hybrid form, but always trying to push them a bit more to the digital side, because it's just way more efficient and easier for them to do it.

We do use digital society as one of the main arguments for internationals to come here. Since the 90s Estonia decided to put all the bets on services. The IT sector is the one that has seen the fastest growth. And that's what also makes it a perfect recipe for international students. Another argument that we use is the fact that you can grow a career much faster than in other places where there is more competition.

There are different segments of the population who are coming to Estonia. If you want a very cosmopolitan life with a lot of different places to go, then Estonia might not be comparable to Paris or Berlin. But a person that likes nature more, or that wants more time for themselves to actually have a great work and life balance, can do everything online and Estonia would suit perfectly. There is also now the possibility of a digital nomad visa, which means people working for companies not established in Estonia but want to get a taste of how it is to live in a digital society can spend some time in Estonia.. And then if you like it, going back to your country and still being connected to Estonia and getting residency, which allows you to use as a foreigner all the country's digital services, including running a company remotely in Estonia and getting to the market in the EU.

We don't want to talk just about all the positive effects, but also about the challenges. Not everyone is oriented to IT services. Building a bridge with those people coming from different countries and not that acquainted with digital services is a challenge in itself. We help them know how to use the services and make sense of the potential.



Ecosystem Approach to e-Governance

How can you turn paper based processes into a digital ecosystem? This is the reason why I ended up in Estonia, because I found this is the most receptive, the most welcoming, and also, in that sense, a time machine that allows us to see what are the effects of a society that goes heavily digital. How to achieve that and what are the impacts of the digital transformation of the public sector. By public, I mean, basically all of our environment, our information society approach, and the elements that come through that, trying to identify

success factors and hindrances.

Estonia is a case study of understanding what are the special factors that work as a pressure cooker, to let things happen, which otherwise would take longer, or which are harder to achieve for the countries, like Germany or even the US. The US is heavily digitalized in the private sector, but in the public sector, it's not in Stone Age, but it certainly takes more time. And in Estonia, basically, the corona times were not really a big challenge because things are more advanced.



A conversation with

Robert Krimmer, University of Tartu, Skytte Institute

Robert Krimmer is a Professor of Governance at the University of Tartu in Estonia.

Originally from Austria, grew up very far away from the capital, halfway between Vienna and Paris. He went to university in Vienna, with a quite digital context back in 1988 when, everywhere else, at that time, everything was done on paper, already using, for instance, video text. Through that, he got interested in these matters, not only academically but also personally, so he was always interested in digital transformation. And because of the need and interest in digital ecosystems, he is now working in Estonia to understand digital transformation of the public sector and helping to promote and implement this transformation.

My third child was born in August last year. For him, I had zero bureaucracy contact. One hour after he was born, the midwife came and brought a little wristband, which had his 11 digit code on there. Using that code, I could go online and give him his name, and get the birth certificate two days later by email encrypted. Then I got all the family benefits online, and so on. But that was possible because there was a unique identification and authentication.

Identity, Data Protection and Data Sharing

Having a personal ID issued to every citizen is really a key element. But just issuing hardware is not enough. You need to build the ecosystem, providing interesting and useful applications. In Estonia, there was the Internet voting effort, that introduced internet voting in 2005. In the beginning only 2% of the voters casted their vote online, which wasn't too much, and was almost disappointing. But of those 10,000 voters, two thirds of them were first time users of the ID card. And that was obviously an interesting enough application. We see that in other countries as well. Democracy seems to be something for which people are willing to learn technology.

But it's not what gets people to use technology. You need to have something that's useful enough that you use it daily. It should be similar to something you do every day, like requiring it for online shopping or getting your test results. In Austria, right now, whenever you get a test result, you can store it in your wallet and you use your mobile signature for that purpose. Once you have that, you basically have a ecosystem of a feedback channel. And that, in Estonia, was online banking. For the online banking to require ID cards, they introduced the transaction limit whenever you wanted to make a transaction over 400 Euros, which back in that date, 2006, 2007, was the average wage salary. This minimum wage also shows the economic development that the country has taken. But that is also another important thing, people need to know that digital is good for them. They need to have a success factor. And obviously, if the country basically doubles its GDP in something like 15 years, and it has invested heavily on digital, people will believe that digital was bringing them the increase of the GDP, but more likely, was the access to the free market and joining European Union.

**People need
to know that
digital is good
for them.**

So, success, of course, is also important, as well as positive feedback, but also for digital is, also, to have a different or more modern understanding to data protection. **Data protection is really, really important, but it cannot be in the sense of don't share information.** We need to share information, although, in a controlled, accountable and transparent manner. We need to know how is our data being used. What is it being used for, and, in case it was misused, we need to have possibilities for remedy.

With the data tracker, which is part of the citizen portal in Estonia, you can see how the data is used, by whom, and at what time. You can limit the access to your private data using the health platform where you can have this information sphere of control. You can only have it for your doctor, or you can limit your doctor from seeing that you went to another doctor to get a second opinion.

The third core element, along with identity, and data protection, is about data sharing. You need to have an enabler and data sharing platform. There was a paper by Lean and Lean in 2001, which developed the stage model, which basically consists of four stages. The first is cataloguing that we provide

information to the citizens, where they can access the different services, the second stage is offering services. Then it starts with integrating the services between different levels of administration, the so called vertical integration. Then, when you go to a practitioner, your family doctor, as well as you go to the federal hospital, they use the same data. That's called vertical integration.

And then, there is horizontal integration that is agnostic of the sector in which you're using the data so that when you, for example, apply for a driver's licence, you need to show that you're fit to drive, right, so that your doctor can provide you with the certificate you're fit for driving. And that can be accessed in the central government portal. And we need Europe to have this horizontal integration. I'm the best example. I'm a so called digital immigrant, I immigrated to Estonia, and not only had to move there physically, I also had to move my data, my birth certificate, my marriage certificate, my university diploma, and all of that happened on paper. Why? It won't be so much more trustworthy as we see now, with the COVID vaccination password, if we will do that digitally signed that we can trust. We need to have a data

exchange for Europe.

First identification, second is data protection, third is data sharing, and then as a last I will give kind of like the outlook for the single digit gateway regulation, which basically means by the end of 2023, we need to be sharing data, European wide, mandatory digitally.

Roadmap for operators for the digital age

We have the biggest motivator to maintain systems with the so-called path dependence in the public sector. You all have that symbol for path dependency in front of you. Look at your keyboard. Why are the keys assigned like that, like they are right now, that has been defined over 100 years ago, based on the mechanical typewriter so that the keys don't get hooked into each other. Why are we using the keys in the same way? Or why are we typing the same way as 100 years ago, when we had a mechanical reason, but that mechanical reason has fallen away? So there is no reason why don't we manage to change our keyboards. And that is the so-called path dependency, which basically means you're only managed to change when you have an external influence when you have a crisis. And that's exactly

what we have right now. COVID is a crisis which enables, which is a kind of pressure cooker. And the same thing is in Estonia, the crisis was when it did become independent, and it had to rethink how to organize the country. And why would we want to organize our country based on paper when we can do it digitally, and, finally, we are able to beat our neighbour, which is our role model, which was Finland at the time? Finland was the modern, the mobile country, the one that had Nokia, the brand that was dominating the world, in the 90s. And basically, for Estonia, in the 1920s, Estonia, and Finland were on par in terms of GDP. In the 90s, obviously, it was like a tenfold difference. The idea was how are we going to beat our Finnish brother. And we only manage that by copying and doing better than they did. And that was doing digital, and the crisis was the possibility to go independent. And that allowed to go forward. And, so, we need to use a good crisis now. The other thing is to build identity, built ways of ensuring that you can protect the data, and then build a transaction layer or a data exchange layer, which is this third element that we not only should do that for our nations, but also on a cross border element. That would be my three steps.

Good Examples

When the Iron Curtain fell, Austria used the opening of the East as an opportunity to do business there, and managed to transform its administration quite well, but not in the same way or not as successfully as Estonia, because for one reason that sounds really weird: there was too much money available. The best example is the Austrian Postal Service. They are basically operating on a civil servant basis. So, the person that is bringing the mail is a civil servant. That means they have a guaranteed lifetime employment.

When every year you lose 2% of your turnover, meaning there is less mail to be transported at some point you don't need that many postal delivery guys? But what are you going to do with them? They have a lifetime employment right. What they manage, they made an organization where people are paid for doing nothing, so they basically move them to another company. And in that sense, there is money in the system that needs to be spent because there are legal guarantees, but they cannot use that money for innovation.

In Estonia they never went the way for lifetime contracts. Yes, of course, there is the contract without time period, but the overall system is

much more fluid that you go to the private sector, because you can do your own start-up. I mean, we want to be the next space.

Germany has a huge GDP, with its very successful industrial sector. But, digitization is in stone age. In the 1980s, they had the chance to introduce a fibre network in the whole country. At that time, they had the Minister for telecommunications and there was a Postal Service minister. He was really in charge of the state owned Postal Service. And what he said was, 'we have a cable TV network that is not amortized, so we still have to pay off the depreciation now. So sorry, we're not going to invest into fibre because we haven't paid off our own network'. So had they done that in the 1980s, they would have a fantastic telecommunications network, but they just wasted the opportunity. So today, there's still only cable TV. And using that for internet, of course, works as well. But I mean, fibre is so much faster, so much more reliable, and so much more future proof than copper cables. And so in that sense that's just giving you so many incidents, that there needs to be several factors that need to come together.

So there needs to be an eagerness, there needs to

be an immediate return of success. And there needs to be the actual infrastructure being built. And then last, but not least, you need to have the services and the willingness, right.

In Estonia, taxation service is easy because the system is easy. Estonia has a 20% income tax. Yes, that's not very low. But it's still a very easy tax system, that all the rules for calculating your tax return can be done by a computer. You don't need to have tax advisers. Germany has a hoard of tax advisers. So that type of tax advisor job does not exist in Estonia. So people use the taxation service in a way that 25% of the population is doing the tax return in 24 hours. It's on 15th of February, the tax return opens. And on 16th of February, one fourth of the population has already filed the taxes because it only means one click. And why do they do that? Because when you do it online, you get it within two weeks, transported onto your bank account. If you do it on paper, you only get a half a year later, I will be naturally doing it online. So that's a real deal breaker. So people need to see that it brings them a benefit. So I can give you a list of success factors that I think are useful for that.

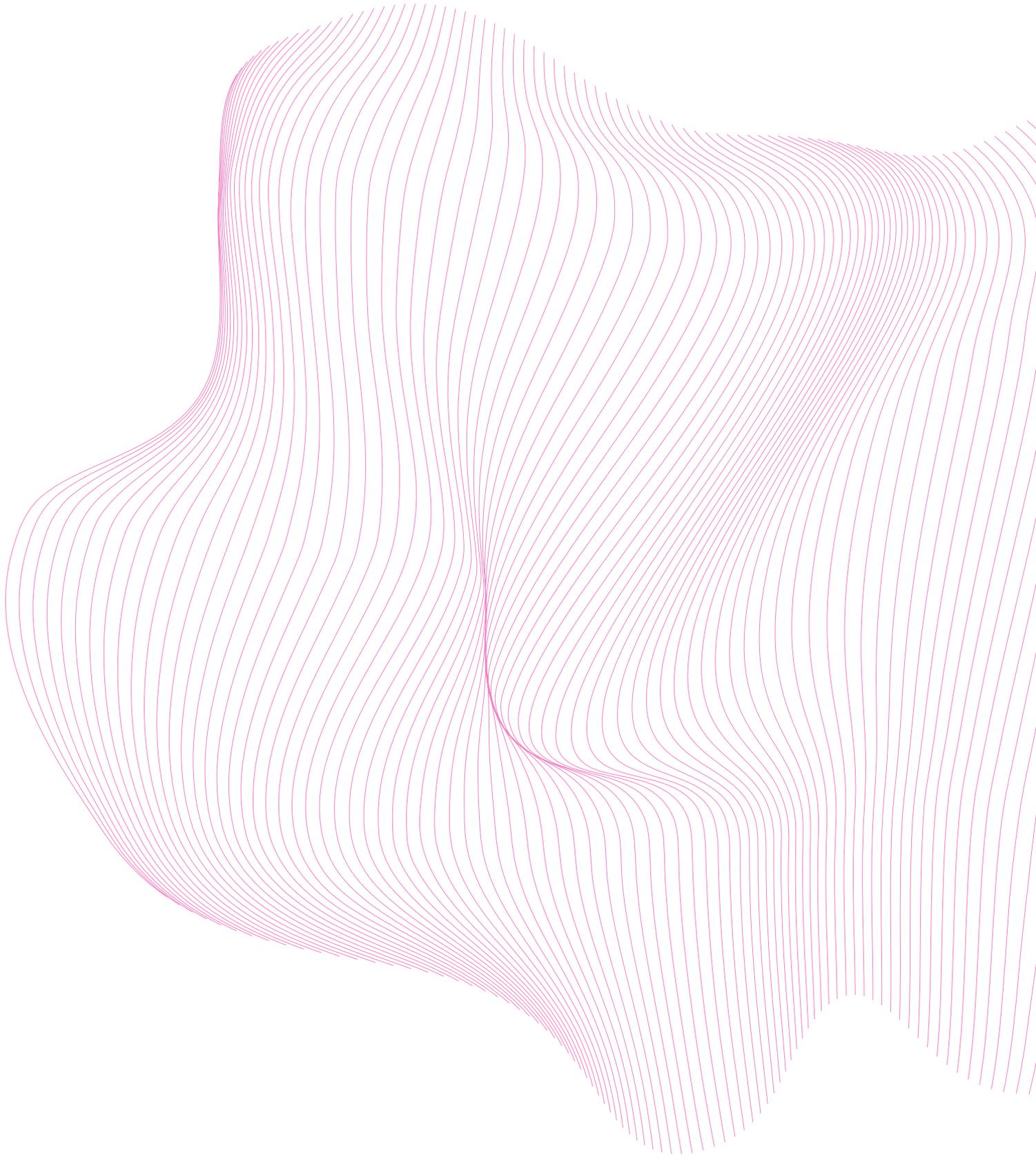
Early adopter mentality in Estonia

Early adopter it also a built mentality. I would say the innovation ecosystem that exists in Estonia is certainly different than in many other countries. And that is one of the special factors. The digital transformation is a result, and it's also a push and a pull factor. Estonians are like, oh, but we need to have the next big cool thing. What's that going to be? Oh, we're going to do Siri for e-government. So you need to be able to apply for your password using voice. Had they done that without you, with BBC, with CNN coming to the country? Likely not because there is no need for that. But it's cool. It's great. It allows you to position the country, it allows you to market the country so there is a push and a pull factor. Pull, when you're interested in the transformation, and push in a sense we need to find the next big thing to get the next news, and what is driving that it's Putin. You need to have an enemy, and the enemy unites the country bringing people together and every report in the West, every interest from the West shows one reason less that you can attack the country. All of that also, it's very special in that sense, but it also pushes the ecosystem for innovation and brings that step forward, in

comparison to other countries, but I wouldn't say that that is the only reason. Countries that are more proactive, adopting innovation and changing their business are a bit more successful in terms of economic development. For that we need to have things like the European Union, which is doing those transfer payments, which is trying to build an ecosystem for the whole continent, and tries to pull all countries together. But of course, it's not an easy development. And countries like Estonia, they also struggle. There's not much else than digital. There is basically only the forestry, the agriculture, and then there's the services industry. The industry itself, the second sector is almost missing. There are some lock houses, there is some salmon to export...

There are a couple of innovative companies, like Meiren snow ploughs, but, on a large scale, industry is something where Estonia can evolve. Service sector is really doing well nowadays, especially when it comes to things around Skype and Bolt. Bolt is the only competitor to Uber, from a 27 years old Estonian guy. He just decided he's going into logistics and they're now trying to replace the supermarket around the corner by having a pilot in Estonia. I just say it's not the only thing, but we need to try to share the knowledge. We also need to be cognizant of the context of specific factors that are really unique to different cases. And we need to separate what is context dependent and what is, actually, transferable.





Transformative Economy

The new Regulation for the deployment of alternative fuels infrastructure is a true milestone for the European Commission's Green Deal. It involves billions in investment from the EU and from the member states, and obviously, also from industry. So, there is an overall impact.

The European Union needs to remain competitive on a global market, not least when looking at all elements of the electric charging eco-system. Within this context the importance of European and global standards are often under-estimated.

e-mobility or hydrogen ?

On the policy side of things, the conscience is prevalent that both electric and hydrogen are the way forward; that the EU discourse has moved completely towards both options. Of course, there is the argument that combustible engines, depending on where the energy comes from, are not actually as bad as people think, especially because diesel engines are more efficient, and so on and so forth. First of all, though, it's evident that with hydrogen or electric mobility, we're taking the pollution out



A conversation with

Glenn Cezanne, Time & Place Consulting & CharIN e.V.

Glenn Cezanne runs his own consultancy Time & Place Consulting and, as an European Union lobbyist, influences decision making at the public affairs and public relations side of things. He is also the head of EU governmental affairs at the CharIN association, the worldwide promoter of interoperability based on the Combined Charging System (CCS) and ISO15118, as the global standards for charging battery powered electric vehicles. In parallel, he has taken a very much linked new twist, that belongs to the bigger picture. He decided to become a movie producer, building a media productions company and starting to film this year. Understanding public perception and capturing the viewers attention, that's essentially what lobbying is also about.

of the cities. And I think that has a strong health element to it. Now, when it comes to hydrogen, the amount of energy you pump into it to gain the relevant yield, is something, notably from a personal view, where clarity is needed in light of the plethora of available scientific statistics. And at the end of the day, let's be honest, studies are done with questions and very often even the conclusions already set, no matter what sector. In this case though, I have the luxury that I don't have to argue either for hydrogen or electric mobility.

Depending on infrastructural availability, the best argument seems for the moment is to still have a mix between the three (hydrogen, electricity & combustion); if necessary, just to keep mobility going. How the relevant public authorities and public funds might help with building the infrastructure will always also very much have something to do with it. But the question that will remain to be set is, regarding how much that municipality or that country would want to invest in one technology, or the other?

I think the path that we're taking right now is a good one. Indeed, when you have the facilities to charge your car, it's a whole different game. What you

need to do when you're looking at human centric capacities, is to look at the available technology to facilitate it for the population. Of course, you have to think about education, people getting more comfortable with it, focusing on the millennials and newer generations; looking towards harnessing and accommodating their opinions. But if you have somebody who was waiting in the parking lot, there are only two chargers, and he/she has to go to work the next day and can't charge the car, they're not going to go and buy an electric car; especially if the other two cars are there for the next six hours, because that's how long it can take with a lower amount of KWs per hour in terms of charging power. So, you need to look at necessity, but very often necessity isn't a sufficient driver, when it comes to new technology, because people don't necessarily know. Not everybody is "truly" aware of or concerned with the environmental and social impact of running diesel cars, because people can be much more worried of getting to work rather than taking in second-hand smoke from car fumes in the city. So, very often, people need to be introduced to the technology and its contribution to human centricity. When looking at innovation and human centricity, it

is necessary to look at three sides of the contextual square which surround human centricity – i.e., business, society, technologies and the political context. As representative of CharIN, I am working with pretty much all elements of the electric mobility ecosystem. And I am working together with other key e-mobility actors within a subgroup of the European Commission, primarily with a view of advocating for a set of standards with focus on for the communication between the vehicle and the charging station. Within this context, a main underestimated question remains. What is the cost of non-standardisation? Imagine every mobile phone company still having its own charger? It would certainly not be a very human-centric approach. In general, though, transformation related to society, politics, and business are essentially the three elements I look at. The legislative package for mobility published under the Green Deal touches upon pretty much everything when it comes to the roll out, from hydrogen to e-mobility capacities. And now, what you have is a strongly Western centric infrastructure, that you must expand to the East, to the Baltic states, Poland and so forth. So, in the bigger picture of transformation and technological implementation, it is really also about the political level, creating a balance within society, and the necessary appetite for private and public funding. For example, the proposed legislation in the alternative fuels' investment regulation states that, in the corridors, from west to east, north to south, there should be a charging station every set amount of kilometres for heavy duty vehicles. One of many necessary key elements.

The digital world

Another part of my world is a digital one. I am representing a client interested in providing open-source contributions to various EU projects. So, we're looking at Horizon projects, which can involve increasing health-care capacities, solutions for an ageing population and big data interpretation. I believe that the beauty about open source, is the true democratization and human-centricity of software. (And yes, I am also a strong advocate of cryptocurrencies.) It truly is a biological form of technology whereby most large companies are taking it on board, transforming and adapting it. Tailored solutions based on publicly available code... It comes close to what I would consider some mantras of what human-centricity should be about.

Taking a step back to look at digitalization across the EU, there is a digital (and as such arguably a societal) divide within the European Union that I would like to highlight; not necessarily a negative one as divide often implies. What might be very interesting is the discussion between the North and the South, because that's essentially where a significant form of digital divide exists. This is also

something I experienced when I was working in the gambling sector. The North was much more digitally advanced; maybe Germany less. So, when it came to gambling, a lot of citizens from southern states went outside and to the shops to bet, whereas in Nordic countries, you'd have a lot more people betting online.

All in all, though, and beyond gambling, of course, if it wasn't for the EU, I believe the digital and societal divides would be much further behind. Herein, I think a very important question to ask is often seen as a very uncomfortable one: Are we really aware enough of the technology that is changing our society; for us to understand it as a critical enough mass of the population? I mean, look at Cambridge Analytica and Facebook. Dominic Cummings' use of Facebook essentially caused Brexit, and people are still using Facebook.

So, the question is: Is it already too late for us to understand? Are we just in the flow of it, and that's it? There are plenty of things happening well – i.e., with a positive impact- , but we've suffered through a pandemic, and we've also suffered from a wave of far-right populism. Both have done a lot of damage,



Credits: Photo by André François McKenzie on Unsplash

also because attention, credibility and investment was actually taken away from key pillars which should have mattered more – i.e., education, society, progress, innovation (not least the technological innovations promoted and funded by the EU). Horizon 2020 was to a large degree a very effective policy umbrella, as well as Erasmus plus, and I think this is where our strong points really are. One is the capacity to get people together and to create a sort of democratization and proliferation of access, including in infrastructure. As half a Romanian, I have seen the brain-drain marking people leaving Romania because there was no hope; there was nothing or very little to build a sustainable future on. And now, I look at a lot of my young friends who left to find a job abroad, who are now looking at finding a way to go back to Romania and invest in their own country and work in the factories as engineers or in-house lawyers there. But these are still for some part still unspoken things; although increasingly noticed.

A sense of responsibility

Three years ago, I did a motorbike trip from Brussels all the way to Montenegro, alone, tent in the back, stopping at various camping sites and just talking to people. I don't think anybody really ever said anything nice about the European Union, nor about Angela Merkel, notably because of her immigration policy. And this is where I think the problem is evident. It's not in what the EU is doing, necessarily, even though it can be argued that some things could be done more efficiently. It is more because the advertisement and public relations capacities are absolutely terrible in reaching out to the whole EU population on the benefits of what the EU brings and societal values it holds. For example, in Wales, you have a population that was one of the highest beneficiaries of EU funds across the Union. And they were one of the highest voters for Brexit in all the UK.

HAPPY

The overall main issue for me though is a lot more complex, for a simple reason. I don't believe most people are looking to have a broad sense of responsibility towards one-another anymore. I know it is a very nihilistic perception. Nonetheless, I see this notion growing rapidly, primarily because everybody is so overcome with the necessity to survive within their own world. We talk about responsibility, and how people need to feel that they should contribute to society. But the bigger the cities, the more complex it gets. People are seeing the change as a cost rather than an enjoyable factor or rather than the feeling of really being part of something. When we were talking about the recycle, reuse generations, people felt like they were contributing, they were part of a wave, going against the wastefulness of our grandparents and our parents. But now, everybody is bombarded with things that they're doing wrong. "You shouldn't be doing this!" "Why are you doing that?" We're getting scolded. People are told they shouldn't be on their cell phone that much, stop playing so many video games, you're working for the wrong industry, etc. Indeed, people are more and more spinning within a negative spiral.

I'm not a sociologist, but when I look at what's been going on in Europe over the last decades, in many cases, the feel-good element has disappeared, because people are often looking for the cynical side of things. People are looking for the faults, they're not looking to motivate others anymore, because scolding is the easiest defensive mechanism that you can have. Apparently, rather than looking for change, people feel that as long as one is right, then it's fine. And I think most people are also just super tired with the pandemic. People are tired of making efforts, people want to be back or stay out. I look at the youngsters here in Brussels that said they were part of the 60s and 70s flower power generation, by going outside and demonstrating for their own rights. I really think it's just a way for people to manifest their discontent. And even more so, many people feel disenfranchised; their rights, youth and future taken from them. This can easily be extremist spawning ground.



Pillar 2

Circularity

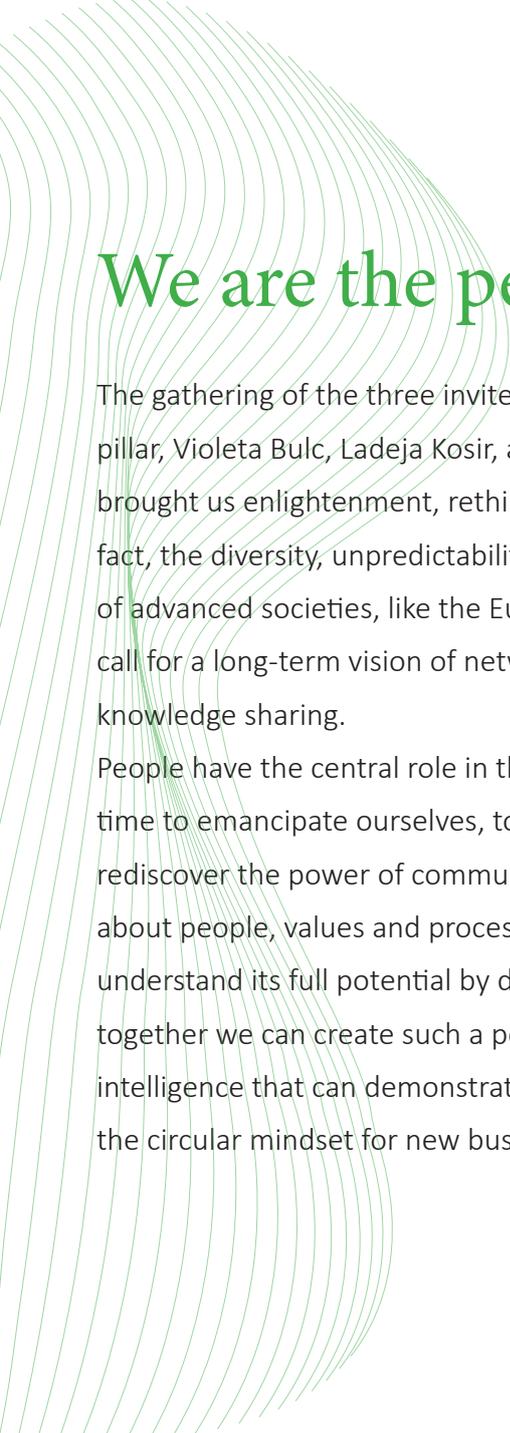
Building
blocks for
the future

An abstract graphic featuring a series of thin, wavy green lines that create a sense of movement and depth. A dotted path of small green circles winds through the lines, starting from the left and moving towards the right. The overall shape is organic and fluid.

ECOCIVILISATION

SUSTAINABILITY

CIRCULARITY



We are the people we have been waiting for.

The gathering of the three invited speakers of this pillar, Violeta Bulc, Ladeja Kosir, and Beatriz Luz, brought us enlightenment, rethinking civilisation. In fact, the diversity, unpredictability and complexity of advanced societies, like the European Union, call for a long-term vision of networks of trust and knowledge sharing.

People have the central role in this evolution, and it's time to emancipate ourselves, to connect, act, and rediscover the power of community. Circularity is about people, values and processes, and we will only understand its full potential by doing it. By working together we can create such a powerful collective intelligence that can demonstrate the potential of the circular mindset for new business opportunities.

Partnerships and connections are essential for systemic solutions, along the entire value chain. And we need new rules, new values, new metrics and new financial returns.

Otherwise, it's not going to close the circle.

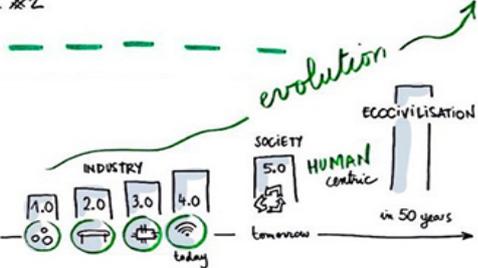
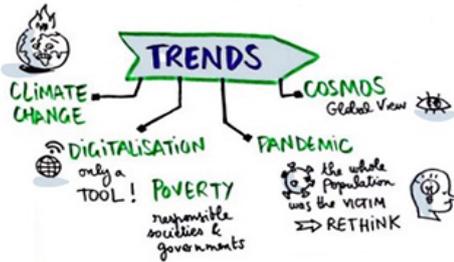
Although we do not have all the answers, we do have, indeed, each other. Based on trust and transparency, spiced with a systemic approach, now we have the unique opportunity to use all available "Green Recovery" resources (financial, human, natural) to cocreate a prosperous, circular and sustainable future, highlighting, as a wonderful call to action, that we are the people we have been waiting for.

CIRCULARITY

PILAR #2

HUMAN-CENTRIC CIVILISATION

Do you think we can reinvent yourself?
Violeta Bulc



BUSINESS evolution



I have a DREAM

TRANSHUMANITY

ECOCIVILISATION

CIRCULAR CHANGE

everything starts with a design
Ladeja Godina Kosir

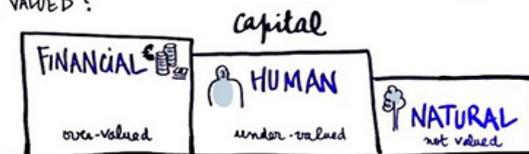
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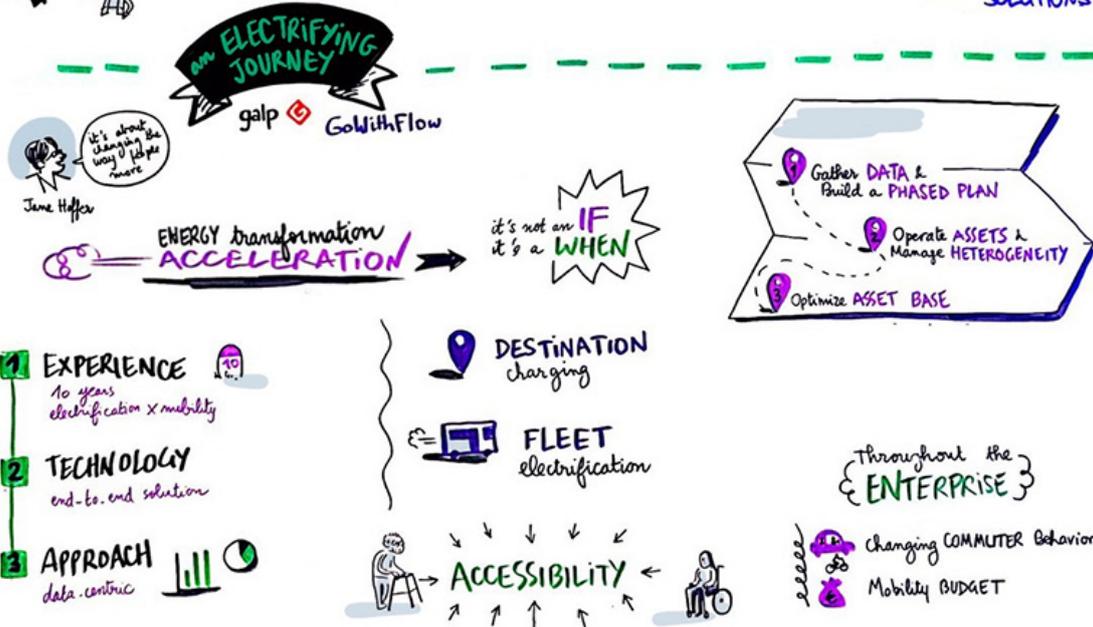
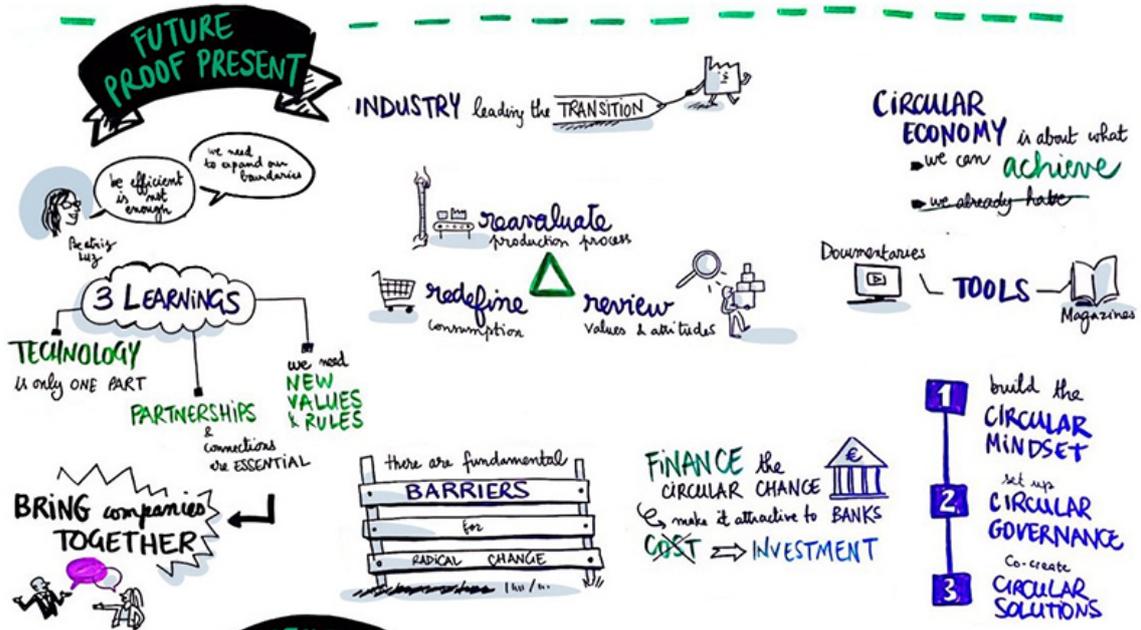
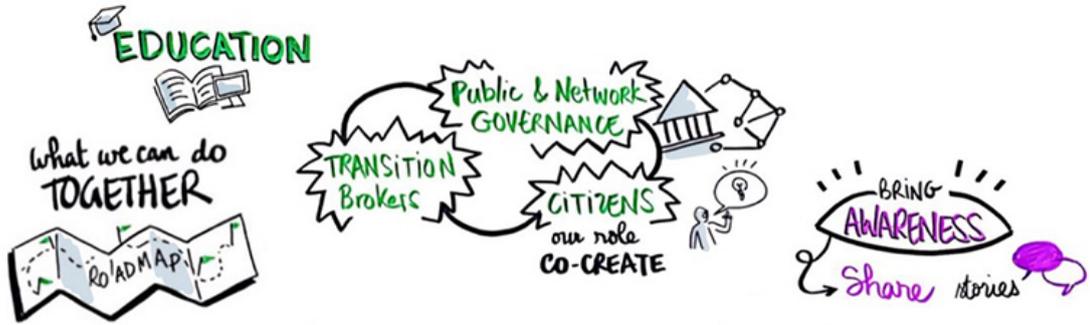
does it AFFECT our QUALITY of LIFE?

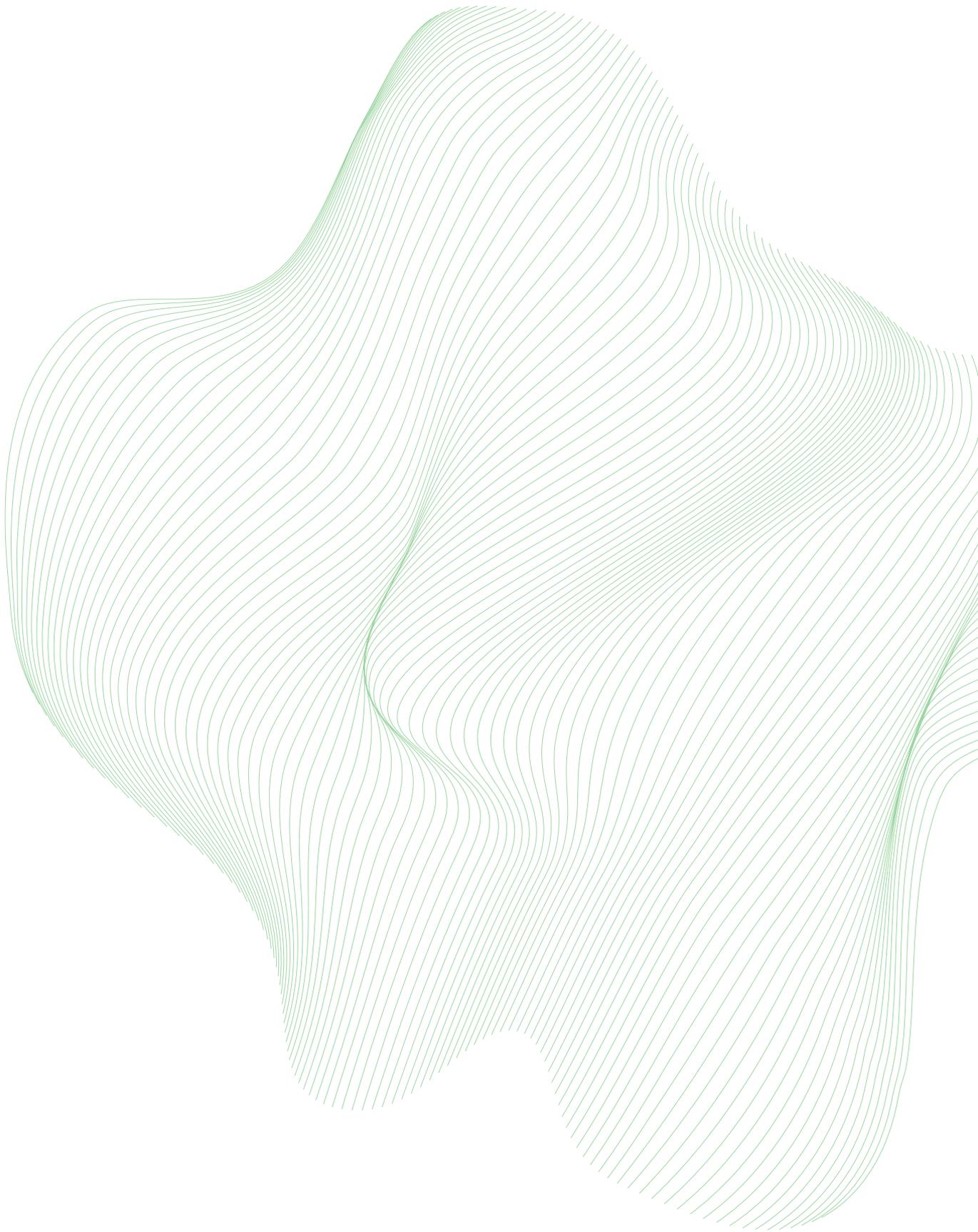


EU framework is CLEAR → Green Deal

what is VALUED?







Human Centric Civilisation

Ecocivilisation is a movement, a global community that I have started to curate in April 2020. It is emerging as a new shared global destination, just possibly a ticket for our survival beyond the expected climate change. The weak signals of the crisis of the Western Civilization can be seen everywhere: decadency, lack of respectful public values, lack of trust, transparency, decomposition of democratic laws. Those are strong indicators that it is time to regenerate, reinvent ourselves or become a part of history as yet another civilisation that got lost and fell.

The concept of Ecocivilisation did not happen

as an overnight inspiration. It is a result of an ongoing observation of our societies, many intense and deep discussions with colleagues from all over the world and of a strong influence of the International System Science Society principles. Prior experiences from the corporate and entrepreneurial world, innovation ecosystems, local communities, European politics, as well as a deep interest in cross civilizational wisdoms, helped me to broaden my mind, and to dare to look beyond the established societal frameworks. Out of that, infused by the collective consciousness and the concept of “knowledge as universal



A conversation with

Violeta Bulc, Ecocivilisation

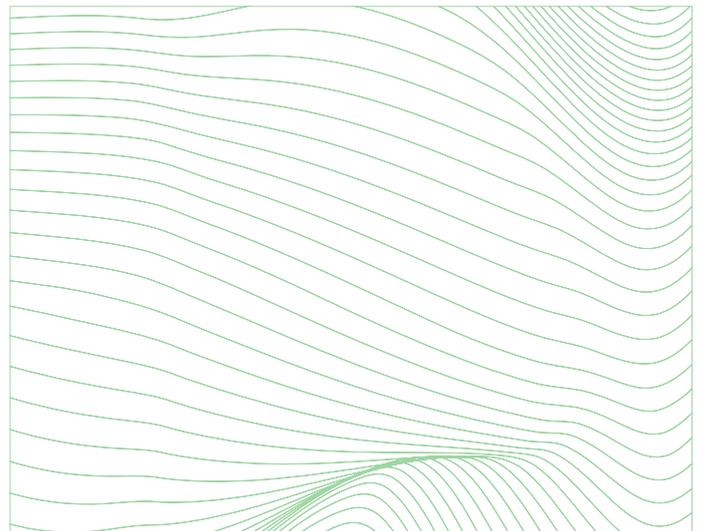
Violeta Bulc, is the curator of Ecocivilisation movement, and lecturer at universities and conferences. Bulc has a bachelor's degree in computer science and informatics at the Faculty of Electrical Engineering, University of Ljubljana, Slovenia, a master's degree in Information Technology at the Golden Gate University of San Francisco, and PMBA at the Bled School of Management, Slovenia. With relevant roles at DHL in Burlingame, California and at Telekom Slovenia, later she became vice-president of Telemach and CEO of Vibacom. Bulc joined Slovenian politics in 2013, serving as a minister responsible for development, strategic projects and cohesion. In October 2014, Bulc was confirmed by the European Parliament as an European Commissioner in the Juncker Commission, where she served until December 2019, with the transport portfolio.

good”, the model of Ecocivilisation was born: 5 entities (beings, communities, consciousness, land and relationships), as the core of a new societal framework. I feel that the Ecocivilisation era will be a global civilization and will emerge from a global consciousness. During my mandate in Brussels, the EU went through serious challenges, starting with the Greek crisis, then post economic crisis with rising left and right fundamentalism, then terrorism, the refugee crisis, then Brexit, Trump, and so on... I could see how every one of these challenges had severe consequences on people’s lives, as well as on the established structures, which were struggling to respond to the challenges in an efficient and sustainable manner, mostly due to their static structures, lack of resilience and absence of an innovative spirit. That is exactly what the Ecocivilisation movement tries to overcome.

Climate Change

Climate change is real. It is one of the natural behaviours of the planet Earth. However, with our, human intervention/bad behaviour, we have speed up the normal cycles to a point that we, people, are almost incapable of readjusting. In the last 50.000 years, people had time either to move from one place to another, or to reorganize themselves and adjust. But now, we speed up the cycle so much that substantial changes are happening in one lifetime, in one generation.

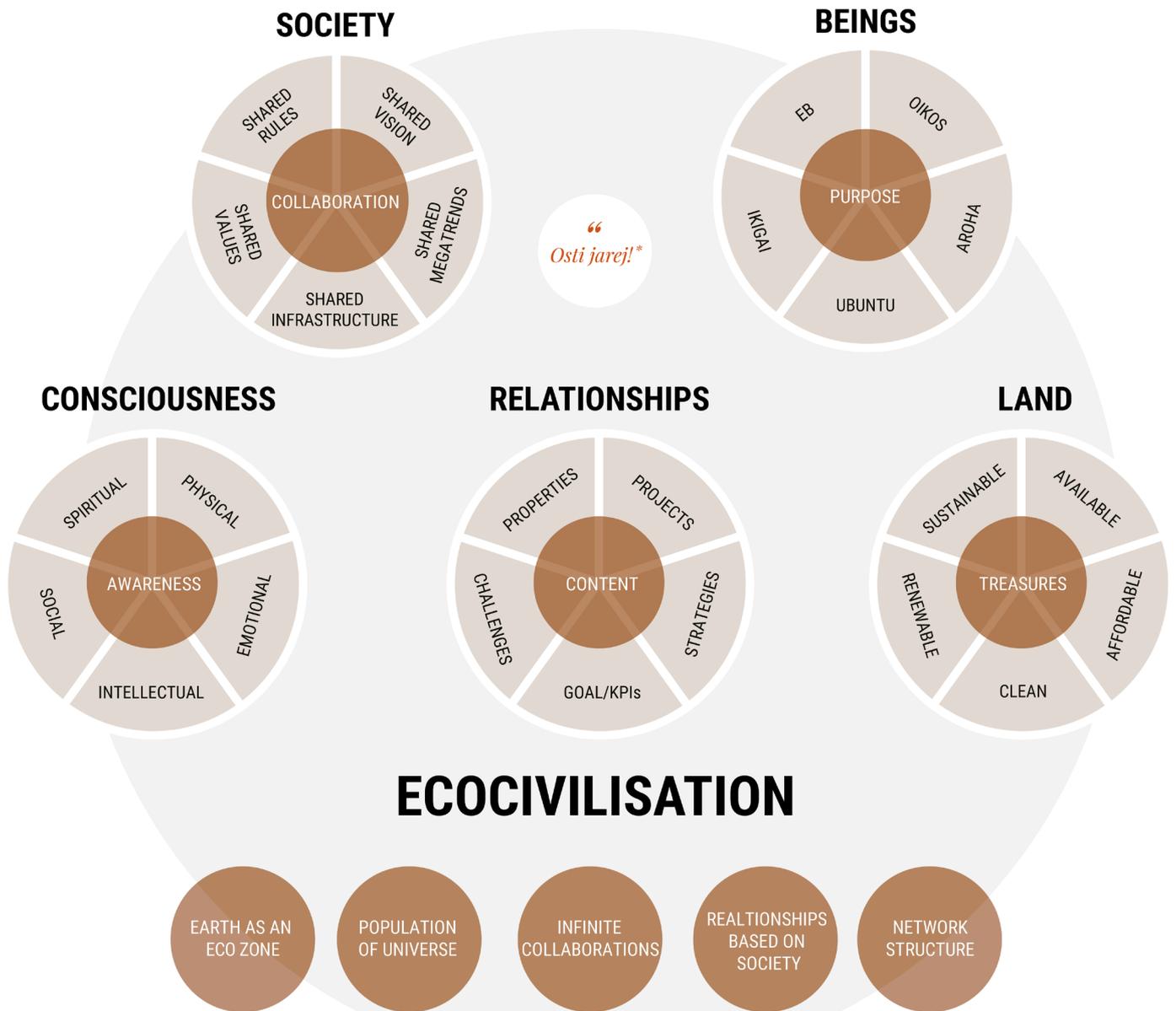
Many civilizations had disappeared because of the climate changes in the past. Do we have a chance as a species to be the first avoiding the destruction? Are we any different from the previous civilizations



which all had their glorious days and at one moment started to decline and fall? I can think of two: the planet is all claimed with no land to move to without causing a serious global conflict, pushing us to find solutions at the place where we are, and availability of data in real time from all over the world, giving us a chance to act and possibly re-invent ourselves, leading the way to a new civilizational paradigm. No matter what we do, we must face the climate change at the place where we live. How to start preparing people to be ready for the climate change at their place? Consequently, we talk a lot about circular economy and capacity building on the ground. But without overcoming the four missing problems, regardless if we talk about the SDGs, or the European Green Deal, or circular economy, we will not make it. These are: organizational re-design and restructuring to be added to all climate related projects, an improved governance model, and an improved measurement to be able to get a system picture about the climate change and human contribution to it. Last but not least, without an honest commitment and acts by our global leaders, politicians, all good wishes and goals will fail as they have been failing so far.

The EU has been experiencing a double edge effect: on one hand a growing pollution due to the oil-based lifestyle, on the other hand more than 90% of all energy used being oil based, as well. So, in order to decrease the pollution, the EU needed to find a new, reliable energy source, possibly on home territory to decrease the vulnerability due to the fluctuation of the oil prices and the supply of oil. That was the major drive behind the green agenda, with additional positive social impacts like decrease of premature deaths due to the pollution, a new field for the burst of innovation and creation of a higher value.

The EU was the first global power to push for a green vision. It still has a chance to be among the most influential global green powers, however, it will have to move from projects to organizational redesign. In order to lead, the EU needs a system approach with the commitment to some painful organizational changes along the way. And one good point to start showing its soft power is in addressing and solving the growing green poverty around the world. The goal of Ecocivilisation is to ensure that Earth stays an ecozone of our galaxy.



**stay vigorous*

Digitalization

Digitalization helped us to dramatically increase the number of connections with different subjects and objects through diversified communication channels, paving the way for receiving a huge amount of data and/or information at any given time of the day.

With digital technologies came many discussions about “who is actually leading the world”, “who is creating our future”, “do we still have free will”, and above all, “who owns the data”.

The citizens are trapped between 3 polarizing global models: “all data are owned by a state”, “all data are owned by a corporation” and the EU model that deals with data from a perspective of the “users’ rights”. Yet, the citizens are left out in the open without definition of accountability and stewardship over assets for the next generation. On top of democratic digital architectures like the internet and blockchains, new global monopolies are being built, pushing towards a technology-based world. Ideas like transhumanism, singularity and surveillance capitalism are used as a new global framework to control and manipulate without democratic

governance in the interest of users and citizens.

One very negative consequence of such a tendency has already been seen in a growing digital poverty emerging around the world.

Will the new civilization be driven by technological improvements, like our Western civilization currently is? Or will technology be just one of the enablers of value creation and something new will emerge in the future as the dominant one? Within the Ecocivilisation movement we are tapping into different leverage points, trying to observe how the humanity is evolving, how the holistic development of individuals is evolving, and then try to see, what will be the next new enabler of this spiral evolution where the spin is all but linear. One thing we know for sure, we have to keep the on/off switch handy. We are only a year and a half into the process. Our goals are set for 30 years, and it’s very encouraging how the whole world is responding. We have now our nodes in 20+ countries. We want to set up our points of presence in 100 countries, in order to really get a good information flow on the perception, awareness and consciousness globally.

Space

Space seems to be a new “wild west” territory, where billions of taxpayers and private money is being engaged with any global regulator overlooking the actions and negative externalities. As a consequence, space debris is rapidly becoming a serious problem, entrepreneurs and individual countries are passing laws to allow companies registered in their countries to mine asteroids and possibly planets in our galaxy. Nobody is monitoring what is happening to our stratosphere.

In spite of the good intentions of space dreamers in the 20th century, countries have not signed a common declaration for space exploration and rather moved the competition model to the Space, as well. The focus is on business, exploitation, territorial possessions, but nothing about the socialization and democratization of space, shared vision, common action plan.

I dare to speculate, that the technology as we know it today will not get us to other planets, nor will it make us immortal. Within the Ecocivilisation community we sense that we are yet to discover a law of physics to be able to get beyond rockets when travelling through the Space, to be able to see the unseen. We are also looking into how to address

space imperialism versus space democracy.

We can say that people on Earth have already benefited largely from the knowledge and technologies being developed for the space explorations: medicine, sensors, filters, food packaging, new materials, kitchen cloths, etc. The EU is finally repositioning itself in the space ecosystem. Our space agency along with a very strong entrepreneurial base has a capacity to influence the global space game, focusing on space explorations with intelligent instruments, strong data mining capacities and AI based simulation systems. Maybe the EU is the one who will show a completely new way of travelling through the Universe. Another opportunity for a stronger autonomy yet integrated in a large open space with a strong global governing body that the EU can infuse.





states, giving up on freedom of speech, the right for a second opinion. The EU is now in a unique position to take a holistic approach to pandemic management and build a resilient public health system which includes citizens in problem solving and effective response.

During the pandemic we could also see health and digitalization merging under this new push for digitalization of public health systems. Over 60% of all diseases that humans have are a product of socio-economic conditions, which you can never see if you check your blood and pulse. You can only understand the reasons for a high pressure if you see a human being in its economic and social framework. This is a big battle now, and the proposal for the European Health Union, is very much focusing on this human centric public health system approach. AI and digital avatars are becoming a great tool, yet, successful diagnosis consists of more than just organic data, it is contextual, and relationship based for which the medical personnel that cares is essential. Lessons are still coming, but one thing is already known and is also the basis of Ecocivilisation debates on public health, we need flexible human-centric public health systems based on care and solidarity.

Regulation

We need to understand the nature of different systems. The nature of a company is to grow and deliver profit for its stakeholders, but the nature of a state is to take care of people and deliver for them a decent quality of life. For these two completely different motivations to coexist, regulation is needed to keep both in the balance and bring transparency and predictability to the core of their cooperation. In many cases, especially on a global level, we have no regulators and that's why the high-tech companies have unlimited power and do whatever they want to do. Nobody regulates them.

Why don't we have something like the International Civil Aviation (ICAO) or the International Maritime (IMO) Organizations for space, or for digital technology? We lack the decision making and must develop the awareness of the challenge.

I tried, for example, to stimulate the establishment of a global Space agency. If we want to have at least some decent sort of relationship in the Space, we need and should join forces to share the innovation and technologies, and then act together. Humankind is curious, but regulators should set rules. For example, the owners of satellites or other

space equipment have no obligation to bring the devices back to Earth when they no longer serve the purpose. So, the level of space debris is growing by the day and nobody is taking the responsibility for it. Within the Ecocivilisation movement we are looking at different net-based solutions that would support global regulation without the need for a global government.

Participatory Models

Before I entered the European politics, I was very much engaged in working with local communities and companies. One of my key tools for successful leadership and collaboration were participatory models and participatory engagements. I am more and more convinced that the parliamentary democracy, where parties have such a big power, is no longer working for an open and inclusive society. Democracy needs to be re-invented, refreshed. Politics needs to be re-invented. Democracy and politics need innovation. The Ecocivilisation movement is exploring this topic, bringing together different best practices from all over the world to use them as a starting point for a possible fresh view about the future organization on a local and

global level, in politics and democratic structures.

We're building a network of nodes, where we are bringing together people from Europe, India, Africa, Australia, moderating dialogues and building a fresh knowledge base.

Ecocivilisation movement is not seeking a revolution, but evolutionary changes in order to readjust for modern demands. People are awakening. Millions and millions of people are being awakened, connected, activated, demanding different structures in order to engage. So, we are testing all kinds of participatory frameworks. We try to bring young people on board and see what they think and support them.

Certainly, if we want to sustain as a society, or even bigger, as a civilization, we will have to reinvent ourselves. Otherwise, we will just disappear like many other civilizations over the last 50,000 years. We will be the next dinosaurs of the future if there will be any skeletons left at all.

Participatory budgeting

I believe in the concept of participatory budgeting that emerged from local communities. We have more and more municipalities in Slovenia, who are practicing participatory budgeting. And I was so happy when I've heard that Portugal announced at the end of the presidency, as the first country in the world, a participatory budgeting on a national level. This is a way forward!

Citizen Parliaments

In Belgium, they are experimenting with a Citizens' Parliament, activating citizens for a limited period of time in the decision-making processes on political level. The results are positive. This could potentially replace the lower Houses of Parliament, bringing more dynamics and fluidity into the system, while giving all the citizens a chance to rise their awareness about what it means to lead the state, to curate democracy and moderate a collective effort for a better life. This could rise the level of political competences and weaken the influence of political elite, looking these days more and more like monarchies.

Knowledge as universal good

Nowadays, there is a lot of talk about knowledge as universal good. When I look at the relationship of a modern society and accumulated knowledge, I feel that something is just not right. I ask myself how anybody can claim ownership over knowledge?! Knowledge is not invented but uncovered, accumulated, recognized. Everybody is just using it, uncovering it, connecting loose ends. Ecocivilisation lives by the rule "knowledge is a universal good". Intellectual ownership law needs to be revised to be fairer, to give to the guardians of the knowledge and wisdom a place in the society that they deserve.

The awakening of people

We have so many extreme positions these days. This means that the system is challenged, that it is trying to defend itself, that their end is coming, that the change is under way. In Slovenia, the government tried to pass the law on water, where they would have much more influence on the privatization of the shores and water sources. Slovenians are not really interested in politics and our turnout on any kind of referendum or even elections are low. This time, it was amazing how many people voted, although it was a holiday time. People preregistered, voted by post, and the young people finally understood what it means to have a voting right. Exciting to see. The youth has been awakened. They started to come forward, and we are all feeling the strength that they have. They are our fuel and hope!

Slovenia is leading the way

In Slovenia, climate change and this sort of green agenda is very close to our hearts. We are very much connected with our land. 50% of people still live in the countryside. So it should come by no surprise that the concept of a "smart village" was born based on the experience of smart communities as part of the Heart of Slovenia partnership network. We are the second largest country in Europe covered with forests, rivers and lakes. Our capital city of Ljubljana has just been voted as the greenest capital city in the EU. We are the guardians of the oldest wheel in the world, the oldest flute. We are the only country that has in its name the word "love" (Slovenia). We are the only country that has never attacked anyone in its entire history and is proudly listed among the top sport countries in the world.

The global connectors

I come initially from a corporate world. After several years in Silicon Valley I came forward to Europe which I recognize as my home with all its diversity, unpredictability and complexity. As an entrepreneur I always felt a special passion for innovation, receiving many national rewards for business and social innovation myself. So, BIN@ is very much related to my personal interest in the functioning of global communities, without losing authenticity of a local community, small businesses or individuals. There are some very encouraging models already emerging, especially those based on circular economy. Ecocivilisation is hosting many global network-based leaders, the connectors for the nets of the nets. When you look deeper into their way of working three basic characteristics emerged.

100% transparency

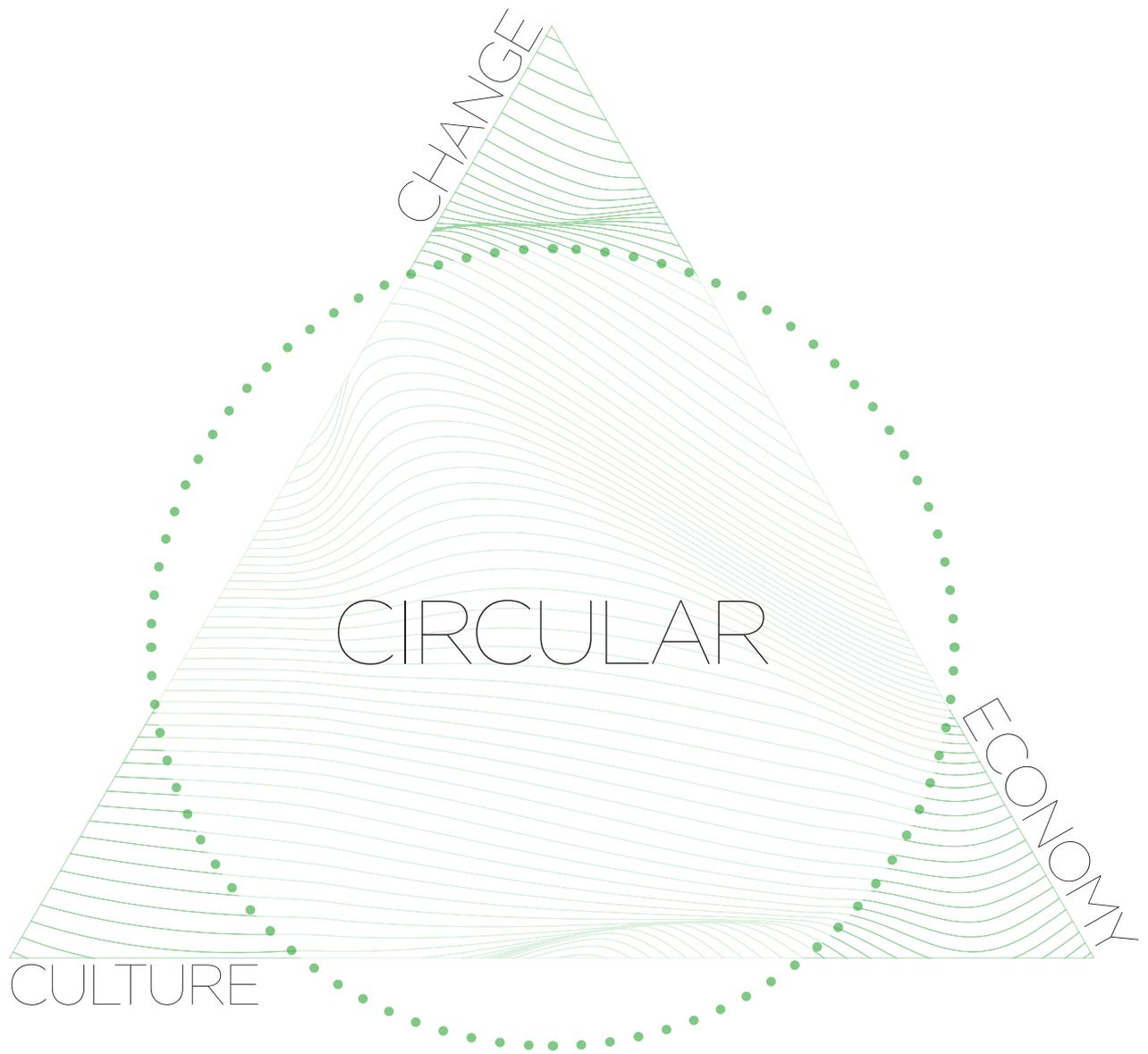
They engage in a completely transparent way with everyone on the local level, with connectors, and those that coordinate the whole corporation. They call it actually a network, they don't call it a company anymore.

Trust

They don't work with people they don't trust. No mercy. In classical corporations, if you don't generate profit, they cut you off. Here if you're not delivering trust or supporting trust, you are out.

You do what it feels right

It's very powerful rule. It empowers your personal responsibility; you do what you believe is right because that's the most you can do. That is the intuitive level, which is the only information that one can comprehend in a clearest form.



Circular Change

This is all about change. Starting with the circular triangle, the concept we introduced while we were preparing the circular economy roadmap for Slovenia back in 2016. We realized how everything is interconnected, and now we use this approach on roadmaps and other projects to zoom out to see who are the stakeholders, what is their role in the society, in economy, and then zoom in to see how they can collaborate. In this triangle we have circular economy as an economic model, with everything that relates to that, such as the transition of business models. We cannot achieve this new model without circular change, a systemic

change in a holistic approach of the whole system. And then there is circular culture, the third very important component, because everything is based on values. So within the society, we start with our basic values, the driving force for our decision making, that significantly contribute to our lifestyle. If we do not have this big picture of all these components, understanding how one affects another, we're too much in silos and we can never achieve this paradigmatic shift, which is not just about the economy, but it is also, or maybe even first, about the society.



A conversation with

Ladeja Godina Košir, *Circular Change*

Ladeja Godina Košir, #EUwomen4future, lives in Ljubljana, Slovenia (the only country with love in its name!). She is the founder and director of Circular Change, a private non-profit organization devoted to circular economy, founded in 2016, implementing national circular economy roadmaps in different countries, organizer of the international Circular Change Conferences and publisher of the "Circular Insider" magazine. Ladeja is involved in EU and UN projects, is the chair of the European Circular Economy Stakeholder Platform in Brussels, co-chair of the CE group within the BCSSS Austria, and collaborates with Doshisha University in Japan. She has also work in progress with Jacqueline Cramer, former Minister of Environment from the Netherlands and Petra Kuenkel, from Germany, author of books on transformative leadership.

Transition of paradigm

I'm now particularly curious about why we are seeing the existing systems are collapsing. I mean, the health system, education system, even political system. And we don't have an alternative, at least I don't know what the alternative would be at this very moment. On the other hand, the power of financial capital and multinational companies, is running the globe and they're those who are making the world go round. How to maintain the enthusiasm and hope for a prosperous future if we, citizens, are not considered as partners in change? So, how can we connect different players on the national, international and global level, and co-create a much more fluid structure that is not governed in a traditional hierarchical way, but really to be somehow self governed? Based on shared values, and because we are in crisis, climate crisis, health crisis, the crisis management is needed. To find out where is the potential or the force for this new, inclusive and engaging kind of crisis management, from the individual towards the society. How to harmonize now or adapt in a new way? Only together we can shape the answer...

A broader level for Circular Economy

A question often asked is how do I see circular economy in the broader context of sustainability, like SDGs, and the whole disparity of sustainability. What I see as beneficial when we are talking about circular economy, refers very much to design. First design thinking, then designing things (or services) in a way to maintain their value for as long as possible, looking for different kinds of business models- moving from product to service, implementing the sharing economy. Solutions are very tangible. In a so called "developed countries", including Europe, we are more used to linear that to circular thinking. With slogan "Build back better" EU is encouraging return to "life as it used to be". But we should be forward thinking and re-evaluate our economic system, redesign structures that are not solving climate and health crisis. It is not about "fixing the problem". Profound paradigmatic shift and behavioural change is needed!

Circular Culture

Let's see the circular culture topic and the segments we can put under this. One are values, to agree on what we value and what we do not, and then we



Credits: Photo by Jan Kopřiva on Unsplash

should value this also money wise, because so far, we still use money to evaluate the value. The more profound question is, what the value of money is based on, nowadays... The second important topic is education. When talking about the times we are living in, educational system is one of those that needs a profound change.

During the COVID we have learned, what can be done remotely and online. But what is the role of education? You can have access to information, even to the knowledge online.

What is missing, when real social interaction is lacking, is the exchange of energy, of the flow of ideas, of spontaneous cocreation, vivid discussion that brings new ideas and sparkles creativity, innovation. Relationships make us human. Education shall not be just about “transferring” knowledge, but much more about joint search for new knowledge, insights, ideas. It shall be based on dialogue. Let’s also touch the importance of narrative in a border sense- how we talk, what words and images we use, what is our tone of communication. If we want to engage people and make a real impact, it is not about preaching and telling them to do this and that. We shall enable a safe space where we

can nourish this inclusive dialogue, and then also create messages that are encouraging, not simply populist, but truly focused on cooperation and on opening of new possibilities. This whole narrative still have to be developed. Storytelling is essential, because the whole society is based on stories, that is how we, as humans, have develop through the history – based on worth of mouth, on stories and rituals.

Green and Digital

Two keywords we are now praising are green and digital (alongside with new technology and AI). Let’s take a look at what is actually happening nowadays – we are colonizing and polluting the space and digging deep into the oceans to get rare resources needed for “new technologies”. It is catastrophic. We should be much more respectful towards nature- including the sky and deep oceans. Our behaviour is far from “green”. From my perspective, the problems we have caused by over-exploitation of natural resources, can not be fixed with “build back better” approach. Let’s take a look at mobility- green mobility. Simply replacing existing cars with electric cars is

not a solution. I'm disappointed in a way since we do not address right questions, we just go in one direction, thinking that we are solving things, but actually we are causing new problems. The direction is to produce less and to use less, but that doesn't necessarily mean to lower our live standards and the quality of life. The purpose of mobility is to get from point A to point B, this can be done as well by owning as by sharing a car, or by using a bike or public transport. Or to rethink twice if we have to travel so much, or maybe not. Electric cars can be a part of solution, but much more challenging issue is the whole transformation of energy sector – how to make it green.

So here we are coming back to the need for a systemic, holistic approach that leads to a paradigmatic shift. It is nice having all new technologies, blockchain, AI – but this solutions are using a lot of rare resources and energy. Not to mention all the platforms that are in hands of 1% of the richest global population, that own our data, trade with it, earn enormous amounts of money. This is nor green, nor sustainable, something is very wrong here. The financial capital is running the show again, I'm afraid, while human and natural capital

are taken for granted. New forms of governance are needed to address these global challenges.

Every crisis is also an opportunity.

Can you recall the moment of the first lock down during the COVID19? What did you think about? Where am I going to live, what am I going to eat, is there enough drinking water, is there a loving person next to me... very basic needs. And that is so natural, so human. We forgot a little bit that what is essential for our well being.

What was the next "big discovery" during the lockdown – the power of internet. We cannot move around, but we have internet, and we can order whatever we want. Again, the whole story about consumerism just moved from real to virtual environment. This was the twist and very soon people forgot what is in the core, I don't want to say of the problem, but of our existence, and of this feeling of well being. The difference between what we need and what we desire fade out once again.

Of course, there are also positive shifts. A lot of small entrepreneurs found a way to make their business work online – particularly local players got closer to their local customers, what is great.

What I have noticed within the European Union and through the European Circular Economy Stakeholders Platform that I am chairing in Brussels is that in the last few years, we, Europeans became humbler. We are more opened for the dialogue and not so convinced that we, by ourselves, have all the answers. We have the ambition to be the lighthouse for other countries, particularly through the implementation of the Green Deal. But at the same time, we are realizing that so called “less developed” countries with different culture that are in different stage of development, have a lot to offer regarding the circularity and sustainability. They still understand that they are part of the nature and based on that also how to behave towards the nature. So, it’s not all about “exporting” our knowledge and educating them on what to do and how to do. It is our responsibility to stay open for their solutions, their practices and lifestyle. They are very circular out of the need, while circularity in the “developed” world is still a matter of choice. We can both learn from each other. Let’s take an example. We come to a “poor village”, where people are repairing, refurbishing, reusing, sharing staff. We consider them poor, starting encouraging

them to buy new things, promoting our way of consumerism. But they are nourishing right values, sustainable and circular ones! We are those who shall recognize, uau, that it is great if I just do it and repair my dress not to buy a new one. Again, we shall consider the perspective, who is more developed or who is wiser?

We shall prevent a so called “circular colonialism”. In most cases, financial interest is running the show – investments in (rare) natural resources are happening all around the globe and during the CoViD pandemic we have learned, how vulnerable our value chains actually are. And how dependent on natural resources we are- particularly in Europe. Circular solutions are focused on maintaining value for as long as possible, therefore they make us also less vulnerable.

Future of cities

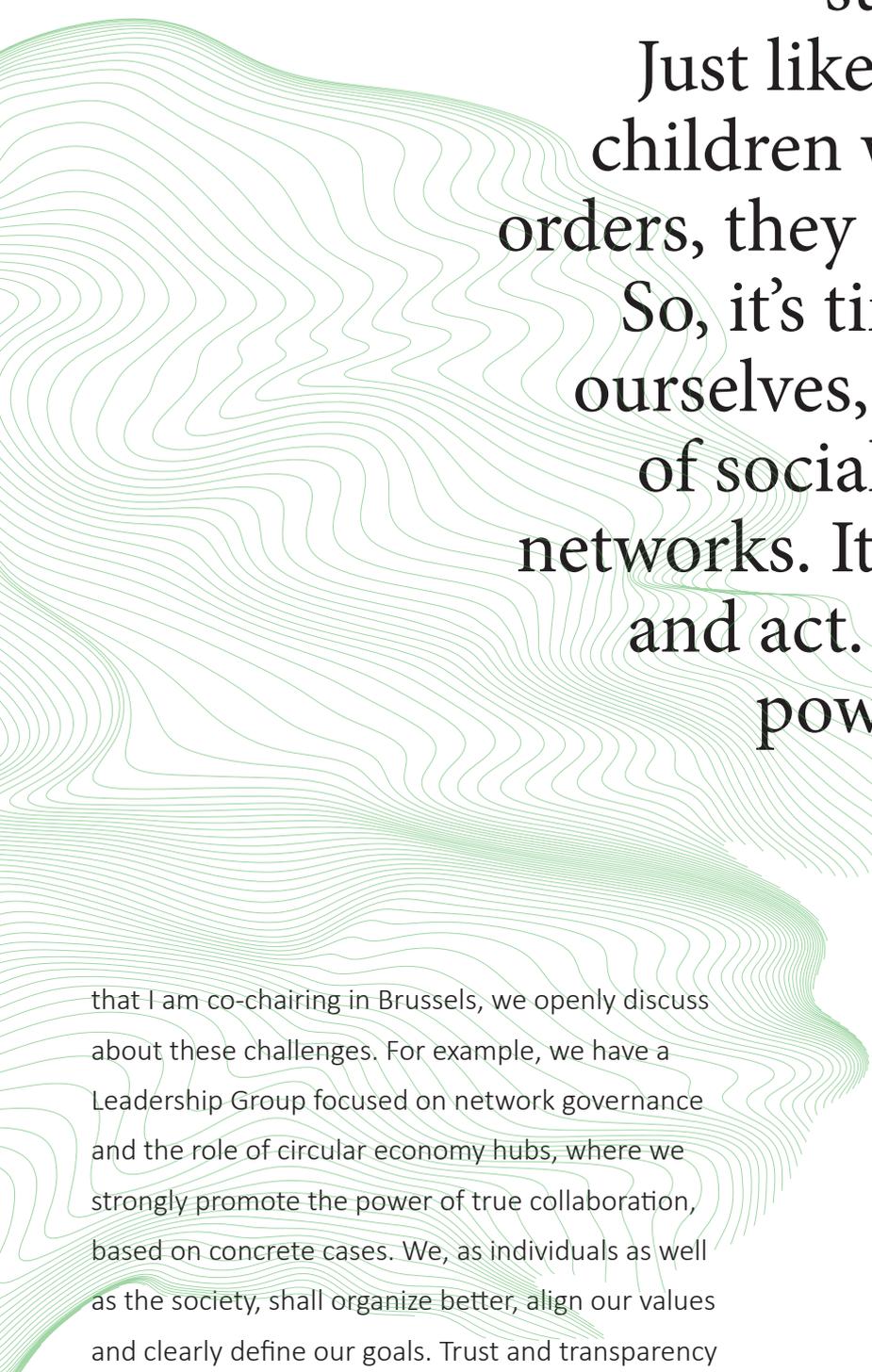
Because of this pandemic situation, what was desirable about the city life, is becoming less attractive. Based on forecasts, population in cities shall grow in the future. In Europe, 40% of people live in cities, 70% in urbanized areas today. But how was it during the lockdown – was life

more attractive in Paris or, for example, on the countryside in Tuscany? The answer would probably be the countryside. It is all about well-being, about the quality of life. Cities will have to adjust to our “new reality” and strengthen bonds with suburbs, rural areas. One of interesting EU initiatives are also “Smart Villages”, focusing on solutions that encourage people to live and work in villages.

Citizens call-to-action

What I notice that we are lacking is the active citizenship. In some countries we can see a negative selection when it comes to who chose to go to politics. It is important to better understand the role of the citizen and the power that we have in our hands. I don't see the need for revolution. I am more in favour of connecting and enabling different stakeholders to have a stronger voice, and to realize, that there is a power in our hands through the actions we are taking and through our daily decision making. We often believe that the revolution can allow us to do something differently, or we are waiting for incentives to come to change our business patterns, but we can do a lot based on small steps. I don't want to put the pressure or all

the responsibility on the side of individual, not at all! We have the system and politics, so they should take their stake of responsibility. However, do not forget that we, as citizens, still have power in our hands. What I see now, and this is my personal view, is, that pandemic crisis is often abused, and political power used for wrong purposes. On EU level I sometimes miss more alignment on key issues. We are small, old continent, dependent on global flows and trends. Very sensitive and vulnerable. At this very moment we have a unique opportunity to use enormous amounts of money that is allocated for green recovery in an impactful way, with long term positive effect on our economy, society and environment. For that, we do need radical collaboration among different stakeholders. As I see, we have not found the right formula to bridge top down and bottom-up approach, yet. What worries me is that a huge amount of money is going to be allocated for the same players as usual, to those, who have capacities to get this money, while those small but significant change makers who have transformative potential, will not get the access to these funds due to bureaucratic barriers, lack of human power or similar. Within the ECESP



Community is more than a
sum of individuals.
Just like childhood, while
children wait their parents'
orders, they don't emancipate.
So, it's time to emancipate
ourselves, to use the power
of social media and other
networks. It's time to connect
and act. To rediscover the
power of community.

that I am co-chairing in Brussels, we openly discuss about these challenges. For example, we have a Leadership Group focused on network governance and the role of circular economy hubs, where we strongly promote the power of true collaboration, based on concrete cases. We, as individuals as well as the society, shall organize better, align our values and clearly define our goals. Trust and transparency are the glue of prosperous society. As long as we are passive, waiting for "Brussels" to give us instructions on how to solve problems, time and money are passing by.

GOOD PRACTICES

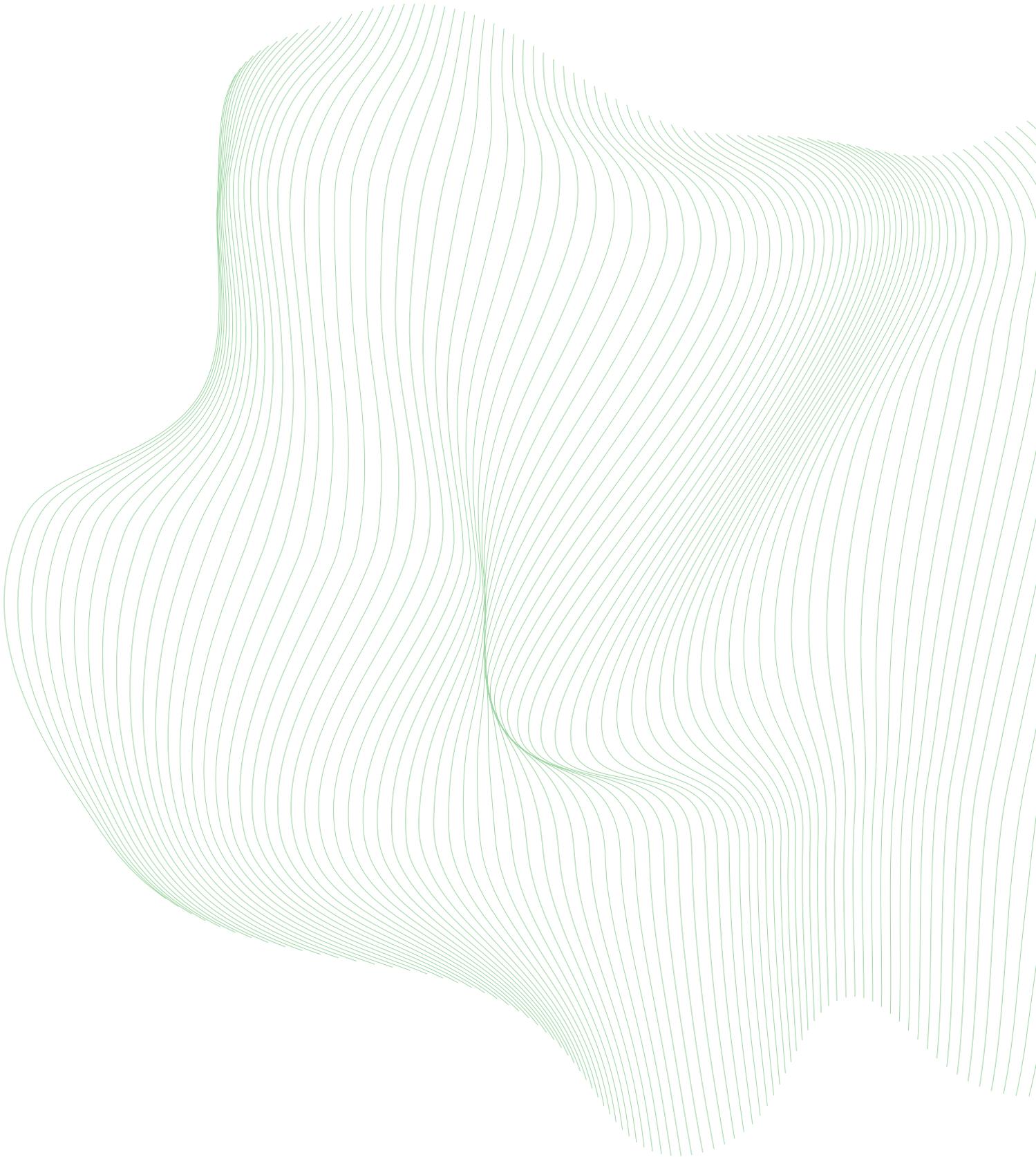
Aquafil

At Aquafil, they're producing 100% recycled nylon. I like their story because when they decided to explore the opportunity to produce nylon from something else than oil, they started an exciting journey. They started to collect fishing nets and while doing so, they realized that, for example, fishermen in Philippines who were collecting them, need additional education. Often, they found turtles and other animals trapped in those fishing nets. Aquafil hired experts from the London Zoo to teach those people in Philippines, how to treat the animals. So, this is a great example of how the actors in your value chain change when you shift from linear to circular, because, suddenly, you have different partners, and you need completely different skills.

Slovenian producers of tomato - Lušt

This is an example from our local community, from Slovenia. What I like about this example is the mindset of entrepreneurs. The company grow tomatoes in indoor facilities heated by geothermal energy using cutting-edge and environmentally friendly technology. Next to that in collaboration with the Pulp and paper Institute from Ljubljana, they have developed an innovative way to process tomato stems into biodegradable paper bag. In this way, organic plant material previously considered waste has become a resource in paper production. I am using this example showing how to use everything that you can in a proper way.





Future Proof Present

There is an increase in the demand for circular economy debates among industry and government. We've just finished the study of a potential roadmap for a circular economy in Brazil sponsored by UNIDO, that gives a very good basis for the discussion in Brazil and the National Industry Association has been involved in this discussion since the beginning, bringing the topic closer to the industry environment. But the understanding of the broader view of the circular economy is still not mature enough. Companies, here in Brazil, are more concerned about saying

we are already doing it, than trying to understand what it means in order to see what are the potential benefits of doing things in a different way, in a circular way.

Pressure is becoming so high for companies to say "I'm involved in circular economy", that they are just looking internally trying to find anything closely related to circular economy to be able to position themselves in it. My concern is that if the companies position themselves like that "we are already doing it", with simple measurements, they don't create a need for further knowledge.



A conversation with

Beatriz Luz, Exchange 4 Change Brazil

Beatriz Luz, is founder and executive director of Exchange4Change Brazil (E4C). After 10 years of international experience, she created the Brazilian Network for Life Cycle Thinking and, recently, with her own strategic consultancy, she created the Brazilian Circular Economy Hub. At present, with Exchange4Change Brasil, Beatriz assists organizations to re-think their business models, re-design products and process and gain competitive advantage through the circular economy mind set and strategies, co-creating and adapting global solutions to the Brazilian reality. Beatriz published the 1st circular economy book in portuguese and is the curator of the brazilian documentary that aim to bring the concept to Brazilian market in a unique setting.

Throughout my journey of this last six years, I realized that circular economy is not something that you do in isolation, as a one-man job or a one company job, because we need to look at the ecosystem and integrate the several parts of the value chain. When a company states 'we are doing circular economy', or 'we are applying circular economy principles', the question is 'with whom?', because it can't be done by yourself. If it is being done by yourself, it is just a sustainability measurement, it is a resource efficiency, it is renewable usage, it is redesigning a product, but it's doesn't have the system thinking. E4C efforts now, in Brazil, with the industry or the government, is to promote this system thinking, is to promote this new set of skills and the new governance necessary for the transition – circular governance, collaboration, co-creation with suppliers, market needs research or evaluation of competitive advantages to provide a service rather than a product, for example. In the beginning of 2020, the circular economy Brazilian hub was launched, because I realized that I didn't want to provide circular economy education to one single organization, so was needed to create an ecosystem to facilitate the

communication among the large companies and small and medium sized companies. To promote the reverse cycle of materials, brand owners and recyclers should be side by side to understand that this is a joint project and not buy and selling recycled material based on a commodity negotiation on price. It must be based on value creation, so a new economic model, a new relationship, a new financial indicator should be established. For that to happen, we need to bring this discussion beyond the procurement department, because it has to be a strategic decision, not just the best purchase, the best negotiation. So, this is what we've been learning from this two last years, by working closely and bringing the small and medium sized companies close to the brand owners

**People are at
the center of
every change.**

So, transition happens when we realize the role of all of us in this change. Industry has a role, government

Reevaluate Redefine Rethink

has a role, and society has a role. If the consumer is not willing to take this new product or this new experience you cannot just create a new product or a new production process.

We need new values, new attitudes, new relationships. It's not enough technology, new products, designing for modularity, durability or to the sharing economy, if the society is not willing to take up this new consuming process. Since we started to learn more about the transition, we came up three new R's: Reevaluate the production process, Redefine products and service and Rethink values and attitudes, not only remanufacturing, reuse, repair, but it's the product itself and the production process, about the people, the values, the attitude. It's much more than just material flow and developing technology. Is creating new experiences and new markets. Circular economy is a new mindset for business development.

Jobs for the communities

Moving towards an economy where we promote, repair, remanufacture or reuse, may generate new jobs. Quite often, it's not just automation, but manual labour, with new skill setting courses

and capacity building. There is an opportunity in developing countries to raise the bar of the working level. It is unacceptable to see poor communities being mentioned because they pick up the litter from the ground for earn money. It is not a beautiful thing and waste should not even be there, but somewhere else where it can be separated, generating value in a different way. And we should be able to merge technology with human labour. In Europe, when we talk about recycling, there are huge machines with sensors, but perhaps in Latin America, we can use this technology merged with the generation of jobs. This is one of the things we've been discussing. How can you use technology to accelerate the process but still generating new high-quality jobs? How to become a tool for these people to generate more revenue? It's a new economy related with the circular economy.

The challenges

We've been educated since the industrial revolution to work within our own boundaries, so companies had to be more efficient and reduce costs to be more competitive towards market competitor. Now we realize that working in isolation, might be just

The biggest challenge is to integrate all of this and to engage all these stakeholders,

transferring the problem from one part to the other.

The problem is along the value chain, so we need an integrated solution to solve it. There are several problems around the value chain, and we are trying to tackle them individually. But then we just transfer the problem from one party to the other.

So, circular economy is telling us, we cannot work in isolation anymore. We have to bring together different sets of skills, different departments, different players around the value chain. The biggest challenge is to integrate all of this and to engage all these stakeholders to work towards a common view, because we are used to compete with each other. It's difficult to understand the value of pre-competitive collaboration, so, people are still very reluctant to trust each other's information, because information, itself, may be a competitive advantage. Ecosystems with companies from different levels of the value chain will only be trustful and comfortable about sharing information when they realize there is a common good and positive results for everyone. Another challenge is to think long-term. In many regions, we are trained to work towards the annual results and yearly KPI's. So, we must establish long term KPIs. We are changing the way we are doing

business and this change may take some time, because we need to talk with different players and departments. We should not remain at the first inspirational 'Wow!' with an event, a debate. This is the first step. We should go further, with the second and the third steps.

We need to bring companies together in small groups and "learn, fail fast, learn fast". Get together, design a project, fail, move along, learn from our mistakes, and move in a different direction. We don't have time to just keep thinking, we need to go hands on. But we need a group of professionals, and companies determined to do that, to go hands on. So, we need the long-term view. But we need also a set of determined people to allocate time to think and to learn from this. If there is no time to discuss this, how do we know what is being done?

The Circular Economy Brazilian hub is being very powerful. The digital opportunity for online meetings facilitates to gather companies and decision makers from different areas of Brazil to discuss, share information and make decisions and we were able to accelerate some discussions, because people are focused and willing to share the information. This is a big learning from this working model.

thinking long term, but with short term changes.

Because Brazil is so big, if we have to organize a meeting with lots of people from different regions, then it's a whole day for people to travel and get together. In the past, quite often, someone in the decision-making level would say to a junior person to go and attend this meeting. This is a positive aspect of this virtual exchange. But at the same time, I also feel that we need the human contact to build trust, to bring along people from different parts of the organization, to share important information. Otherwise, we just share public knowledge, but what about that information deep inside of the company, that it's really necessary to change?

We also need short term changes. It's about communication, process, paperwork. Much more than technology or finance. Once you have everything designed, then you create the business case, then you have the technology, you have the finance.

We are changing, we are creating a new equilibrium within the value chain, especially if we want to do reverse cycle of materials. We've been thinking of half of the cycle all along. We develop products thinking of the use phase. What about the after-use phase? We have to think about after use and every

single organization say it's expensive. Well, of course, it costed zero until now! There's no infrastructure, no business plan, no value for the secondary material. But what about if other indicators are brought into place? What about scarcity, the value, the pollution impact?. That's why it takes time for building these new business models.

Paving the path

In Latin America and developing countries, the governments are not up to speed, as in Europe, because I guess in Europe, there are much more limitations in terms of space, in terms of existing resources. It's a kind of a risk management. In Latin America, in Brazil, we have not reached that point yet. The work we've been doing is much more provoking the industry to act and do not wait for the policy to come. **To be a pioneer!**

Going before the legislation may give competitive advantage. And when exporting to other markets, legislation is already there. I think it's much more sensible to work with industry and get them up to speed to change, and in parallel, to work with the government. By having a practical example, of someone working without the government

incentive, allows us to go to the government show what is done without the incentive, so please act and provide incentives. That's our long-term view.

Raw materials circularity

I've been working very closely with the steel industry and the plastic industry. The plastic industry, I think it's being pressurized globally to change the way they run especially because the result of not thinking of the after-use phase is there on our face, floating around ocean. Industry is starting to get together to develop coalitions and to fund projects. But I still see this as very much a response for market pressure. It's not like actively thinking of business opportunities, is a reactive move, yet. The steel sector, on the other hand, position themselves as a circular material. They are demanding more steel waste from the market. This is very much in line with electronics and white good companies doing reverse logistics of their materials now. The circular economy Brazilian hub is bringing these two companies together. The white good companies have to bring the fridge back from consumers house, to recycle, but they don't know how to do it and it is very expensive, because they never did it. And

the steel manufacturers need that fridge without knowing how to get there. So, we are bringing both together.

Connecting missed links

It's all about economics. The same good with different value perspectives, for companies trying to pay less and maximize profit. It's an economic decision. We don't have the infrastructure nor the logistics, otherwise transition brokers and circular economy influencers, would put them together showing they were looking at the same thing, in different points of the value chain. They never thought about creating a reverse logistics project together. They only see themselves as maybe suppliers of materials and buyers. But what about get together and try to find this new economic equilibrium?

Funding

We don't have any support from the government here in Brazil! It is blood, sweat and tears, trying to persuade companies that the only way to find a good systemic project is to work together. We created ecosystems, and, depending on

the type of organization, the business model is based on organizations providing a monthly fund for this ecosystem. We have a team of experts talking individually with each of them to get the information, very time consuming... Then we bring all together creating a collective intelligence: a set of information that no company will have, if they were in isolation.

Soft transition and translation between different languages and different mindsets

This is the biggest learning in recent times: circular economy is all about economics. Materials flow. There are lots of studies saying that if we recycle more plastics, we will get a revenue of a certain amount, they get the value of the plastic in isolation, they get the volume of plastic generated, and they generate a number, naming it 'the potential for plastic recycling'. But what about all the changes that must happen to validate this amount, the investment on the infrastructure or the logistics, on the awareness raising of the consumer, so the consumer can bring the packaging back? The impact of this change is difficult to measure. What's the value of convenience? Are you prepared

to change your consumer habits? If I go out and I'm thirsty, I go to a bar or supermarket to buy a water bottle, I drink it and throw it away. Well, but I can carry my bottle, and when I'm thirsty again, I will have to find a restaurant or a water fountain to fill up my water bottle. And then when I get home, I have to wash it, then put in my bag again. And if I forget to bring my water bottle, and I'm out, should I wait to come back to my house to drink water, or now I just buy another bottle of water? So it's about a new equilibrium, it's about attitudes, and convenience gets into the way because it's easier. I don't want to carry the bottle. And this is a very simple example, you know, drinking water. What about bigger industry level changes ?

Sourcing carbon footprint

When I was living in the UK, I found Brazilian mango in a supermarket, and I was so excited to see it that I bought that very expensive Brazilian mango. When I got home and I had this slice, it did not taste like Brazilian mango, there was no juice, it was artificially. Do I really need Brazilian mango in the UK supermarkets? But some people would say the consumer will have the right to have fruits from all

over the world any every season. This is something that always come to my mind: what's right, what's wrong? **Is this convenience essential?**

Should we have access to all of these products. Has this made my life better or worse? It surely had an impact, having products from all over the world being packaged and shipped. It's one of the big questions in terms of consumption.

Ecosystem

I think there are a lot of people discussing new technology. We need new technology to transform waste into resources, which is great. But what technology is only one part. We need to think about the ecosystem. I can be able to transform and get extracts from a mango seed to make it raw material for cosmetics, but if markets are not buying that natural raw material for cosmetics, there's no point for developing that technology. So we need to think systemically again. Technologies have been developed together with a market demand.

3 big learnings

Technology is one part but we need integration of the stakeholders in the value chain. Partnerships and connections are essential for systemic solutions, with multiple sectors. And we need a new rule of the game, new values, new metrics, new financial returns. Otherwise, it's not going to close the circle.

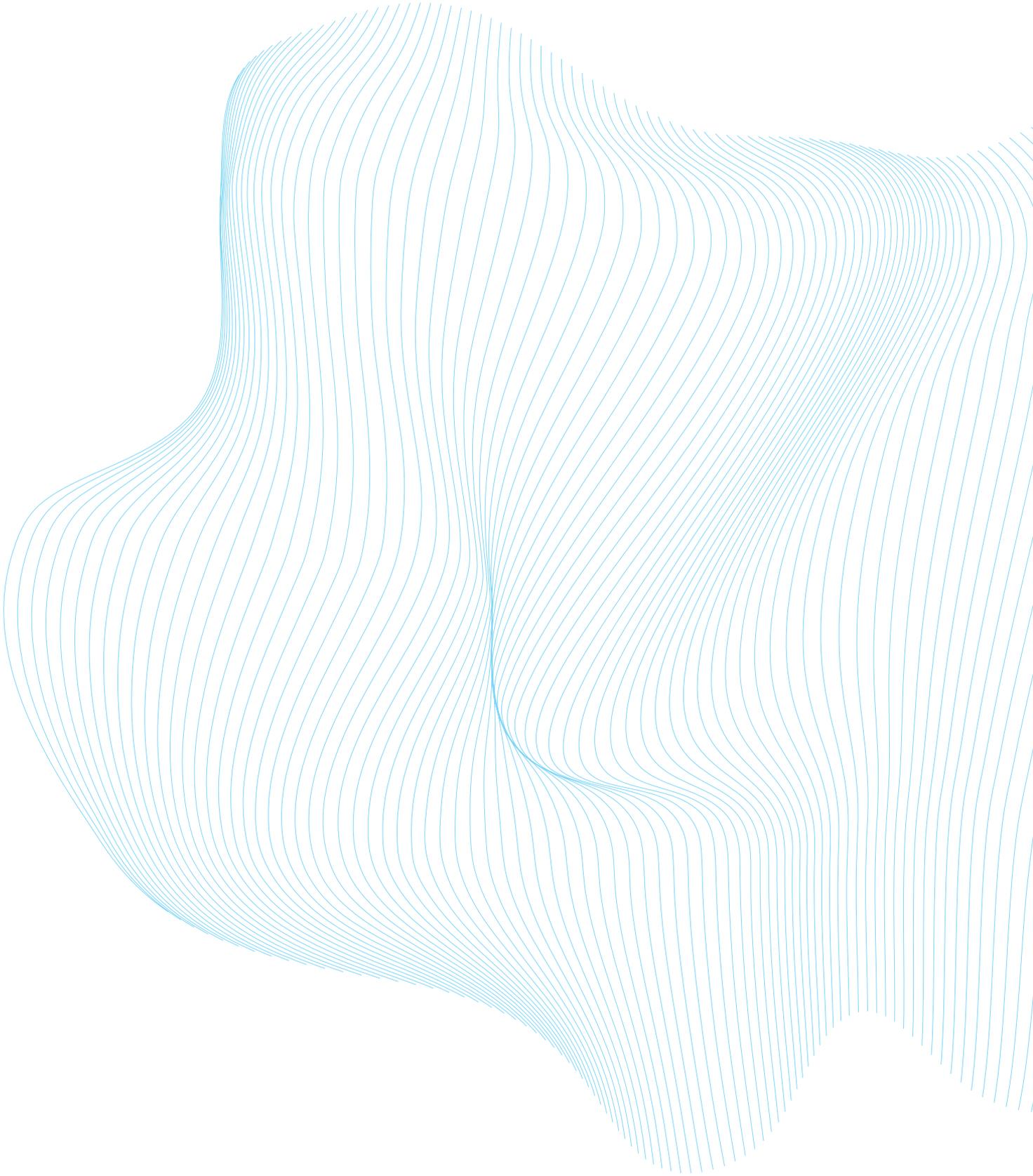
Next steps towards the future - The circular economy transition

Even though countries are so different, and we have different cultures in Europe and Latin America, at the end of the day, industry, government, and society want the same thing. Industry wants to prosper, society wants a new experience, a new product, and live a healthier life, and government wants to be powerful, influent, relevant. These are basics, and it's the same in every country. Circular transition will accelerate if we become more and more open to share our learnings among each other. BIN@Porto is an excellent opportunity to share information, build relationships and trust, because we only do business with the ones we trust. Especially in Latin America, that culture of collaboration it's not very strong, we are always kind of sensing that other person wants something from me. I think this is what we need to do for circular economy to happen, raise the bar about contact of people and share information and trust each other in a cultural change.

Pillar 3

Health and Well-being

Building
blocks for
the future



Technology to foster human interaction, not to replace human beings.

Health and well-being, although being the essence of life, are, in recent years, earning a more relevant space in discussions and in the actions Humanity needs to take to create a sustainable, fair, equal and happier planet Earth. Our invited speakers, Terry Huang, João Transmontano, and Ana Correia de Barros, are committed to the integration of systems thinking and systems science into public health. The complexity of the systems, with so many factors interfering in health quality and health services, are challenges being faced with the help of design methodologies and digital technologies. From a different perspective, indeed, we are what we eat, so we can start from food to work on prevention and healing.

People will get access to more and more complex

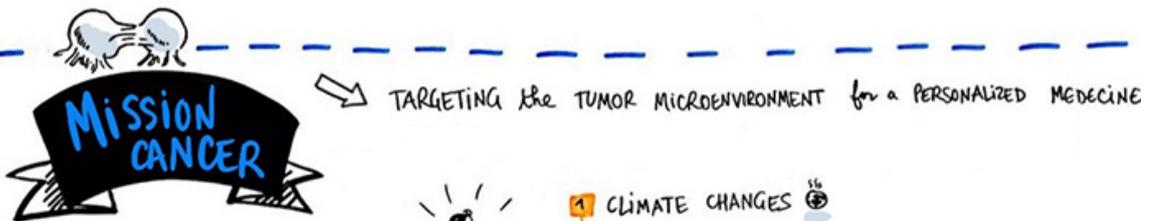
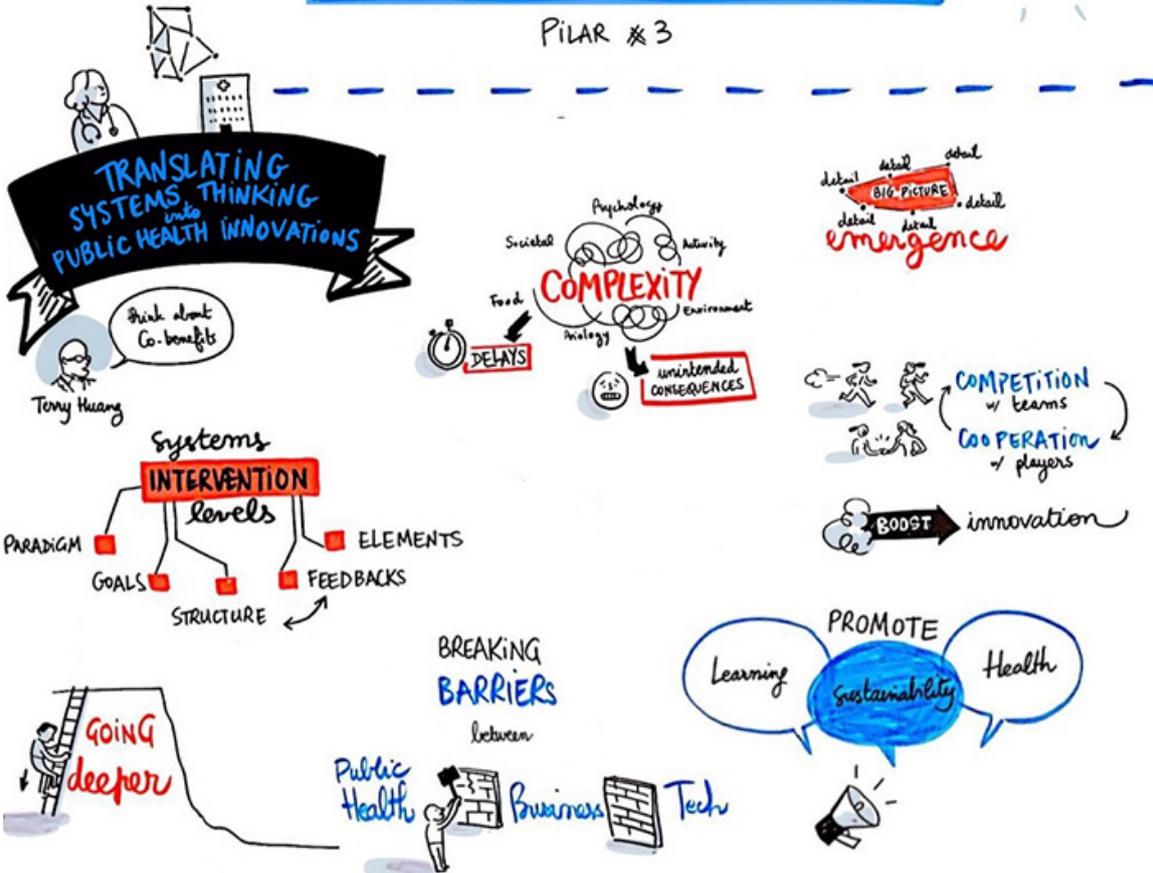
data about themselves, about the environment, but also very importantly, information about how the systems themselves work.

And people need to understand this in order to trust these technologies, and the algorithms in the case of healthcare, because they provide predictions or recommendations. People need to know how these algorithms were built, whether to trust them, and how their data are being handled. Giving the data back to the users will be one of our greatest challenges in the future.

There's the vision that technology may come to replace us, but there's the other vision, that technology can come precisely to help humans, and to bring them together. Technology to foster human interaction, not to replace human beings.

HEALTH & WELL-BEING

PILAR #3

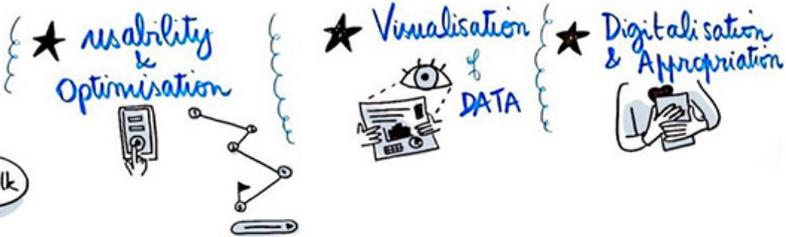


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HUMAN-CENTERED DESIGN for LIVING & AGEING with DATA



Ana Correia de Barros



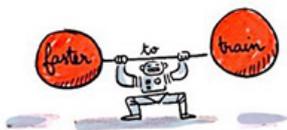
SEXUAL health PROMOTION
let's talk

- ageing + illness
- intimacy
- explore



application of DEEP LEARNING in HEALTHCARE

Jonathan RUBIN
it's faster to train



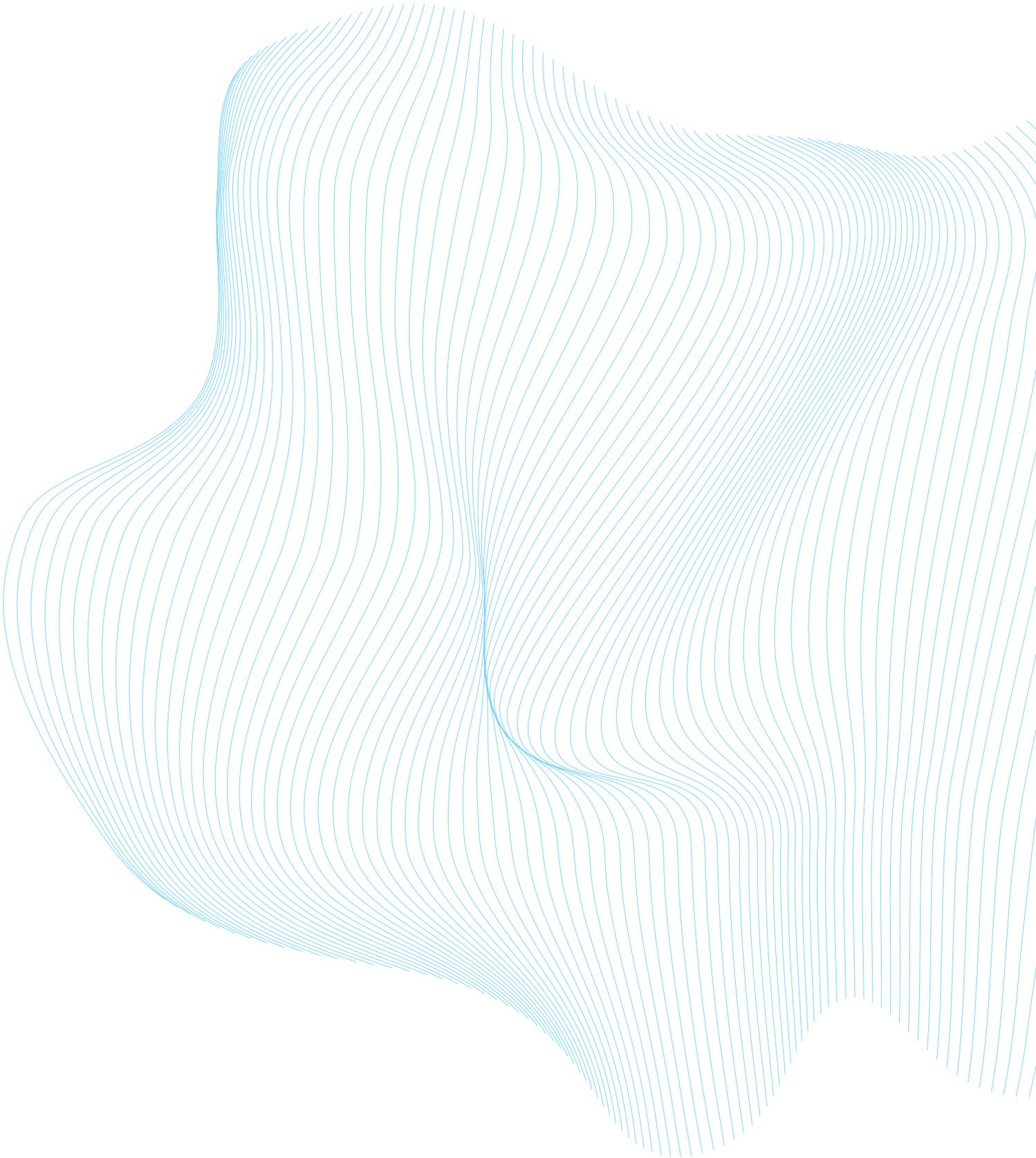
- SIGNAL PRE-PROCESSING
- NETWORK ARCHITECTURE
- IMPLEMENTATION DETAILS



new CHALLENGES

- ★ HUMAN Behaviours ⇒ opportunity
- ★ DON'T forget the LITTLE DETAILS
- ★ COMMUNICATION ⇒ fields x Machine





Translating Systems Thinking into Public Health Innovations

Public health and healthcare are one of the sectors most resistant to change, very slow at adopting new ways of thinking and doing things. The same set of strategies in public health have been tried for a long time but they're not making a big dent regarding many of the complex diseases that the world is dealing with. Obesity is a case in point. Although billions of dollars have been spent in addressing this, the problem is only getting bigger. Part of that is because siloed approaches still dominate in society, without our really being able to truly connect the dots or truly transform the

system in a fundamental way that get individuals, organizations and corporations to all work in a different way. The academic endeavour to push towards systems change and develop and test innovative strategies is an important part of Terry's work, championing the integration of systems thinking and systems science into public health, and obesity and chronic disease prevention, in particular.



A conversation with

Terry Huang, CUNY, Firefly Innovation

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Systems thinking for system change

Everybody, naturally, defaults to a standard way of doing business, even if, nominally, they're interested in creating a better world, because the fundamental equation in our political, social and economic system hasn't really changed.

Public health people have been trained, over many years, to focus more on the problem so they have become really good at dissecting the problem in ever finer details and running very sophisticated statistical models to tease out cause and effect. But we've not been very good at coming up with solutions. Often times knowing what causes a problem doesn't translate into what is needed to solve the problem.

To tackle a specific given problem, just knowing what the risk factors are, doesn't necessarily tell you what needs to be in the solution package. The public health way of thinking is, 'if I can identify what is on the right side of the equation-- these are the main effects -- and do something to intervene on these main effects, then I'm going to solve the problem'. But we know it's not that simple because these main effects rarely work in isolation. They work in an interconnected system, they interact, and there are many other variables that you did not include in your

equation. It is precisely the inability of traditional statistical models to fully capture this complexity that is fundamental to our existence that we begin to see the emergence of systems science.

Systems science is not new. It's been used in engineering, social sciences, ecology, and other fields. The approach seeks to capture the behaviours of multiple stakeholders at multiple levels, ranging from individuals to families, communities, organizations, sectors, etc. Within this approach, there are a lot of feedback loops and complex structures that underlie the emergence of a particular problem and its potential solutions.

Why systems thinking approach?

In the mid 2000s, we realized that individually tailored approaches were not working. Health education is important, but it's not adequate. Policy and environmental interactions are important because they create the conditions in which people can potentially optimize their behavior. For example, just building a park doesn't mean that people will come. Policy and environmental interventions alone are also not enough. To effectuate policy and environmental interventions, we need individuals

(at different levels of society) to act. So, we still must deal with individual behaviour at some level. There are interconnections lots of feedback loops, but how do we bring everything together? Computer scientists, engineers and ecologist have been using systems science techniques to manage this type of complexity. How can we incorporate these into public health?

Now, 15 years since we first began to champion it, systems science is accepted as an important approach in the mainstream. Systems thinking is now one of the key competencies prescribed by the accrediting body of programmes and schools in public health. That's a huge leap. Not everybody understands what it is exactly and certainly not everybody practices it. But at least it is recognized as a valid approach. Systems science doesn't displace the traditional toolbox; it adds to it.

This systems approach is really about aligning multiple stakeholders. We have to work across sectors. The toolbox gives us several techniques, including qualitative, quantitative and computational methods, that we can leverage to get from point A to point B. I often talk about the heterogeneity in a complex system, across factors, actors and

sectors. Health really is everybody's business. Unfortunately, it does take everyone in. However, the biggest question is what is the role of each actor? And how do the different actors work in a way that is coordinated, so that they're not just duplicating each other's effort but actually working in a way that is mutually reinforcing? The whole has to be greater than the sum of its parts if we are to effectively intervene on the system.

Competition and cooperation for boosting innovation

The key here is not just one top management. It's really about coordinated management at multiple levels, and we have to be able to delegate. Some of these system insights have become really crucial to public health. I can't say that we are really good at it yet. When it comes to collaboration and competition, traditionally, public health only talks about collaboration but dismisses competition. However, if we rely only on collaboration, that doesn't necessarily lead to innovation.

Competition is also a necessary ingredient for innovation. It turns out that if we set up collaboration and competition at two different scales, we can create a virtuous circle whereby

competitive teams attract members that are collaborative, and more collaboration leads to teams being more competitive.

But, the reality is that we rarely do this. When was the last time you ever saw government agencies, for example, set up to compete with each other (in a friendly way) to come up with the most innovative idea to solve a particular problem? Never. Even in the private sector, there is great room for improvement.

Crowdsourcing ecosystem for public health innovation

We need to leap outside our comfort zone. At Firefly Innovations, for example, we're creating a whole new ecosystem where we can crowdsource the most interesting ideas, not limiting only to people working in public health but also those from the broader community and with diverse expertise. There's a lot of untapped talent in communities that are disproportionately affected by health disparity problems. These talents are rarely discovered and are rarely get connected to the larger ecosystem for innovation.

Because CUNY has a very strong mission in serving

students from underserved backgrounds – an aspect of our brand equity – it's very natural for us to use Firefly Innovation as a platform to uncover these hidden talents in the community.

Once community innovators are identified, we bring them into the tent, and we cultivate them and provide them with resources, mentors, and education, so that they become more competitive in accessing the broader ecosystem out there. As part of this effort, we are constantly leveraging both collaboration and competition to further promulgate innovation.

This type of approach just has never really been used in public health. We can also imagine doing this at the community level. We can create innovation containers, hubs or living labs.

I have a vision for how we could solve complex public health challenges such as obesity, without becoming like Cuba. We need to create a culture that promotes creativity and prizes failures.

However, because there is a lot of inertia within any established field, I'm a firm believer of integrating other disciplines and sectors into public health research and practice, be them from the arts, humanities, design or engineers., If we only rely on

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people within public health, they're too resistant to change.

They're not going to be able to get there on their own. We need to bring in other viewpoints and expertise areas from a totally non-traditional public health arena to disrupt the system and status quo.

One of the challenges in public health is that we're not always in tune with people's real needs. Public health tends to be quite top down, telling you what you're supposed to do or to eat, when to exercise or how much you're supposed to sleep. And on top of that, messages are not always consistent, they change depending on new information that becomes available, often times, it's too late to, then people are confused. So, public health is one of the worst communicators ever. COVID situation has really shown that huge light on this deficiency. Part of creating systems change is to work with people who are really good at branding, marketing, PR, health communications, to come up with new ways of talking to, and engaging with, the people.

This is an area that we're really lacking. My school just introduced a new MS programme on health communications and social change.

We need to train more public health graduates

who can become experts in communicating with people. I fear that we are still only scratching the surface because we're not really working with the real experts out there in the field. They're not in academia, they're in practice in different industries who really know how to frame things, because part of communicating is not just being open and being able to speak to people, but also knowing how to frame an issue in a way that is digestible and relatable, with small messages you need to be emotionally or actively engaging. You can't only speak to people's brains, you have to speak to people's hearts.

That's really a real challenge for us. This is why I love working with designers. We work with a lot of designers on our various projects, because I recognise my own deficiencies and we need the input from people from other disciplines.

A public health-related ecosystem

COVID has really accelerated the effort to create a much more interconnected and virtual ecosystem. Firefly Innovation, launched at the end of 2019, has been operating completely online. This has worked to our advantage. We're taking this as an opportunity, not as a challenge. Even though we're housed in a university, there's no reason why our platform can't serve the global community. We're about to launch a new campaign called Firefly Collective, where we're going to invite public health entrepreneurs from around the world to self-identify and engage with us and join this network. Echoing back to what I said earlier about health being everyone's business, we need to be able to draw on the strengths, the goodwill and resources from a much more diverse group of people from around the world to solve complex challenges. And, in fact, we can do a lot with very little money. If people are committed to the cause and they're interested in doing something different, their time and talent are even more valuable than the money that might be crowdsourced. I really believe in the power of converging diverse people and minds.

A glimpse about

Health And Well-being + Circularity + Society

In fact, this brings out how health really intersects with the other two pillars of the summit programme, circularity and society, because at the end of the day, **we're not going to really be able to address most of the top health conditions that affect morbidity and mortality if we don't fundamentally rethink what is the sustainable system that we all need to shape and construct in order to basically alter and realign the incentives and disincentives in our system.**

Until we do that, we're just going to be playing on the edges and we're not going to get to the core of the issue. In public health, there's already a lot of interest, for example, in more sustainable food systems. For example, how should we tackle food waste at the same time as improving population nutrition? Again, here's a perfect intersection of circularity and health.



Example 1 | Firefly Innovations

At Firefly Innovations, there is an action pillar that includes a lot of the usual innovation activities, such as hackathons and accelerator programmes. Because we're housed in a university, there is also a really strong education pillar, targeting both the public health audience as well as audiences outside public health and academic settings. We have both for-credit courses as well as not-for-credit programmatic activities, lectures and workshops throughout the year that seek to bring people with different backgrounds and interests together. Every year, we try to introduce new topics, new ideas, and new people to stimulate all of our minds. And no one ever knows when that little magic spark might emerge.

In addition to these two pillars, there is a third pillar

is focused on strategic science. As the platform matures, Firefly Innovations can be in a position to assume leadership in conducting research on the entrepreneurship process, to be able to demonstrate that public health entrepreneurship leads to improved public health outcomes.

In the meantime, the R&D we are engaged in now is more tailored to the startups in our ecosystem. We help ventures with community-based research, validating their ideas in the community and thinking through public health metrics so that the public health impact is baked into the business model for startups. Last but not least, we're also interested in the health and well being of the entrepreneurs themselves, which is an area that's just beginning to get attention. In the long run, as we work with more and more ventures, we want to be able to answer the question:

Does adding entrepreneurship to the public health toolbox make a difference?

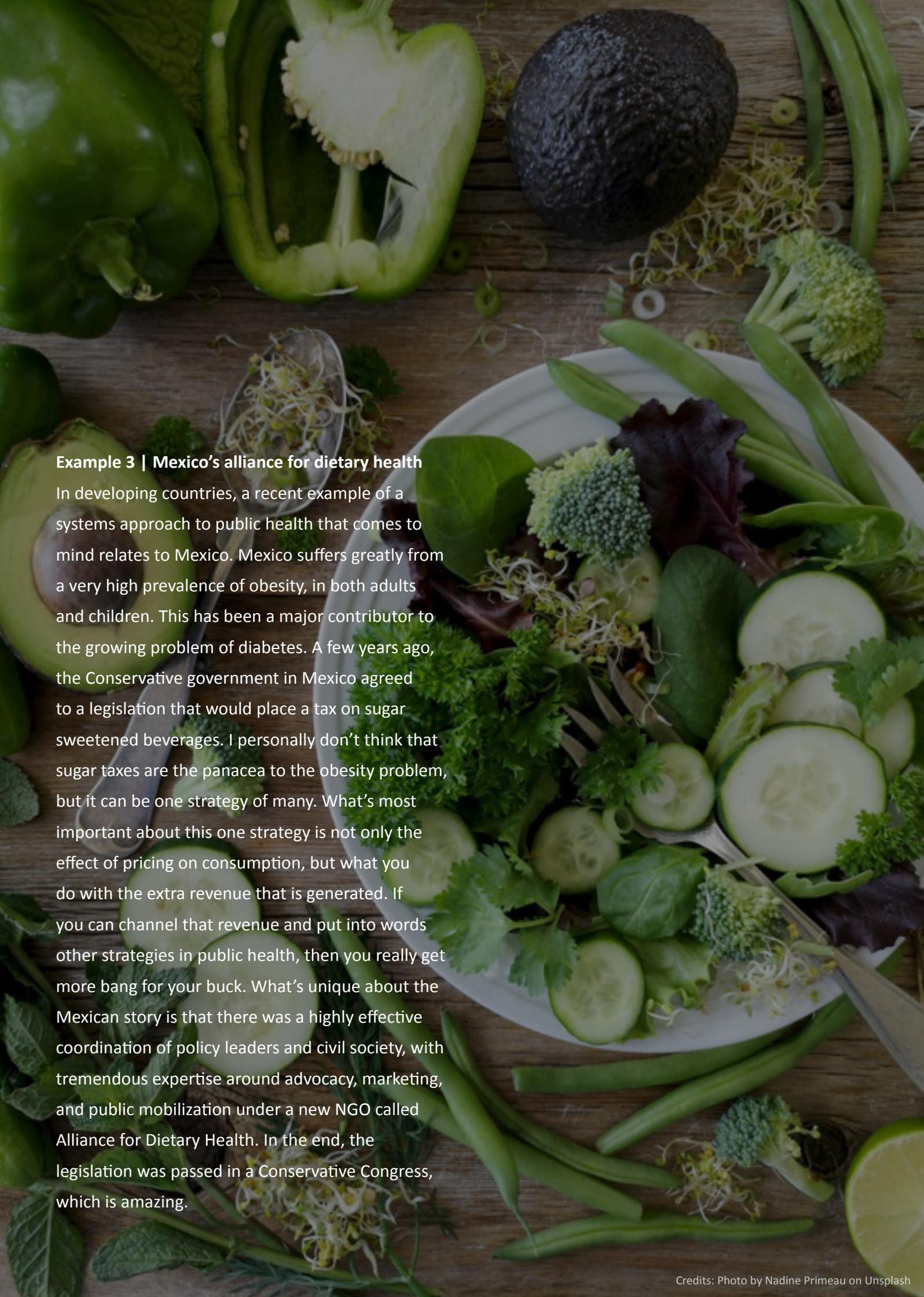
Firefly Innovations is a passion project, but it's also an effort I believe can really lead to true transformations for public health and for society.

Example 2 | Healthy Cities Movement

We can glean a lot of lessons from the success of the Healthy Cities Movement (HCM) that started in Europe but has now spread around the world. Looking at European cities versus American cities, for example, there are very different approaches to health and well being. The notion of social or policy entrepreneurship is very strong in the HCM and a lot of that has to do with building the capacity of individual actors to become champions and agents of change- people that work in public health but also in related sectors. It's about really cultivating an army of change agents. In addition to involving the public sector, increasingly, the private sector is being looped in. This gradually shifts the paradigm of public health being a purely public-sector business to one that emphasizes health being everyone's business.

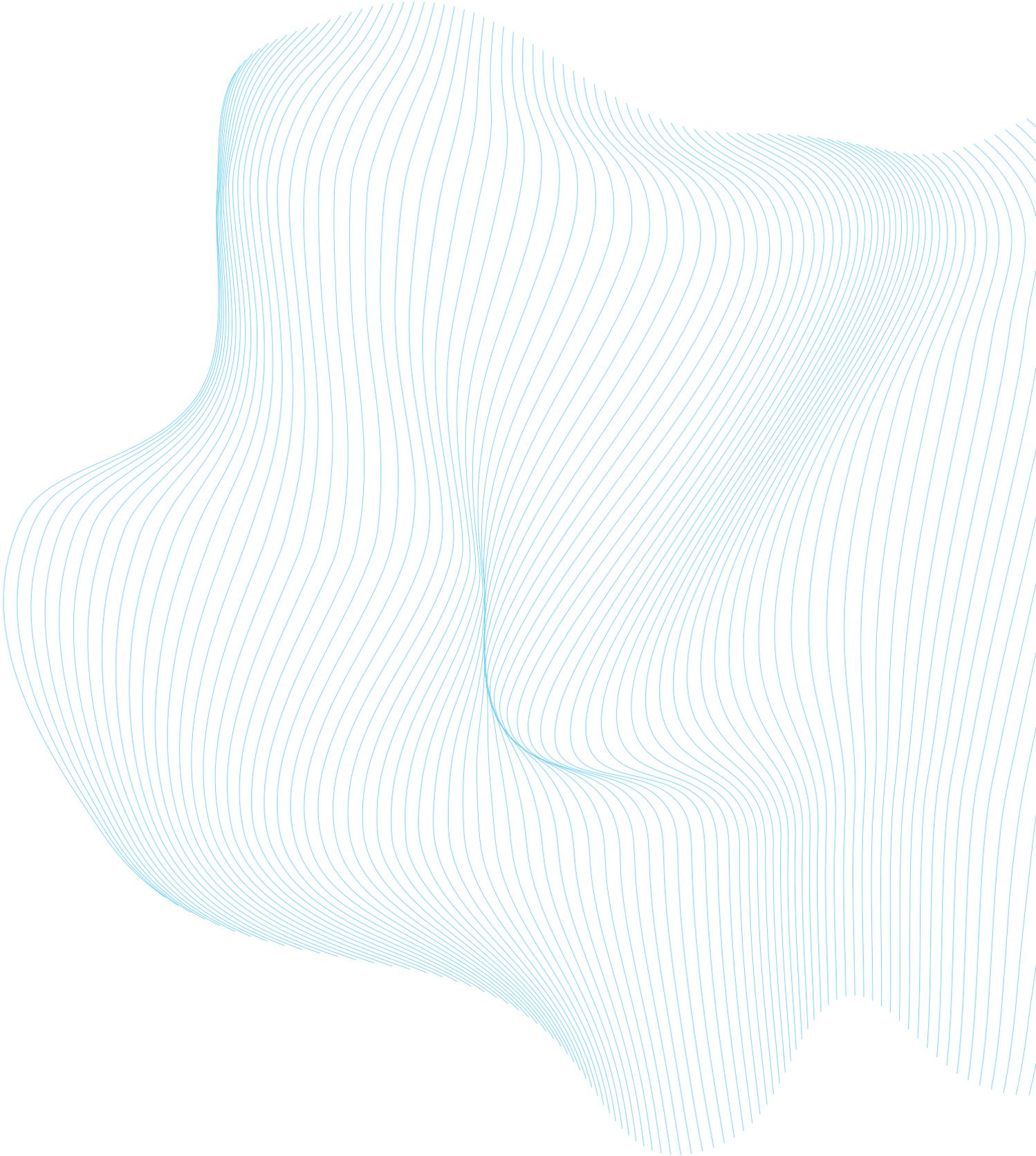
This movement illustrates the need to have health in all policies and in all places and the need to involve a lot of different sectors and actors in order to create a culture change.

The HCM is less about showing obesity or diabetes reduction by X percent but more about creating a social climate that favors health and well being.



Example 3 | Mexico's alliance for dietary health

In developing countries, a recent example of a systems approach to public health that comes to mind relates to Mexico. Mexico suffers greatly from a very high prevalence of obesity, in both adults and children. This has been a major contributor to the growing problem of diabetes. A few years ago, the Conservative government in Mexico agreed to a legislation that would place a tax on sugar sweetened beverages. I personally don't think that sugar taxes are the panacea to the obesity problem, but it can be one strategy of many. What's most important about this one strategy is not only the effect of pricing on consumption, but what you do with the extra revenue that is generated. If you can channel that revenue and put into words other strategies in public health, then you really get more bang for your buck. What's unique about the Mexican story is that there was a highly effective coordination of policy leaders and civil society, with tremendous expertise around advocacy, marketing, and public mobilization under a new NGO called Alliance for Dietary Health. In the end, the legislation was passed in a Conservative Congress, which is amazing.



Healthy Ageing

As we eat healthier, medical treatment prolongs life of human beings. Looking back 100 years, people would rarely get older than 50 to 60 years old. In a century, our genetics did not change much, we are still the same people.

What fundamental factors are responsible for a 20 years increase in the life period? Medicine is one of them, obviously. Food is another one, but food is catching up in a bad way. As the number of people living on the planet increases, more food is needed, and chemical substances that normally increase the food production also cause damage to the human health. This is where the

medicine enters. We're seeing diseases like cancer, Alzheimer and Parkinson increasing. With less expression in the past, once we live longer, they got relevant and some of them are caused by what we ingest during our life period.

Medicine did a wonderful job keeping people alive, and we are not only living more, but with quality of life. The development of new products is incredible. Less invasive diagnostics are critical as people age, helping to diagnose situations that normally would not be detected on time. The doctor was a miracle man in the past. He had to identify or try to guess the problem. It



A conversation with

João Transmontano, Entogenex Europe

João Transmontano worked in the pharmaceutical industry for over 25 years. He is PhD in pharmaceutical technology and drug delivery systems, Post-Doc on pharmaceutical medicine and MBA in marketing. He was guest professor in Southern California for global business strategy, leadership and ethics, which was pioneering in the 90s and a critical part of doing business globally nowadays. He has been active in most continents, developing innovative projects focused on wound treatment, mostly on elderly people improving their conditions of life.

was extremely difficult, especially if the patient was a child. Or even the veterinarians, where their patients don't speak. Nowadays, with all the diagnostics available, the doctor can really do a great job, because he has a lot of support. Diagnostic is a key issue, and then all those treatments that can help you extend life are great.

We would normally say, “you are what you eat”, and a very important part of that is the quality of food. Food supplements contribute a lot, and their market is increasing worldwide. We do not get these kind of supplements in the normal food that we take every day. There is a huge food supplement industry and no price regulation, so they can charge whatever they want for the product. Meanwhile, medicines are highly regulated, you have to negotiate the price, especially in Europe and the United States, and the rest of the world tries to follow the reference prices of their countries of origin.

The big difference between medical devices and medicines is the way the substance acts. Medicines normally have a chemical interaction with some receptors in the body, while medical devices have a physical action. Just like an ointment, a gel, or an

injection of hyaluronic acid in a surgery to give the structure of the eye. Medical devices are also not subject, until now, to price controls. We realized that one of the best products to treat and to prevent amputations, being basically the last line of defense is based on a product occurring in nature and known for quite a long time. The last thing that could prevent you from getting a member amputated, is using honey based products. Honey is a great product, a highly concentrated sugar product that removes the water from the bacteria causing the micro-organism death.

But sometimes honey also has some spores of a micro-organism that can produce botulinum toxin, a very powerful toxin that can cause human death specially if applied on the wound. You need to make sure that your honey is free of contaminated biological agents that can kill the patient. This was done with highly energetic gamma radiation. And in one of the side conversations on the BIN@ event, we found that professor Adriano Carvalho, from the Faculty of Engineering at the University of Porto, had a specific technique to treat the chestnuts with electric current and ultra-sounds, that can be extremely effective and may have huge applications



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in other areas in food processing. We also use some biopolymers that can be reabsorbed by the body, and so you can even treat deep wounds, neutralize the bacteria, apply the product there, and those materials will be reabsorbed by the body. If this confirms the potential, we might have a very nice line of products that reduce the time of cicatrization

up to 50% of difficult wounds that usually take 4 to 6 months to close.

It's a huge cost saving! It took longer to find some honey suppliers with production capacity and eco certificates, but now we have suppliers for the long term with a quite good product.

I do envisage the future with people paying more and more attention to food supplements, and to products from rain forests and natural areas on the planet, where the production is not being affected by the pollution or by these modern substances to promote the growth and increase the crop production. One product that is very common now in Europe, is Açai. It's a Brazilian product, from the Amazon region. It is actually a very rich product with great properties. The quality of the water that you drink also helps drive the extension of your lifetime. A lot of people spend money buying bottled water. Now we also have relatively good tap water. 100 years ago it was not always the case, water quality was quite variable.

Then, there is also a well established need for movement, walking and doing sports, exercise, and open air. And we see one slight danger here is the sun exposure that people do not always take care

If you don't have money, you don't survive? Where do you draw the line? You see all these systems collapsing.

of. Skin problems are one of the largest threats that we will probably see in the next 10 to 20 years. The sun exposure has increased maybe 20 to 30%, when compared to 50 years ago.

On the other hand, this is the dawn of a new age, with diagnostic methods that identify diseases all the time, and innovative treatments. And the question is, how much is that going to cost and who is going to pay? Health insurance has been increasing year on year, where do you put the cap on that? It's a big challenge for the health systems, especially in those highly financed by the state, like in Europe. Brazil has the largest government health system in the world, probably more than 220 million people within a unique system. But also private insurance for around 30 to 40% of the population, where growing costs are becoming higher than the monthly salary of some families. The United States is another country where you have health insurance but a lot of people cannot afford it.

Health for all

Brazil has threatened a couple of times to break patents related to AIDS products in the past, because they had the largest system in the world that provides free treatment to AIDS patients. They use that kind of negotiation tactics to lower the prices, because Brazil has a very large market. When it comes to biological medicines, the situation changes a lot. Let's say, they break a patent of RNA vaccine for COVID. It would take years for Brazil to get the facility built, train the people and make it happen. This is not something that you just go to an existing factory, do a tablet, mix the powders and get the batches going on. This is more complex. And there are not many facilities in the world that can do cell culture, or produce these kinds of products. So breaking the patent, without the assistance, the know-how, it's not that simple.

There was a project we tried to do with the Belgians in the past, to build these small factories that would be assembled inside a container, and could move around the world, to produce the vaccines locally where they are needed. But this was cell culture. This was a more simple approach. Now, India is a very interesting example. It's an exception, because

India has the capacity to produce vaccines in large scale. Why are they not getting vaccines for their population? There might be some interest there, as they produce for other companies and those vaccines are being distributed in South America and other areas. AstraZeneca installed a huge manufacturing plant there.

Let's look at the last 40 years. We know that a virus pops up once in a while. There is a yellow fever outbreak every 10 years. We had AIDS coming in the 70s, then we had SARS somewhere around the beginning of the 21st century. Now we get this COVID twenty years later. And we believe that in the next 10 years, there'll be another one. So, shouldn't we make an effort to have some plants prepared to produce these vaccines strategically placed in different parts of the world? We have a flu every year, actually in the Northern Hemisphere, around April, Southern hemisphere around October, on a current basis. Now we have a flu that has the capability to affect more people and eventually to increase the rate of death by a few percentage points. So this is something as a new market, we got to live with these, there will be more.

The real pandemic is not the COVID, it is the people

that are dying because of lack of treatment and attention. When you turn on the TV and see how many people died of COVID today, why aren't there other lines, with oncology, heart attack, and so on? There's a political use to keep you busy, to control your movements, your complaints, just to try to blame everything on COVID. We know the death toll is set to 4%, depending on your age, but we already vaccinated many people. These viruses don't go away. If you look into the past, to get rid of a disease normally takes decades. You may say we eradicated this and that, but you keep monitoring because sometimes it pops up somewhere. Let's not underestimate the problem, but also not overestimate it. And this is highly done around the world, with countries blocking everything. Definitely, going like that is just going to make another 30% of people poor and jobless, and then you have a really huge pandemic.

Food as preventive medication

The quality of the food obviously contributes tremendously to your health, because it is something you take every day. And what we see today is that a lot of food brings traces

of pesticides. There are no new pesticides in agriculture, everything we use has been developed in the last century. This is one of the few industries in the world that has not changed in the last 40 years. And there's one reason for it. The methods of detection have improved very much, and the capacity of detecting small traces of these pesticides increased tremendously, so less products are allowed. Also science advanced and started to link some of the substances used to some specific disease conditions (cancer, Parkinson, Alzheimer, etc), like glyphosate, paraquat and other. The governments are aware that most pesticides interfere with human processes, at normally causing diseases, and they raised the bar requiring products to have less content of these potentially damaging compounds.

Two years ago, the United States looked at about 50 brands of corn cereal, and they found that most of them contained well above the accepted limits for glyphosate. Science analysed the continuous use of glyphosate during several years, and started seeing people developing leukemia, and that was considered proof beyond doubt. That's when the punitive charges led by the courts affected the manufacturing company. The Fiocruz foundation in

Brazil has been monitoring the farmers around big plantations that use these large quantities of toxic products sprayed by airplanes. Invariably, they all get sick, they develop cancer, it's tremendous!

When people treat the wine grapes and have some beehives around, normally there is a decrease in the population of bees by 30 to 50%. Now, the bees are the key element for pollination. Without insects, we won't live, that is as basic as that. It all goes around. If it goes to nature, it gets back to you. And once you kill an insect with a poisonous molecule that is not easily degraded, like an organophosphate, that insect stays there and he's eaten by a rat or a snake. Birds as the American Eagle eat them, the Eagle started to become more rare and almost disappeared. As the symbol of the US nation it finally triggered some action.

It is like the landmine that you never get rid of. It's amazing that in the 21st century we still tell the farmers to apply poison. And, please wait 30 days, hopefully that the sun and the rain might dilute that a little bit, before harvesting the fruit. But the economics will lead the farmers to do the harvesting as soon as possible. This is the balance, healthy aging is totally linked with healthy food. You bring poison everyday into your body. If we could avoid

that little extra poison in every bite on an apple or on a carrot, that would be wonderful. All these pesticides block enzymes responsible for essential processes in our body.

As common people become more aware, we are seeing an exploding market in biologics, foods produced in organic ways that do not use those pesticides. This was about 2.5% of the world market one or two years ago, but I do expect that to increase exponentially to 10% to 20% in a short time. Products that can be used to treat pests without bringing those kinds of diseases or conditions have a huge future. We have developed some innovative products and we do know that the world market of pesticides is worth about USD 80 billion, and is growing.

Starving the insects

These large pesticide companies are no longer innovative, they are just huge machines to develop products from a laboratory bench into a commercial product. Innovation for their size is rare, as 90% of the innovation is done in very small groups. But they have the money and experience, and this is fundamental (similar situation happens in the pharmaceutical industry). And so far, they've

been trying to block any newcomers. But smaller companies that use some biological products to treat the food crops are now moving and possibly getting into the market. Eventually, the large companies will start looking for these small companies, acquiring them, or making deals with them. They have the power to bring them worldwide, but need to change their own mentality as they will normally give preference to the internal projects and miss the opportunity. If they purchase something from outside, it means that some of their people feel threatened (they fear for their jobs). So they need to resolve this dilemma internally.

Let us establish here a connection between oncology and pest control. In oncology we mostly focus on killing the cells, removing them physically by surgery, poisoning them with chemicals or bombarding them with radiation. But, understanding the mechanism of cancer, we may eventually let the cells die on themselves, if we are able to unblock the normal death process called apoptosis. So, instead of using toxic molecules that kill the insects, why don't we interfere in the processes by stopping their digestion and allow them to starve and die?



It's a change of attitude. Understanding the process instead of simply destroying it, using it in your favour, like swimming following the current in a river instead of swimming against it.

Science today makes this possible. We have this project – Biostarv- we try to block enzymes in insects that are critical for the digestion and energy generation. If somehow we could block this production, then the insects cannot perform digestion, they don't get their energy. Basically, they stop attacking the crops.

This is a project that we are doing with INIAV, the National Institute of Agriculture and Veterinary Research in Portugal, the Center of Biological Engineering in Braga and the Faculty of Sciences of the University of Coimbra, all in Portugal. A similar project is being carried out with Embrapa (Brazilian Agricultural Research Corporation from the Minister of Agriculture) in Brazil targeting different crops. We are trying to identify modulators that may block the

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biosynthesis of those critical enzymes for digestion in the insects, and there is one particular enzyme – trypsin- that is transversal to mosquitoes and insects, which are the pests of agriculture. Our objective is to identify at least one product that may be used as a target oriented pesticide, non toxic and biodegradable, which would be a peptide that would block the receptor responsible for the activation of the biosynthesis of the main enzyme in digestion- trypsin. All insects synthesize this enzyme and this is triggered by a receptor activated in the gut. They start producing the trypsin enzyme and the food is then processed to generate eggs for procreation and energy,. If you block the biosynthesis of trypsin, the insects cannot process the food.

The olive fruit is one of the targets chosen. There is a fly that bites the olive and feeds on the fruit, starting to make some little tunnels. Obviously this reduces the value of the fruit and of the olive oil. It's something you don't want to happen and we are trying to identify the way to block the production of trypsin on this fly. We spray the tree with a water suspension, so when the fly bites the olive surface it ingests an yeast containing that specific peptide.

We need the yeast to protect the peptide from being destroyed in the gastrointestinal tract of the fly, because it's acidic and the acidity destroys peptides. Eventually the peptide is released in the gut blocking the production of trypsin, and the fly does not feed anymore on the olive. She flies around and eventually dies, and will be eaten by other insects, but there are no toxic products. After all, it's just yeast containing a peptide. In Brazil we target cotton, sugar cane, soy beans, maize and coffee.

The mosquito

That's the basic principle, not to kill but to let die. This along no toxicity to other insects, animals and humans and additionally, the product is biodegradable. This idea is behind the project we are developing. With the mosquito, we already have a product that works, and that's already a huge thing. With other insects, we've seen in the laboratory moths and flies being affected by some of our developed peptides, they won't feed on the leaves that they normally feed on. After spraying the leaves, they start biting the leaves, then they stop eating, they move around and then become inanimate and eventually die. And that's all we

want to do, just to make sure that they don't feed in there and go eat elsewhere, trying to not affect the balance of the ecosystem. Reducing the level of crop destruction in a specific plantation from 50% to 10% is already wonderful. Very recently we got results that may represent the proof of concept we were hoping to achieve by 2026. Our partner Embrapa encountered extremely significant activity in two insects that represent the major menace to two crops in Brazil (sugar cane and cotton). If confirmed on the field, this is the breakthrough we were hoping for – the change of paradigm in agriculture. In the long term, you know these insects have been here for millions and millions of years. If you manage to block the synthesis of trypsin they will develop another enzyme, maybe not so effective, but they have the genes there. So they will eventually mutate and go around this. But if you monitor that, if you understand the genome and the receptors, if we crack the code, we hope that we can just keep up with the level of transformation.

The mosquito is a very interesting animal. I learned a lot about it in the pharmaceutical industry, as I worked with malaria. They live from two up to four weeks. Only the females bite and they normally

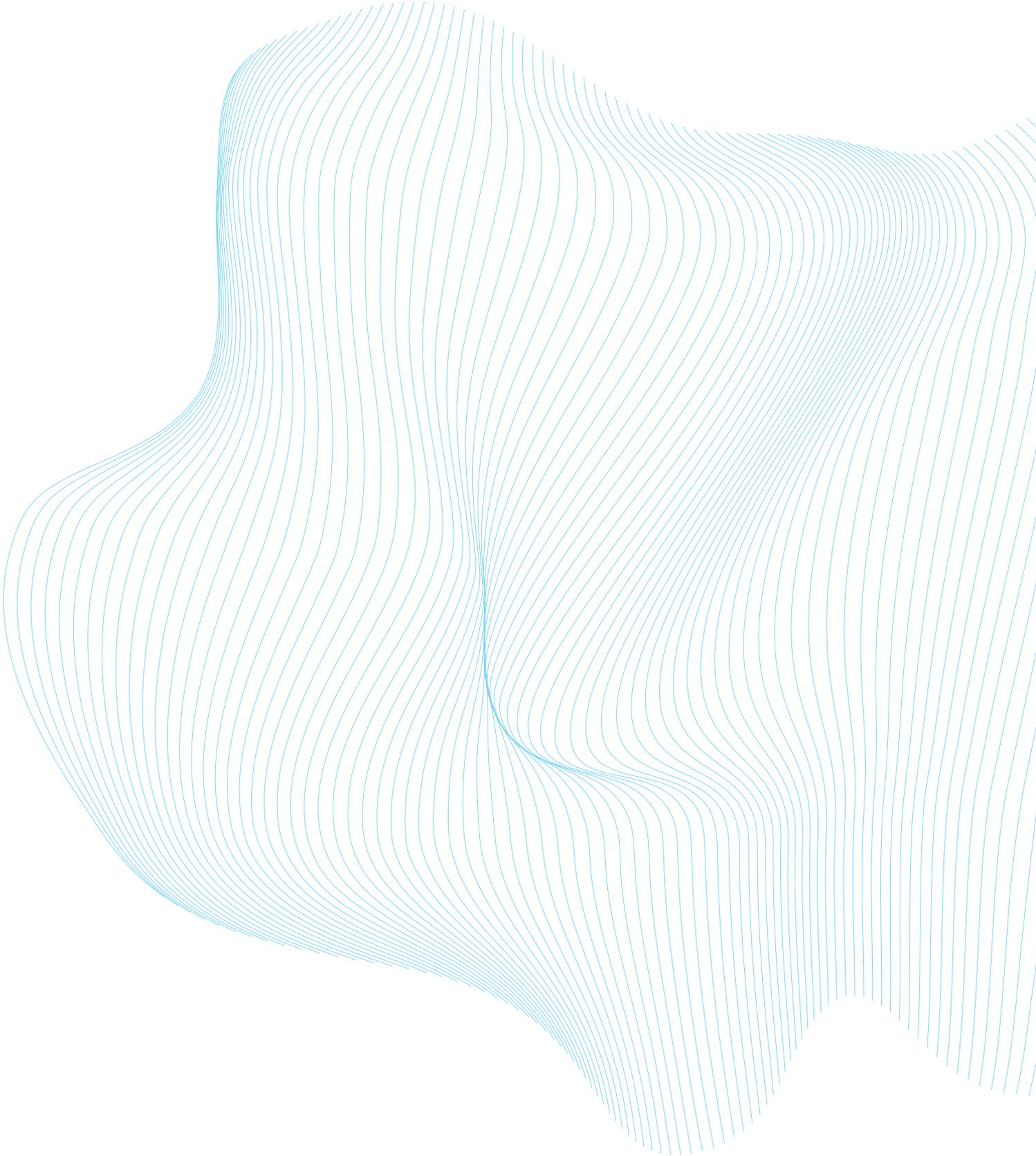
ingest 2 to 3 times their body weight in blood. That's why they lay low in the house, usually in the humid and dark toilets. They immediately start producing trypsin to digest the blood and generate amino acids to produce eggs, they produce around 150 eggs every time. But they have an auto-regulation mechanism. So we're using a natural peptide that occurs in the female mosquito. The ovarian follicle starts to produce a decapeptide normally 10 to 20 hours after the ingestion of food, and this decapeptide blocks the receptor responsible to activate the biosynthesis of trypsin. At that moment, the female gets the signal that she should take off and go lay the eggs around, close to the water. Those eggs are viable for up to two years, and when they meet some humidity, and heat, they within seconds generate a larva. And that larva has a voracious appetite and feeds on everything that's organic. In Europe and in the Americas, 8 to 10 days after she undergoes a metamorphosis and generates an adult, while in Asia, the mosquito has already mutated and only spends about 3 to 4 days on the water. Because that's the most critical and fragile period of its life cycle.

These mosquitoes have been around for about 100

million years. In perspective, the dinosaurs left 63 million years ago. So, the mosquitoes survived the dinosaurs. And we humans came into the equation only 400,000 years ago, and 10,000 years ago we started to have less air in our body surface. We became a very good food target for the mosquitoes, so the female lives around us.

Once you kill a mosquito, and you see the blood in your hands, you have that decapeptide that blocks the receptor also in there. What was done was to isolate that decapeptide, sequence it and reproduce its genetic code, then put it into a yeast genome and then ferment the yeast, kill the yeast with heat, generate a powder, disperse it in water and apply that in the form of a spray into nature. The larva prefers this yeast because it is one of their favourite foods, ingests the yeast which liberates the decapeptide into the larva gut and that blocks the production of trypsin. That's how the larva does not

develop, and does not generate the energy needed to do the metamorphosis into an adult mosquito. We targeted three mosquito types that transmit over 30 known diseases: Anopheles transmits malaria, Aedes aegypti in America, and Aedes albopictus in Africa, Asia, and in the south of Europe. This is the Tiger mosquito that transmit 27 known diseases among those zika, dengue, chikungunya, yellow fever, Japanese encephalitis, Nile virus fever, you name it. And then the Culex quinquefasciatus that we have all over the planet, that transmit filariasis. One mosquito kills a person every 30 seconds, and this means about 1 million humans per year. So it's a pandemic every year. No vaccine. But it was until now a poor people's disease. With climate change on the planet, we need to get ready. We were a couple of months ago in Murcia, Spain, and one of the huge problems they have is the Tiger mosquito. They're already endemic in the region, and if they make the way to Alcáçer do Sal in Portugal they will become endemic there, too (in ancient times they were endemic there). They are aggressive, and if they bite somebody who is infected and they spread the disease, then we have a huge serious problem, we don't get rid of them very easily.



Human Centered Design for Living and Ageing with Data

It is very fortunate to work in a team where everyone is already evangelized about human centered design for healthcare and well-being. But we do have some of these experiences, sometimes with clients, trying to explain the value that we could bring. And I found that the most efficient way of doing this argument is through examples that we have. Examples of clients wanting something, going into the field and understanding that they have to redesign the problem, because they were about to put money in the wrong one. Or examples of data that we have collected when people were using health care technologies, and

what they were interested in. In a project for Parkinson's disease, we had developed a solution for self management of the disease. We had lots of features that were asked from engineers and from the medical doctors. And then we have what the patients and the informal caregivers had asked us. What we saw, in a longitudinal study with logs of the use of the technology, was that the features that people asked for were the ones that were really used. These are small examples that we try to use to convey the value of user research and of human centered design.



A conversation with

Ana Correia de Barros, Fraunhofer Portugal AICOS

Ana Correia de Barros is a senior researcher at Fraunhofer Portugal, in the AICOS Assistive Information and Communication solutions center. She is the head of the Human Centered Department, a multidisciplinary team of researchers. Her main interests are in the field of human centered design applied to healthcare and, recently, to manufacturing, bringing healthcare to the workplace, shop floors, factories, and designing technology for these environments. Designing together with people, this team invests not only in devices but also in longitudinal studies about technology, how people are using appropriate technology.

Give the data back to users

It is key to invest on tools for remote monitoring of the technology. As people are using the technology, in longitudinal studies, data about that use is collected with people consent, and this is tremendously useful to identify events that are surprising or mysterious, and then use these data to go back to the participants and interview them to understand what is behind the behaviour found on data. This data could be used in two ways, one for research purposes and the other to give the data back to the users, and this is very impactful as people see themselves in a different lens. The design role is not just to select which kind of data to show, but also to work on beautiful and usable data visualizations for aging adults, novice technology users, or people with disabilities or chronic diseases. It's very important to invest on the usability of these visualizations. There are several examples of people thinking that they know how they behaved, and then there is a self confrontation with the visualizations. They get epiphanies. And this is why we are giving back individual data.

Digital literacy is evolving

As you age, there is a natural aging decline in your abilities: sensory, cognitive, or motor abilities. But in terms of literacy and mental models associated with computers, being them smartphones, desktops, or tablet devices, we noticed that knowledge has grown. We have a technology called the Smart Companion. From the beginning, it was designed for someone who had never seen a computer, and the premise was that this person has to unbox it and use it immediately, being that intuitive. One of the things we did a lot was to break down tasks. For instance, scrolling was not intuitive and was not self discovered by the users, so we had to use buttons for navigation all the time. But then, as people began to interact with the devices, these strategies we designed just became annoying, taking a lot of time to complete tasks. People started scrolling and there was no scroll. It was broken down in so many steps when it could be done at once. So, it forced us to gradually design customizable solutions. We understood that there was this spectrum, it taught us to design solutions in the way people can customize them to their own needs. throughout time. It's really important not just

to design technology, do usability studies and see if it works or not, but also to learn with people living with the technology, with the tweaks to our devices. And it's important for technology to accompany that progress in the learning.

Trust the technology

Whether the technology we are using are mobile

devices, wearables, VR or AR, usability is something we will always have to care about. They are different, with different challenges, but it's doable. The challenge may lie precisely on the mental models and usability of these visualizations, and people grasping the meaning of the data. People will get access to more and more complex data about themselves, about the environment, but also



very importantly, information about how the systems themselves work. And people need to understand this in order to trust these technologies, and the algorithms in the case of healthcare, because they provide predictions or recommendations. People need to know how these algorithms were built, whether to trust them, and how their data are being handled. And this, I think, will be one of our greatest challenges in the future. But we don't see people in everyday life concerned about this, not in Portugal at least, in some other countries maybe a little bit. For instance, we see that in projects in Germany, older adults and people with chronic diseases are much more aware of these issues.

It's important for the future not just to think about how to convey this information, but also to convey it to the widest possible range of the population, thinking about an inclusive design. This is a really big challenge for many who don't know anything about artificial intelligence. But if you think of people who may have some kind of impairment, cognitive, sensory or motor, this is even more challenging. If we're going to do it, we should be thinking about the widest possible range of users.

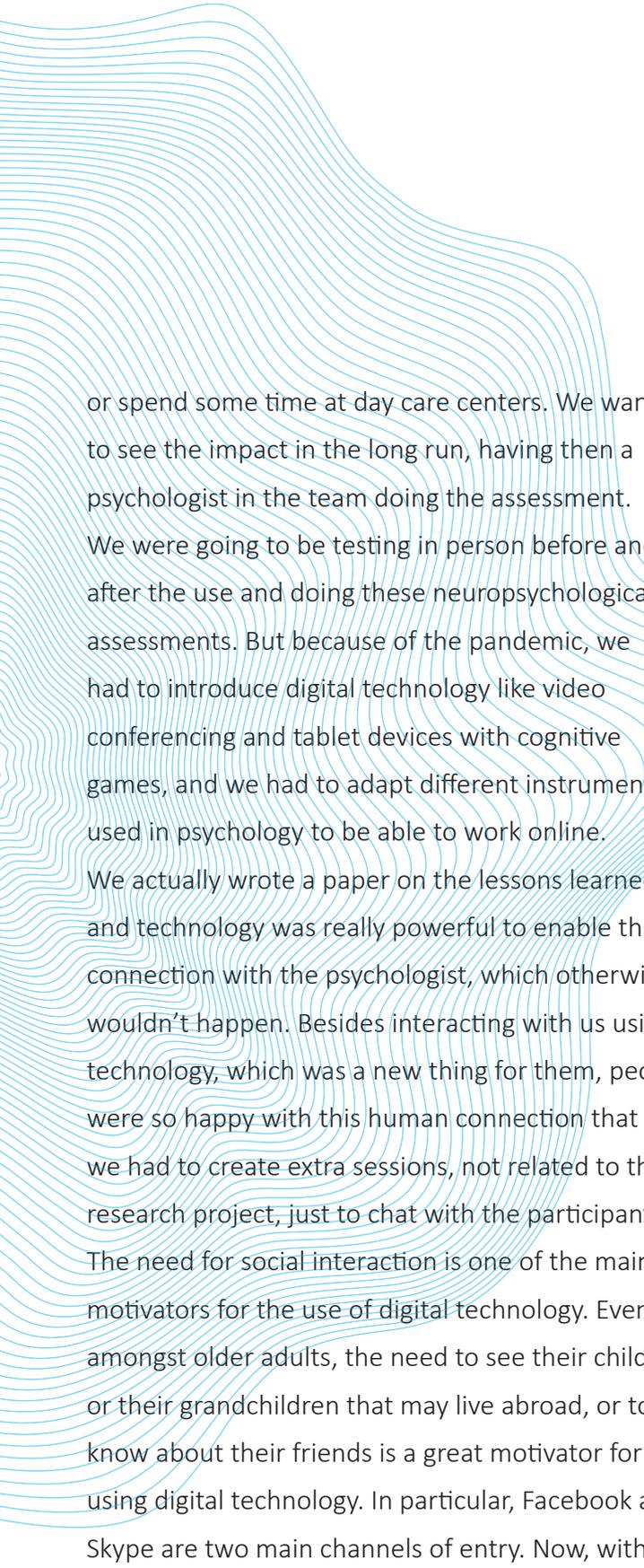
We are working on the mechanisms to audit the

algorithms, to get a tool that anyone can use to see whether the algorithms may be biased and analyse the kind of data they were built upon. We also look at the end user side, trying to come up with mechanisms to explain the whole process of how an algorithm is built and how people can explore and make questions. That's the side of Human Centered Design, the parts of this meaningful experience. Another project by the Intelligent Systems group is on ways to certify datasets and algorithms, creating a pedigree of the process, which is traceable to support transparency and accountability.

Human Connection

Sometimes we think we should abandon the screens and do something tangible so people can share it. There's the vision that technology may come to replace human beings, but there's the other vision, that technology can come precisely to help them, to bring them together and to create richer interactions. This is an actual discussion, and is what we like to think or to work on.

There is a longitudinal study to characterize a cohort of older adults in different places of the country, dozens of older adults that are living in residences



or spend some time at day care centers. We wanted to see the impact in the long run, having then a psychologist in the team doing the assessment. We were going to be testing in person before and after the use and doing these neuropsychological assessments. But because of the pandemic, we had to introduce digital technology like video conferencing and tablet devices with cognitive games, and we had to adapt different instruments used in psychology to be able to work online.

We actually wrote a paper on the lessons learned, and technology was really powerful to enable this connection with the psychologist, which otherwise wouldn't happen. Besides interacting with us using technology, which was a new thing for them, people were so happy with this human connection that we had to create extra sessions, not related to the research project, just to chat with the participants.

The need for social interaction is one of the main motivators for the use of digital technology. Even amongst older adults, the need to see their children or their grandchildren that may live abroad, or to know about their friends is a great motivator for using digital technology. In particular, Facebook and Skype are two main channels of entry. Now, with

the pandemics, people would much rather prefer to have physical contact with one another. But, it was very powerful to use digital technology as an enabler of these social interactions that wouldn't happen otherwise. Even those people who didn't want to use technology at first, were available to talk online with different people, and they wanted even more.

New fields of research

For years we have been working with older adults, then with different chronic diseases, and then to the longitudinal studies, thinking about how people lived with technology. More and more, you see people who are older and are working, and that is a really important part of our life:work. Because of my background, I have worked in a professional rehabilitation center, as well, I understood some of the challenges, that have to do with integrating people with different abilities in the workplace, and to get evidence on the impact of work on occupational diseases.

Combining all these experiences, we then started this new field of research of human centered technology for the shop floor. We have this MIT

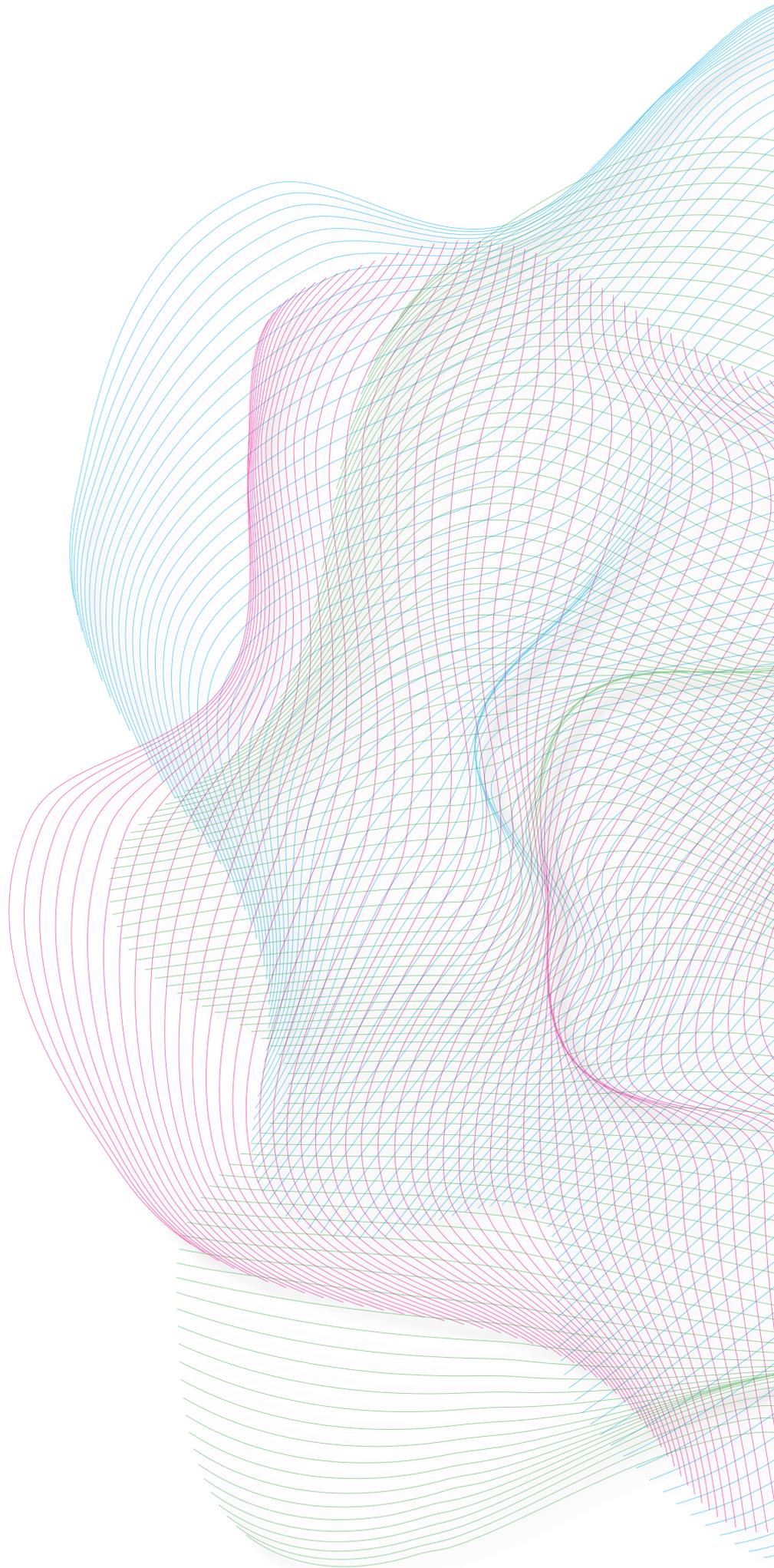
Portugal flagship project, called Operator, and we are using active and passive data to come up with ways to hopefully create better workplaces. We're trying to reconcile the vision of the companies with those of the workers. The companies are concerned with productivity rates, but this comes at the expense of workers' health, and we want to measure this. We want to measure in particular mental health, and collect some evidence on the really high rates of absenteeism, burnouts, or presenteeism. We are also collecting data on the environment, and the risks that people are exposed to. And then we can give back these visualizations, so that people can relate the data, and look at themselves in a different light.

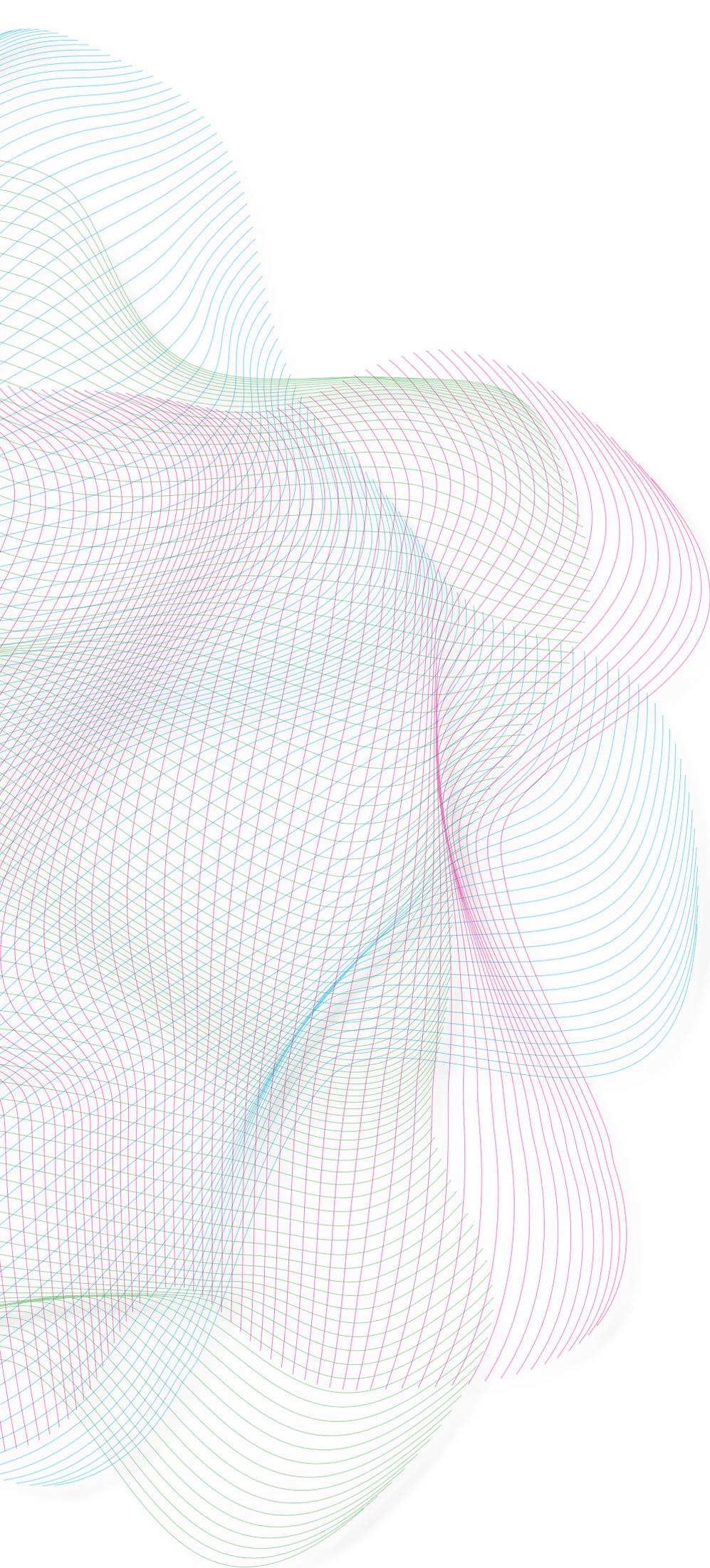


There's the vision that technology may come to replace human beings, but there's the other vision, that technology can come precisely to help them, to bring them together and to create richer interactions.

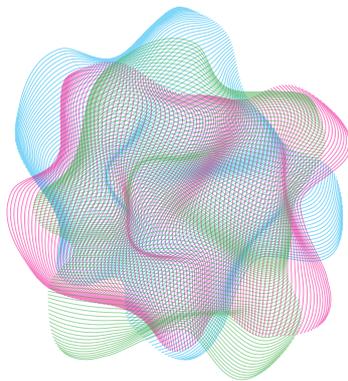
We have plans of expanding this, looking into older adults, and people with disabilities at work. We started with shop floors because these are more challenging environments, even for Human Centered Design. It's really challenging to do these kind of activities, taking workers from the shop floor, who are, or not, producing while they're talking to us, or doing our exercises. But it has been a rich experience so far, for us and for the companies. There is a new project that we have called Anathema and which is looking at sexual health in older age. And this for Human Centered Design is challenging for many aspects. The strongest one being stigma. For us, this is completely new. There is almost nothing done around this field. So, this is something that I would like to highlight and get people thinking about.

We have also invited philosophers to discuss what are the limits of digital technology and whether it replaces important things, and still haven't reached a conclusion. We think that **digital technology isn't value free**. So, when we as designers, imprint some kind of values in the technology that we are designing, it can promote some values and demote some others. For example, when you have a medical device for doctors to use, you can promote the idea that the device knows more than a person or you can demote that idea. It is very tricky to try to speculate about the impact that this may have on users. **There's actually a whole field of research on value sensitive design** and, as a research institute, it is our job to try and bring philosophers to help us think about how we design values into technology.





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Júlio Martins, co-founder of Everythink



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