№54 2/2020

life in ESTONIA



EdTech companies make learning personal

A learning space without institutional borders

Estonian scientists envision possible COVID-19 scenarios

Hack the crisis the Estonian way

Delta – a modern ground for entrepreneurship & innovation

The Year of Digital Culture

Kaupo Kikkas: the forest-inspired music portrait photographer

Education nation – for the smartEST in the world



Photo by Raigo Tõnisalu

Cover photos from
brand.estonia.ee

A small nation who has become great in education

Whom we should thank, looking at the great success of Estonia in the global competition for the honour of being best in education? I think that there are three main sources of Estonian educational success today. First, the traditional schools that were developed for the education of the peasant children during the Reformation of the 17th century; second, the ideas launched by leaders of the 19th-century nation-building effort to ensure the survival of the Estonian nation in a world governed by mighty neighbours, provided that it could become 'great through learning'. The third source was really a continuation of the second but in the totally new context of the coming digital age — the launching of the ambitious national digitalisation programme 'The Tiger Leap' for all Estonian schools in the year 1997, when the newly independent country still suffered from a desperate lack of money. At the Independence Day parade the Estonian army marched in second-hand boots, holding second-hand rifles, and Estonian youth tried to use any opportunity to find a job abroad even if the type of work could be described as 'ancient'.

The willingness to create the best education system for the 21st century in Estonia stemmed from three sources: the egalitarian tradition of the comprehensive education system, the ambitions of the nation and trust in education as the only way to grow beyond the limits set by the small size and poverty of the country.

Today, Estonia could be proudly called the Education Nation. Estonian schoolchildren won not only the first places in PISA tests but also many golden awards in various education competitions around the world. The traditionally egalitarian spirit of Estonian education means that even in the context of growing inequalities in all fields in the world, the high quality of Estonian language education is equally available to all children from kindergarten to university. The state has given equal financial guarantees for teachers and families in order to break the vicious interdependence of educational opportunities and social class, material wealth, cultural or regional background of the children.

Estonian education had successfully passed the hard test of resilience and sustainability during the recent global pandemic. The Estonian school system was totally closed down on the 16th of March from the primary to tertiary level. It took one or two weeks for all students, teachers and families to switch from conventional to virtual classrooms. The golden vision of 'Education for the 21st century', created by expert groups in 2019 as a part of the national development strategy for 2035, which envisaged the future of Estonian education as a fully personalised and digitalised learning-space without institutional borders between education, economics, culture, and family life, suddenly became a reality for thousands of teachers and schools and for a hundred thousand students and their families all over the country. We can proudly say that, despite all initial fears, Estonian education has successfully passed this litmus test.

Marju Lauristin
Professor of Social Communication
at the University of Tartu
Lead expert in Estonia's education
strategy 2035



Photo by Argo Ingver

Executive publisher
Positive Projects
Pärnu mnt 69,
10134 Tallinn, Estonia
lifeinestonia@positive.ee

Editor
Reet Grosberg
reetgrosberg@positive.ee

Translations
Ingrid Hübscher

Language editor
Daniel Warren

Design & layout
Positive Design

EAS
Enterprise Estonia

Estonian Investment Agency
supports companies investing and expanding in Estonia. World-class human capital, unique digital capabilities and a competitive business environment make Estonia a smart, agile location for businesses with global ambitions.

investinestonia.com

The production of the magazine has been inspired by green technology

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Education nation — for the smartEST people in the world

Estonian students are the best in Europe in mathematics, reading, science, and financial literacy according to the recent PISA tests. More than 60% of pupils said they consider a future as entrepreneurs. The steady improvement in global education rankings has inspired Estonia to launch 'Education Nation — for the smartEST people in the world' to scale the experience and share it worldwide.

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An educational revolution that started in Estonia

Märt Aro is one of the earliest Estonian EdTech founders and an educational innovator who dreams of enabling access to high-quality education to everyone globally. He is glad that the EdTech startup sector has lived up to the expectations and has used this opportunity to prove its value for learners.

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DreamApply transforms the university application system

The software developed in Estonia that helps admissions systems to use time previously spent on paperwork to counsel students more efficiently.

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Tech companies are putting their weight behind Estonia's education

Martin Villig, co-founder of Bolt, decided to found the Good Deed Education Fund with the help of contributions from 30 Estonian entrepreneurs, to tackle problems the Estonian education system is facing.

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Personal experience led an e-resident to develop an online service for tutoring

Karen V. Ordones is a Brazilian expat living in Estonia. Her personal experience in the tutoring business led to the development of the online service Tutor.id, which helps tutors to manage the business side of tutoring.

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99math creates games to make mathematics interesting

Video game and mathematics enthusiast Tõnis Kusmin tied his interests together and founded 99math, a startup that has raised 500 000 euros.

30

Bringing more girls into tech

It's a well-known fact around the world that women and girls are far less likely than their male peers to pick a career in IT. The stereotypes start in childhood. An Estonian initiative called the Unicorn Squad is tackling this issue by offering hands-on activities for girls to get more acquainted with robotics and tech and bust the myth that technology classes are only for boys.

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Anybody can be a linguist. With Lingvist

Lingvist, the biggest EdTech company in Estonia, is using AI to create individual paths for learning. They have accelerated the speed of language learning by four times but their ambitions are even higher.

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Cleveron Academy for young robotics enthusiasts

Cleveron, which develops and constructs parcel robots, started an applied higher education curriculum called the Cleveron Academy. The academy aims to train software developers with a specific focus on self-driving cars.

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Study on COVID-19: predicting possible scenarios

As coronavirus began its spread in Estonia, scientists at the University of Tartu launched an anonymous online survey to map the symptoms and risk factors associated with COVID-19. Coordinators Professor Jaak Vilo and Senior Research Fellow Hedi Peterson from the Institute of Computer Science agreed to share the results of the study.

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Future learning and education will be co-creative

What should be taught at future universities so that people can solve diverse and wide-ranging societal problems? The fresh collaborative project SHIINE, which is comprised of researchers from 40 countries, is looking for an answer to this question.

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Estonia's biggest data centre opens its doors in 2021

Estonia's biggest data centre was born through a 100-million-euro Finnish investment, hard work, and some luck. A small favour led to a big dream coming true for Kert Evert, now a co-founder of the largest up and coming Baltic data centre in Estonia.

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PORTFOLIO. Kaupo Kikkas: music portrait photographer who receives inspiration in the forest

Kaupo Kikkas, one of the most acclaimed music portrait photographers in Estonia, was supposed to become a clarinet player or singer but became fascinated by photography to the extent that he gave up his career in music. He is most known for his photos of famous musicians, but lately his focus has turned to nature.

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The Year of Digital Culture — an unexpected acceleration of digital innovation in the arts

When the Estonian Ministry of Culture decided to dedicate 2020 to digital culture a few years ago, nobody could imagine the incredible acceleration that the worldwide COVID-19 lockdown would force upon digital culture. The spring of 2020 witnessed a self-fulfilling prophecy of the year's theme.

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New Delta Centre unites the past and the future

Cooperate, innovate, and accelerate — these are probably the most precise keywords to characterise the spirit behind the new Delta Centre in Tartu. The landmark building provides a unique collaborative environment for teaching and research as well as business. It is truly a centre for entrepreneurship and innovation.

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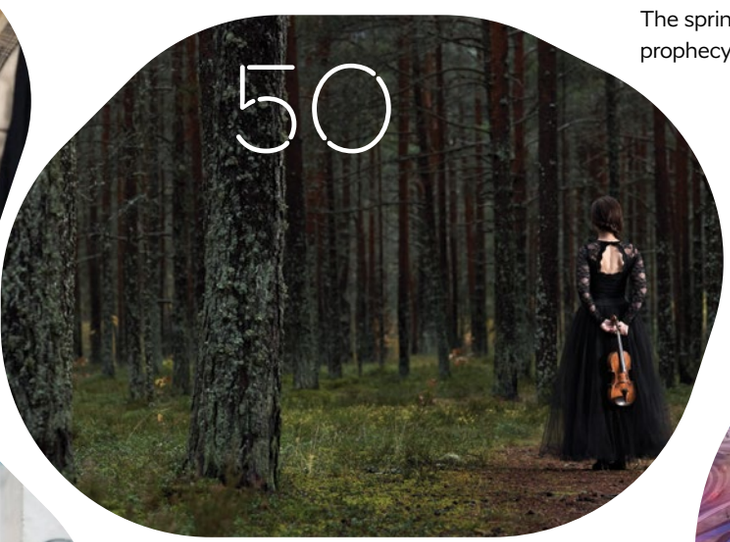
'Global Hack' — an Estonian way to fight the virus virtually

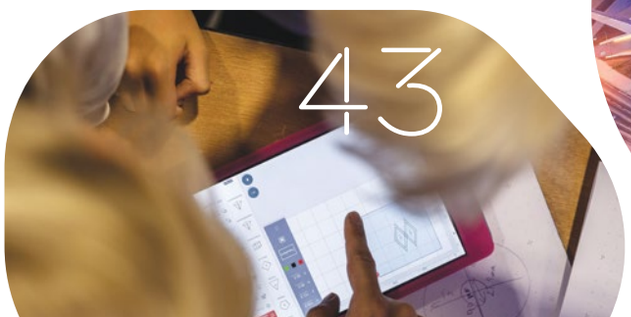
"We Estonians don't know how to just stay still and do nothing in the midst of the crisis — we act and we hack!" Estonian-based Garage48 together with the programme Accelerate Estonia put together an online hackathon 'Global Hack' for over 12 000 participants from almost 100 countries. Everyone in their own homes, in lockdown all over the world, came together to work out new ideas and solutions.

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Maria Tamander — a Swedish-born Londoner returns to her mother's childhood home

Maria Tamander, a Swedish-born entrepreneur, investor, pub owner, and former film executive, fell in love with her mother's childhood farm Hülgeranna on the island of Saaremaa. After having stayed there during the entire lockdown period, she and her husband decided to organise retreats on Saaremaa for Hollywood's big names.







Estonia and Japan planning further cooperation in IT and green energy

Photos by Jürgen Randma







Meeting with the Japanese Prime Minister Shinzō Abe



Kaido Höövelson, former professional sumo wrestler known in Japan as Baruto Kaito, shaking hands with the Japanese Minister of the Environment Shinjirō Koizumi









Minister of Education and Research Mailis Reps



Prime Minister of Estonia Jüri Ratas

The Prime Minister of Estonia **Jüri Ratas** paid an official working visit to Japan in February, the main purpose of which was to strengthen bilateral relations and expand economic co-operation. The Prime Minister was accompanied by the Minister of Education and Research **Mailis Reps**, the Chairman of the Estonian-Japanese Friendship Group **Kaido Höövelson** (former professional sumo wrestler known in Japan as **Baruto Kaito**), as well as several Estonian entrepreneurs.

When meeting with the Japanese Prime Minister **Shinzō Abe**, the focus was set on closer economic relations, environmental and energy issues, as well as co-operation in the IT sector and cybersecurity. According to Prime Minister Abe, there has been significant progress in Japanese-Estonian relations. "The progress is especially evident in the field of ICT. Estonia is the sector's world leader and Japan is continually looking forward to strengthening further bilateral economic relations," minister Abe said.

The visiting entrepreneurs had the chance to attend a business seminar in Kyoto where the Estonian Prime Minister encouraged the entrepreneurs of Estonia and the Kansai region to establish business contacts. Prime Minister Ratas said at the business seminar that even though Kyoto is almost 8000 kilometres from Estonia, the people of Japan and Estonia have much in common. "We both value our traditions and heritage, are close to nature, care about the environment, and most importantly, we believe that technology can make people's lives better and more convenient," said Ratas. "We need innovative solutions to respond to global challenges such as combating climate change. Estonian and Japanese entrepreneurs will find plenty of opportunities for cooperation here," said Ratas.

The visit was especially successful for Estonian companies such as the parcel pick up manufacturer **Cleveron**, the software company **Helmes** and the ICT company **Cybernetica**, all of which signed memorandums of understanding with different Japanese partners to boost cooperation.



Estonia and Germany start cooperation in the field of artificial intelligence

Photos by Meeli Küttim





Ando Leppiman





In February, the Secretary-General of the Ministry of Economic Affairs and Communications **Ando Leppiman** and a business delegation of 13 companies visited Hamburg to strengthen collaboration between the German city and Estonia. To mark this, a memorandum of cooperation between Enterprise Estonia and Artificial Intelligence Centre (ARIC) Hamburg was signed to enhance collaboration between Estonian and German companies in the fields of AI, robotics, smart cities, and digitalisation.

Christian Pfromm, Chief Digital Officer of the City of Hamburg, welcomed closer cooperation between Estonia and Germany. "Estonia is a digital pathfinder in the world, showing the way in using digital technologies for the benefit of citizens. We are delighted that the artificial intelligence communities of Estonia and Hamburg will work more closely together and that all parties concerned will benefit from each other's know-how," said Pfromm. Several large German companies have confirmed to ARIC Hamburg their interest in working together with Estonia, including **Ströer**, **Airbus**, **Lufthansa Group**, **Otto, Nexperia**, and **Bosch**.

According to Ando Leppiman it is an important step in the development of Estonian-German cooperation in the fields of IT and innovation. "ARIC brings together all the major technology companies and research institutions of Northern Germany, providing our companies with great opportunities to develop AI knowledge and skills. As a result, we can move up the value chain towards higher value-added products and services and therefore remain competitive and increase productivity," Leppiman noted.









Tõnu Kaljuste and Arvo Pärt





As part of the visit, Enterprise Estonia wished to show its appreciation to its partners and investors by inviting them to a reception and concert dedicated to Estonia's music at the cultural landmark of Hamburg — **Elbphilharmonie** Hall. The works of the most internationally known Estonian — **Arvo Pärt** — were performed by Ta**llinn Chamber Orchestra** and the **Estonian Philharmonic Chamber Choir** conducted by **Tõnu Kaljuste**. Arvo Pärt himself was also present and was received by the audience with standing ovations.



Maarika Truu

Photo by Kristian Kruuser

Resilience keeps the Estonian startup ecosystem successful

By Maarika Truu, Head of Startup Estonia

2019 was another record-breaking year for the Estonian startup ecosystem. We have reached the magic number of 1000 startups registered in Estonia: startups employ more than 6000 people, paid 46% more employment taxes in 2019 than the previous year, generated more and more turnover and attracted a lot of investments. However, the startup sector is not unaffected by COVID-19.

2020 started off with **Estonian Startup Awards** in which, for the first time, our startup community shed light on the biggest success stories from the past year. During the awards night, **Startup Estonia** also launched a new version of the **Estonian Startup Database**. In the process, we systematised and improved our data collecting methods, leading us to map out a lot of new startups and reach the magical number of 1000 startups registered in Estonia. Statistics from the **Estonian Tax and Customs Board** show that by the end of the first quarter of 2020, Estonian startups employed 6316 people, signifying a yearly growth of 30%.

The top 20 startups in Estonia accounted for an astonishing 57% of the new jobs created in the sector in 2019. The top employers among Estonian startups are Transferwise, Bolt, Pipedrive, Veriff, and Starship Technologies.

A closer look at the demographics of startup employees in Estonia shows that 36% of startup employees are women and 64% are men. The staff members in our startups are relatively young: 52% of people are between ages 21-30 and 36% between 31-40. The rest of the age groups have significantly fewer people — up to 20-year-olds make up 2%, 41-50-year-olds make up 8% and 3% are over 51 years old. Statistics also prove that over half of the employees, 55%, have higher education and 33% of the employees have secondary or secondary vocational education. Interestingly, the proportion of higher education among foreigners working in Estonian startups is above average (60% of foreign employees have higher education).

The clearest impact of Estonian startups on our economy is the increasing sums of employment taxes paid. While in 2017 the startup employment tax contribution was 36 million euros, it increased to 53 million euros in 2018 (+48%) and 77 million euros in 2019 (+46%). According to the crowdsourced database and the Estonian Startup Database, 266.4 million euros were invested into Estonian startups in 2019. Even though the total investment amount in 2019 was smaller than in 2018 (330 million euros), we see the total number of deals increasing significantly. In total, there were 73 new investment deals in 2019, which is almost double compared to 2018 (40). Moreover, 30 deals in 2019 were at least 1 million euros or more, compared to 2018 when the same number was 20. The biggest investments in 2019 were made into **Bolt** (128 million euros), followed by **Starship Technologies** (36 million euros), **Glia** (18 million euros), **Coolbet** (13.7 million euros), **Realeyes** (11 million euros), **Skyselect** (9 million euros) and **Xolo** (5.5 million).

Photo by Kristi Sits



Impact of COVID-19

Considering the current global economic situation, the startup sector is in a relatively good position and startups are likely to survive the next few months. Although, according to a survey Startup Estonia and Estonian Founders Society conducted among Estonian startups in April on the impact of COVID-19 on their business, a lot of Estonian startups have runways for two to five months, meaning they need to raise extra investments quickly. Access to capital is critical for startups, especially in times like these. In the meantime, investors have become more careful and the criteria for giving out investments have become stricter, meaning that startups may not get any fast decisions, which are a matter of survival for them.

To manage the crisis, startups have cut costs (65%), decreased salaries (34%), and had to lay people off (19%). Although a third of the startups see opportunities to grow their businesses in the crisis, more than half of startups are ready to make even bigger cutbacks and lay people off, if the crisis will continue to last in the coming months.

The true impact of COVID-19 on our startup sector is yet to be seen. Even though the revenues of our startups will likely drop significantly in the short term, the startup sector itself is very lean and resilient by definition, always looking for new ways to solve problems, leading to a stronger startup ecosystem. It's critical that the entrepreneurs and the state cooperate to come up with a clear plan to maintain the success accomplished in the startup sector.

See more information and get an overview of Estonian startups:
startupestonia.ee/startup-database

Latitude59 2020 to take place in Tallinn and online

Like almost everything else in 2020, Latitude59 will be different this year too. While still taking place on **the 27th and 28th of August** in Tallinn as was announced back in March, in the true spirit of the flagship event of e-Estonia it will also be available online all around the world.

Latitude59 is the place to get networking opportunities, in-depth discussions with top international players, several pitching rounds for both startups as well as investors, and a chance to get together and reflect on the crazy, strenuous months behind us and forge new plans for the future.

Expect startup showcases that reach way beyond the venue, pitching competitions attracting interest both on- and offline, and plenty of founder stories for inspiration and guidance on how to remain resilient during challenging times. As an added bonus, startup ticket holders can apply to join a dedicated mentor programme designed to help overcome the most critical roadblocks and find answers to all the burning questions that accumulated during the crisis.

Investors will have access to the most promising and fastest-growing startups from the region with a special spotlight on the startups that were born out of the COVID-19 crisis as well. Together with our partners from Invest Estonia, we will once again provide all attending investors with a chance to get together, talk shop, and share tips and stories, this time in the format of an investor breakfast.

The main goal of the organisers is to guarantee the health and safety of everyone attending, so rest assured that all the elements of the programme will be adapted to follow the rules and guidelines that have been put into force to help prevent the spread of the COVID-19 virus.

Both on-site and online tickets are available at www.latitude59.ee. We can't wait to welcome you to Latitude59 — be it in person at the Tallinn location or online.



Photo by Aivo Kallas

Education nation – for the smartEST people in the world

By Maris Hellrand

Estonian students are the best in Europe in mathematics, reading, science, and financial literacy according to the recent PISA tests. More than 60% of pupils said they are considering a future as entrepreneurs. This steady improvement in global education rankings has inspired Estonia to launch 'Education Nation – for the smartEST people in the world' to scale the experience and share it worldwide.

Photo by Atko Januson



Birgit Lao

The Estonian educational environment has been intertwined with digital and technological solutions for decades, just like the rest of the country. The Tiger Leap initiative in the early 1990s that brought IT and the internet to schools is considered part of the foundation for Estonia's digital development. The recent worldwide experiment with remote learning during the COVID-19 lockdown has made the advantages of this digital backbone clearer than ever. As the secretary of state at the Ministry of Education and Research **Mart Laidmets** puts it: "We have already been preparing for this kind of crisis for 25 years."

Trying to pinpoint the foundation of the success of Estonia's education is not as easy as it seems and the correlation with the use of technology is not inevitable.

Innove foundation is one of the pillars of educational innovation and has been tasked by the government to lead the Education Nation initiative. **Birgit Lao**, CEO of Innove, points out several aspects that have contributed to the **PISA** victory: "Historically, the education system of Estonia has been very decentralised. The school headmasters and teachers have far-reaching responsibility for the methodology. Secondly, the curriculum is very flexible. It just leads towards expected study outcomes in a subject and general skills without prescribing how to achieve them in detail — this is the task and opportunity of the school and each teacher."

According to Lao, the spectacular PISA outcomes can also be attributed to experienced teachers: "The average age of Estonian teachers is high but they are tech-savvy at the same time. Teachers are well educated themselves. More than 70% of teachers hold a Master's degree or equivalent — a higher proportion than the OECD average. They have a strong methodological and didactic theoretical background."

Estonia has managed to achieve high PISA results across the whole social spectrum — good results in school do not depend on the socio-economic background of the students. In fact, years ago, the PISA method helped to recognise the weaknesses of the education system and address them specifically — the low performance of weaker learners had a considerable effect on the overall results. Thus, Innove has led a consistent effort to create a better learning environment for weaker and special needs pupils; improving their learning experience has boosted the overall results as well. Estonia has developed a unique nationwide network of education counselling services. 15 Innove **Pathfinder centres** offer free counselling to adults involved in children's education — parents, teachers, and support specialists. Due to the geographical distance, e-speech therapist and e-education counselling services have been made available online as well.

The aim of Education Nation is to take the services of the state and EdTechs to other countries in order to increase the quality of education and to bring personalised education as close as possible to the learner. Estonia wants to be the first country to offer education (micro)services born out of a public-private partnership.

www.educationnation.ee



Photo by Aivo Kallas

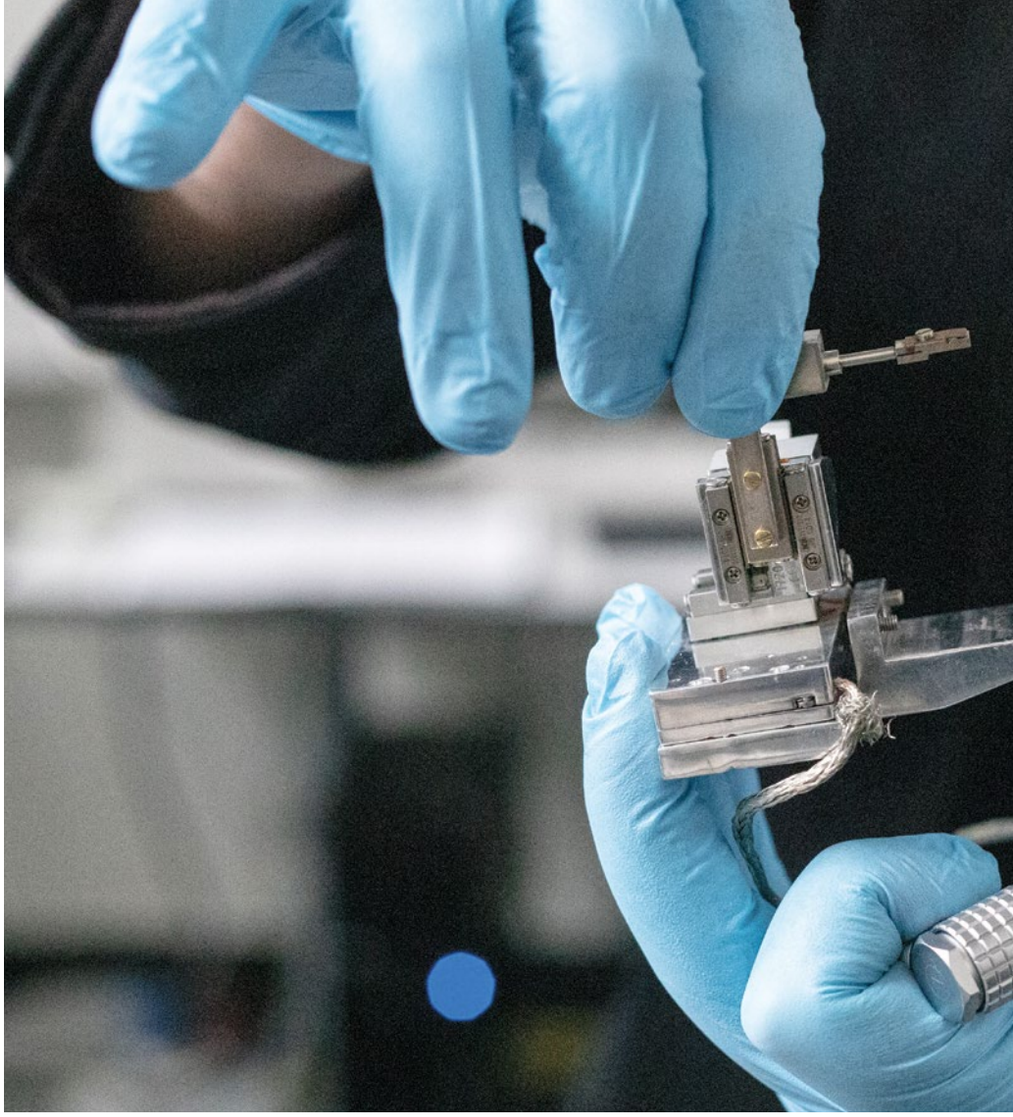


Photo by Renee Altrov

Since it is necessary to test and measure results to assess different teaching methods and approaches, Innove has developed e-tasks and diagnostic tests for schools to assess progress in different subjects. There are also digital testing options to measure the general skills of students. Digital grading enables teachers and learners to get fast feedback during the learning process and quickly adapt to personal needs, thus saving time for learners and teachers alike. Innove aims to provide digital grading solutions in all subjects by 2023.

It takes a village

Education is a topic that touches most people in society and Estonians are eager to be part of the discussion, as well as chip in if needed. The motivation of pupils and families plays a big role — Estonians have always believed that education is the fastest road to success. The spring of 2020 will be remembered in many families as a time when learning and work moved into the home. A challenge and an opportunity at the same time. There is finally an understanding that all of the digital education solutions developed over the last decades are not simply 'nice-to-have' additions to classroom teaching but rather a true lifeline.

Professor **Marju Lauristin**, a lead expert in Estonia's education strategy 2035, was pleased to see that an educational environment with individual learning paths is no longer a utopian dream: "The unexpected closure of schools accelerated the cracks in the shell of the education system and the learner-centred process materialised overnight from vision papers into the lives of hundreds of thousands of families and created a new cooperation network between students, teachers, education designers, and parents. The dream of a self-leading learner and teachers/parents who guide them smartly has received a realistic framework due to these experiences."

How to make Estonia's experience an international success story?

Estonia aims to bring quality education to all learners regardless of his/her access to education or possible special needs. This is already possible in Estonia but the worldwide situation is far from ideal. So, Estonia wants to initiate educational innovation globally. However, Estonia is too small to develop educational services for even its own 150 000 pupils and 70 000 students. The startup model, using Estonia's schools in pilots and as a testing bed with the ambition of scaling globally, is the way to go.

Birgit Lao has shared the Estonian public education model with many governments worldwide during her consultations on building up education systems, to create sustainable teacher training or improve the inclusion of special needs students in education in Eastern Europe and beyond: "Also during the COVID-19 pandemic, some Arab countries like Kuwait have shown interest, even South America. Japan and Spain seem to be very interested. We participated at the EdTechX Online Summit in May; in June we will hold a workshop for teachers in Belarus and next year we will be promoting education innovation at EXPO 2021."



Key players in Estonian educational innovation:

Education Nation
Innove Foundation
HITSA (Information Technology Foundation for Education) has been promoting ICT in education and supporting teacher training for two decades
Startup Estonia
Estonian universities

Toolkit:

eKool
Clanbeat
Tutor.id
ALPA Kids
99math
Futuclass
Nordic EdTech Forum

PISA is the OECD's Programme for International Student Assessment. PISA measures 15-year-olds' ability to use their reading, mathematics, science knowledge and skills to meet real-life challenges.


Inga Kõue

During the COVID-19 lockdown, Education Nation has been hosting the weekly, free, remote learning webinars **'Education Nation: tips for remote learning'** to offer support for all of those affected by the current switch to online education.

Public–private partnership in education

Estonia has created a well-functioning public-private partnership model in educational innovation, involving new approaches provided by private sector initiatives. Over the past 12 years, a stable startup community has developed in Estonia wherein services are provided by nearly 100 support organisations to bring out new solutions with potential for global growth. The **Garage48** series of hackathons, the **STARTER** startup program for students, and the **Prototron** competition of **Tallinn Science Park Tehnopol** have been focused on education innovation strongly. In the last two years, almost 50 new prototypes in the field of education have been proposed, a dozen of which will reach learners soon.

Startup Estonia as a public initiative together with the Ministry of Education and Research has set EdTech as one of its focus activities with the aim of supporting existing EdTech startups and bringing 20 new companies to the market within 2 years. By 2020 there were 40 EdTech startups in Estonia with **Lingvist**, **DreamApply,** and **Opiq** as market leaders.

Global lockdown and worldwide remote learning have been a big opportunity for the growth of EdTech startups. "Within the first month, all leading Estonian EdTech companies acquired tens of thousands of new users — some saw growth of over 400%. **ALPA Kids** and **Clanbeat Education** have increased their user numbers the most", says **Inga Kõue**, EdTech Sector Project Lead at Startup Estonia. Both companies have grown with strong help from teachers and students through a co-creation programme. Startup Estonia, **HITSA** and **Tallinn University** are piloting a co-creation programme of 6 EdTech companies and 14 schools in 2020 to develop new solutions and improve the quality of education. Even during school lockdown, co-creation has continued and given a wider view of innovation to teachers who are involved in projects.

Kõue points out that the continued cooperation between the public and private sectors is the basis of Estonian educational success stories: "Quarterly roundtables of private entrepreneurs with the Minister of Education, integration of private and public sector e-services and integration of learning analytics are the keywords that ensure a strong and unified education system. The joint effort to ensure the availability of high-quality education also during distance learning has highlighted Estonia as an Education Nation."

An educational revolution that started in Estonia

By Maris Hellrand



Photo by Renee Altrov

Märt Aro is chairman of the Nordic EdTech Forum and one of the earliest Estonian EdTech founders. He is an educational innovator who believes that raising the quality of education tenfold can be achieved globally through tens of thousands of micro-services in EdTech that seamlessly work together within a smart infrastructure, delivering the best possible tools and methodology to each learner. Aro dreams of enabling access to high-quality education to everyone globally.

"We would all have finer lives if we were better prepared to co-exist on the little blue dot we call Earth," says **Märt Aro**. He believes this could be achieved if we invite the community to offer solutions to the educational issues they see. Together with a team of volunteers, Aro initiated quick crisis relief efforts: "When the crisis started, we asked Estonian EdTech companies to make their solutions accessible free of charge in Estonia in cooperation with the government initiative **Education Nation** so everybody would have access to the best possible remote-learning tools. Then we extended the free offer internationally — 15 different companies joined initially. Now the movement has become a Nordic-Baltic joint initiative with more than 100 companies under the umbrella of teachmillions.org." Aro is glad that the EdTech startup sector has lived up to the expectations and has used this opportunity to prove its value for learners.

"The agility of the startup approach allowed us to react fast and find solutions literally overnight," says Aro, who could tap into his own experience as a startup founder. As a university student, he discovered through his first company that being an entrepreneur is hard work: "So, I decided it's only worth it if it creates some added value for society and decided to focus on educational development. Education is the foundation of who we are — improving education is essential if we want to have a better society for all of us. If we had access to great education globally, we would probably not have to talk about global warming today, because everyone would comprehend that it's suicide not to correct our mistakes."

Aro now focuses on supporting educational innovation via the **Nordic EdTech Forum — N8**: "Educational innovation is nothing new. Take Gutenberg's printing press, for example, from the 1440s. The ball-point pen was invented in 1888 by John J. Loud but it was allowed to be used in schools many decades later." In the 21st century, the speed of innovation is much faster: "Thanks to the spread of high-speed internet and the invention of cloud computing we have recently seen an explosion in EdTech solutions, but we need to still work on which of these tools actually work and add to educational outcomes. After all, not all solutions are good."

Before looking at specific technological tools, Aro recommends having a better understanding of our goals: "We live in the time of a big paradigm shift from an industrial to an information society. Due to this, the expectations towards schools have changed dramatically. 100 years ago, the expectation was that people who finished school had to be prepared to work 60-hour workweeks in factories, working 6 days a week in jobs that they detested and that were filled with routine. What are society's expectations towards school leavers today and how can we fulfil them?"

Photo by Atko Januson



"Tech development work can't be separated from the rest of society. Ideally, we should first agree on the desired 'product' of the 21st-century school. After the aim is clear we can look at how and which EdTech solutions can help to achieve those goals."

Learning is more than acquiring knowledge

While traditional testing at school typically measures knowledge, the skills emphasised by the World Economic Forum as crucial to cope during the 4th industrial revolution are more elusive to traditional testing methods. The European Union is leading the development of eight fundamental skills that could also be tested: literacy; multilingualism; numerical, scientific and engineering skills; digital and technology-based competencies; interpersonal skills, and the ability to adopt new competencies; active citizenship; entrepreneurship; cultural awareness and expression. Estonia is already able to measure digital skills and is about to start measuring social skills such as communication. If more soft skills are needed to navigate the complexities of the Information Era then learning will have to change as well, creating a need to develop ways to measure improvements in skills such as emotional intelligence, creativity, or cognitive flexibility.

For Aro, methodological innovation comes before technology: "A teacher can choose to just teach multiplication or choose a method that enables the kids to cooperate at the same time. There are methods available to obtain academic knowledge whilst developing other useful skills. We need to support teachers with ways of measuring the complex. This could be done with the help of a learning analytics tool to make sure that, in addition to learning multiplication, we also learn teamwork, leadership skills, etc. Because: what we measure is what we get."

Another intriguing aspect of today's education globally is that we educate citizens to participate in a democratic society using an authoritarian school system. "Conflict resolution is a critical skill in a democratic society — if this is not learned, how can we have a better society for everyone to live in? Instead of just telling learners what they must do, we have to learn how to trigger the intrinsic motivation in students and minimise top-down instructions."

While soft skills are increasingly important, it might seem odd to move towards technological solutions in learning. Can an app really be empathetic and replace human interaction? It can't and it shouldn't. According to Aro, technology's main role currently is to save the teachers' time for things that computers can't do: "There is reason to believe that the academic ability of the teacher is less important than the motivation of the child to learn. And the latter can be affected by seemingly invisible factors. For example, if the child's brain is preoccupied with worrying about a hurt friend, (s)he will not be able to excel in academic learning. While focused on moving through the curriculum, a teacher hardly finds the individual time to even discover problems. Technology can free up teachers' time and support teachers in achieving better results with current resources." Technology can also enable more adaptive and individualised learning paths to enable each child to reach their full potential. When dividing students into grades by age, we often see a wide range of developmental differences — up to 4 years — in one classroom. With the help of technology, we will be able to offer customised learning paths that benefit each learner most at a low-cost per child.

Let the whole world learn

The ambition of Estonian EdTech founders is nothing short of teaching the whole world. Having founded four educational companies, among them **DreamApply**, which makes international education more accessible worldwide, Aro has recognised three main models in educational development: "**Enthusiasm-based projects** don't have a business model and usually end when people run out of resources. **Project-based innovation** that is funded by 1-3-year grants often comes to a dead end because it may take 3 years to create an educational solution that people actually want to use. **The startup model** means that, when looking for educational solutions, the initiators look for possibilities to solve issues globally while earning enough to pay fair salaries to their team members in a sustainable manner."

According to Aro, there are about 500 EdTech startup-like initiatives in the Nordic-Baltic region and the majority of them has been created by students: "The reason is very simple — they have just gone through the educational experience and discovered things that could be improved with the help of technology. In a way, they are still naïve enough to believe they can make the world a better place. We need these crazy people who believe that they can change the world, as they are the ones who do."

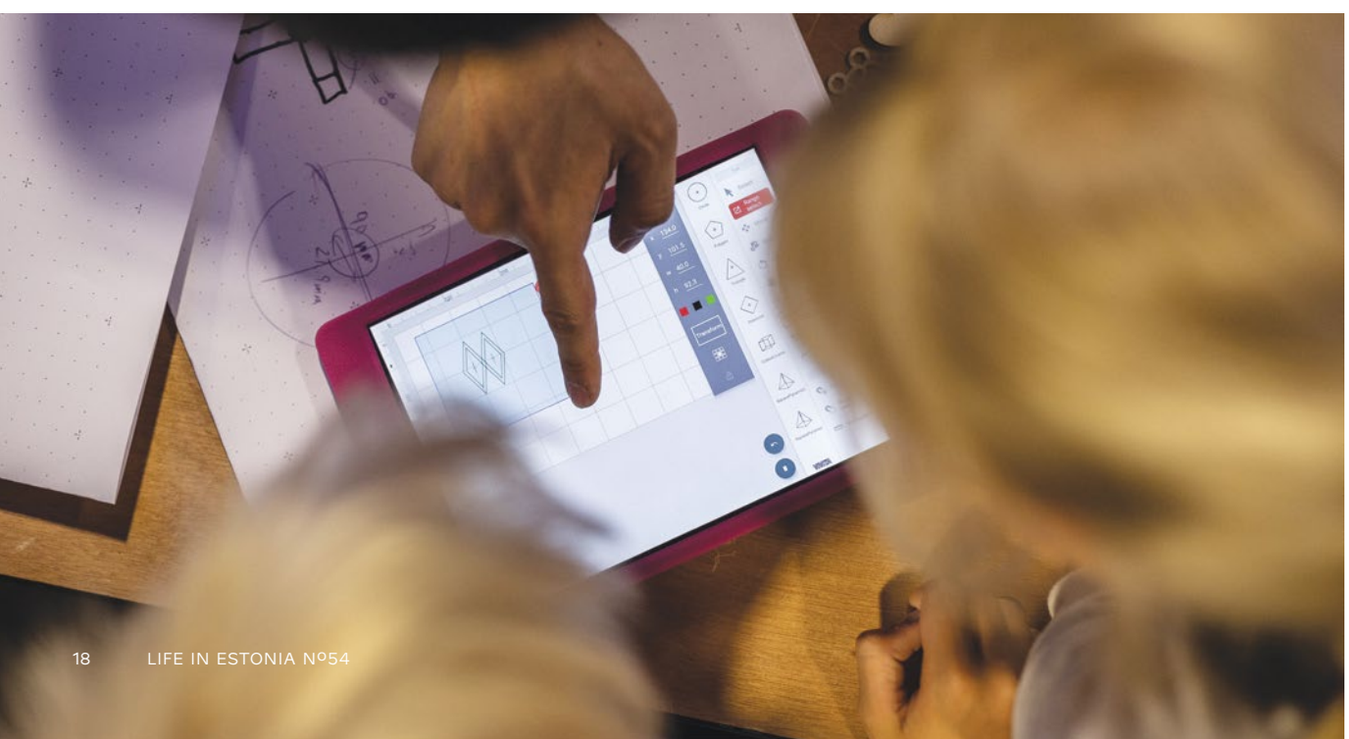


Photo by Renee Altrov



Photo by Atko Januson

DreamApply transforms the university application system

By Ann-Marii Nergi

The simplification of the admission system helps to use time previously spent on paperwork to counsel students more efficiently.

Whereas the entire admissions system of Estonian universities is simplified, digitalised, and automated to the max, there are very many universities in the world where the system is still based on human labour and the reviewing of applications by hand. **DreamApply** software, developed in Estonia in late 2011, helps universities to implement a large and complete change in their application process. Customer satisfaction speaks for itself: out of all the customers — over 200 universities worldwide — each one who has implemented the DreamApply software has decided to keep using it.

DreamApply grew out of Dream Foundation, the previous company of its founders **Märt Aro**, **Sten Rinne** and **Lauri Elevant**, which helped mostly Eastern European students to apply to European universities. In the process, it became clear that university admissions systems were often a bottleneck to the entire process. Therefore, it made sense to offer the solution they had created for their internal use to the universities. DreamApply's first client was the **Stockholm School of Economics** in Riga. Their next challenge was large — automating the entire national university application system in Estonia for the admission of foreign students.

"When we built the system for the Estonian state, our product was still in its initial phase," admits Lauri Elevant, co-founder of DreamApply. "But as it was successful, it has been easier for us to present our product to more client-universities after creating a national structure. The marketing of Estonian higher education has also received a fresh breath of air thanks to the statistics collected by our system. Marketing is one of our focal points and it enables us to measure how many applications are received and how many people actually arrive to study," explains Elevant.

How complicated is it to convince universities, which are considered conservative institutions after all, to start using innovative technology? "Universities are institutions and some of them have existed for half a millennium and their activities are characterised by stability. For a large university, it is a huge challenge to implement a completely new IT system and this process is relatively long. However, once the solution is created, it lasts for a long time."

Elevant says that their product is often the first sign of innovation for universities that are modernising their application process. "Often, until we come into play, they are literally operating with Excel tables and sending documents by e-mail. In those cases, the changes we bring are the most extensive."

Examples of cool features

For many universities, the coolest feature of DreamApply is the fine-tuned user experience, which cuts down on their need to communicate with applicants through e-mail. All systems are built after a university's current processes are thoroughly mapped; the information is combined with the experience gained from building similar systems for other universities and national systems.

As for features that no one else has, DreamApply has an integrated pre-recorded video interview system that allows universities to conduct thousands of screening interviews effortlessly. These days, everyone can imagine how painful a Zoom session might be if it were multiplied by a thousand! DreamApply solves this.

DreamApply also uses machine vision techniques to analyse uploaded document scans to validate and cross-compare the data with other application contents. This helps to catch fraudulent or duplicate applications, as well as simple mistakes made by applicants.

In cooperation with Turnitin, the system is also able to spot any plagiarised motivation letters, which helps to make sure that honest applicants stand out among fraudulent ones.

Last but not least, there is an in-house marketing tracking system which helps universities to track down all their marketing activities effortlessly, and develop the best strategies for their student recruitment activities.

Photo by Atko Januson



One DreamApply's client, **Leonid Markusyk**, the Director of International Marketing and Recruitment at **Vistula University**, the largest private university in Poland, says that their work did not really change due to the coronavirus because they started working with the DA platform several years ago and the admissions process is completely digitalised. But the changes that came with transferring to DreamApply service were indeed significant.

"I can't say that this situation has affected our daily routine too much. Our routine changed far more drastically five years ago when we implemented DreamApply, as before that we reviewed around 400 applications manually, using Excel and Word. Today our staff can focus their efforts on the most important part of recruitment — communicating with prospective students around the world," said Markusyk.

Lauri Elevant admits that these days, electronic admissions are nothing out of this world, but to an extent, the DreamApply service fulfils this criterium. "The level of automatisation that we have reached with our product is very high. Our system can be used to make video interviews with prospective students, to scan documents, it searches for data from passport copies, and identifies plagiarism. The philosophy behind our product is that the less an admissions officer has to deal with paperwork at school, the more time (s)he will have to really work with foreign students and solve their problems."

Coronavirus also influences the work of universities, but mainly universities are tackling the question of how to organise the learning process in the new academic year. In terms of university applications, data from DreamApply clients shows that those who have started the admissions process have received good results and the numbers are not significantly down from previous years. In the case of Italian university clients, the admission system continued to function during the height of the crisis.

Three out of the ten oldest universities in the world use DreamApply: **University of Padua** (founded in 1222, where Nicolaus Copernicus studied), **University of Siena** (founded in 1240), and the **University of Macerata** (founded in 1290).

Elevant says that universities need to spend more energy on marketing and communication due to the virus. Marketing tools are the highest priority in the company's current DA development plans. It is likely that due to the fear of travel and travel restrictions, the willingness of students to study at foreign universities will decrease and universities will have to make greater efforts to attract students.

The opportunities that arise when using DreamApply to develop targeted solutions for clients are endless. For example, DreamApply created


Lauri Elevant

Unique opportunities of the higher education



Raul Ranne,
Head of Marketing and Development
at DreamApply

One of the greatest success stories in DreamApply's history is their collaboration with **Study in Estonia**, which is headed by the Archimedes Foundation and aims to carry out various marketing activities to promote Estonia as a great place for foreign students to study. The tools in DreamApply have been perfected to give the Estonian state as well as universities a precise overview of the efficiency of their marketing activities — it is simple to use the system to measure how many real foreign students a certain marketing activity has brought into Estonia. Also, as all Estonian universities are using a unified system, data analysis allows very precise marketing decisions that use resources efficiently and organise the events and activities that give the most advantage.

This solution makes Estonia unique in the world — no other country has anything so streamlined. According to the data received from the DreamApply system, the methods Estonia used to market itself in various target countries were thoroughly changed, and a national strategy was developed — the Strategy of Introducing Estonian Higher Education Internationally between 2015-2020. The strategy has been implemented successfully over the years and, through the active use of the tools available on DreamApply, the collaboration of the state, universities, and the private sector has led to the multiplying of the number of international students studying in Estonia. Today, 5000 international students make 11% of all university students in Estonia.

the largest student exchange system for music universities and all the conservatories in Europe joined the unified network.

Hungary also uses the DreamApply service to simplify the national application process for scholarships.

"Among the bigger systems that we have built is the national scholarship system for Hungary, which receives approximately 30 000 submitted applications every year. (For comparison, the Estonian national student admission system for international students receives on the order of 10 000 applications per year). The bigger systems present unique challenges since, due to human nature, applicants generally tend to submit all of their documents at the very last minute. This means that there is nothing happening for most of the year, and then suddenly minutes before midnight, you need to start processing seventy documents per second, without slowing down the system! The ability to scale rapidly to such deadline rushes is one of the benefits of our platform," says Elevant.

He has statistics to prove that potential students literally act at the last minute. "Based on the statistics of the Tempus Public Foundation in Hungary, an application round for the Stipendium Hungaricum Programme, the peak of 52 application submissions per minute occurred at 23:59 CET."

Statistics: 60% less e-mails, 95% user satisfaction

The statistics collected by DreamApply show that it really matters to applicants how fast they receive their responses from the university. Across all of their customers, DreamApply has seen that when the university sends the applicant a positive response within three weeks, they will have a two times better conversion rate from applicant to student when compared to a response-time of approximately three months.

Secondly, there is a lot of work in student admissions. Based on hundreds of thousands of applications analysed, statistics show that to admit 100 students successfully, you might be going through more than a thousand applicants. Therefore, DreamApply's focus is on automation.

A few key metrics reported from users:

67% increase in applicants over 3 years
60% reduction in e-mail traffic
40% increase in staff efficiency
85% users find DreamApply easy to learn, use and manage
95% client satisfaction



Photo by Atko Januson

Tech companies are putting their weight behind Estonia's education

By Maris Hellrand

Interview with Martin Villig, co-founder of Bolt, who decided to found the Good Deed Education Fund with the help of 30 Estonian entrepreneurs, to tackle problems the Estonian education system is facing.

Why was the Good Deed Education Fund created?

In the summer of 2018, I bounced ideas about how to give back to Estonian society with my brother Markus and the founder of TransferWise, Taavet Hinrikus. Education stood out as a topic and we decided to discuss it with people involved with education to get a better understanding. After 35-40 conversations it became clear that in spite of the great PISA results, Estonian education is facing many deep problems that can't be solved by international internships of a few teachers or headmasters — it needs a more systemic approach.

Through recommendations, we got in touch with the **Good Deed Foundation**, which has more than 15 years of experience in launching and supporting societal initiatives. We shared the idea with a few entrepreneurs who all immediately agreed to contribute. The word spread quickly and surprisingly we managed to find more than 30 Estonian entrepreneurs within just a few weeks who contributed more than 1 million euros in total. We launched the **Good Deed Education Fund** in December 2018.

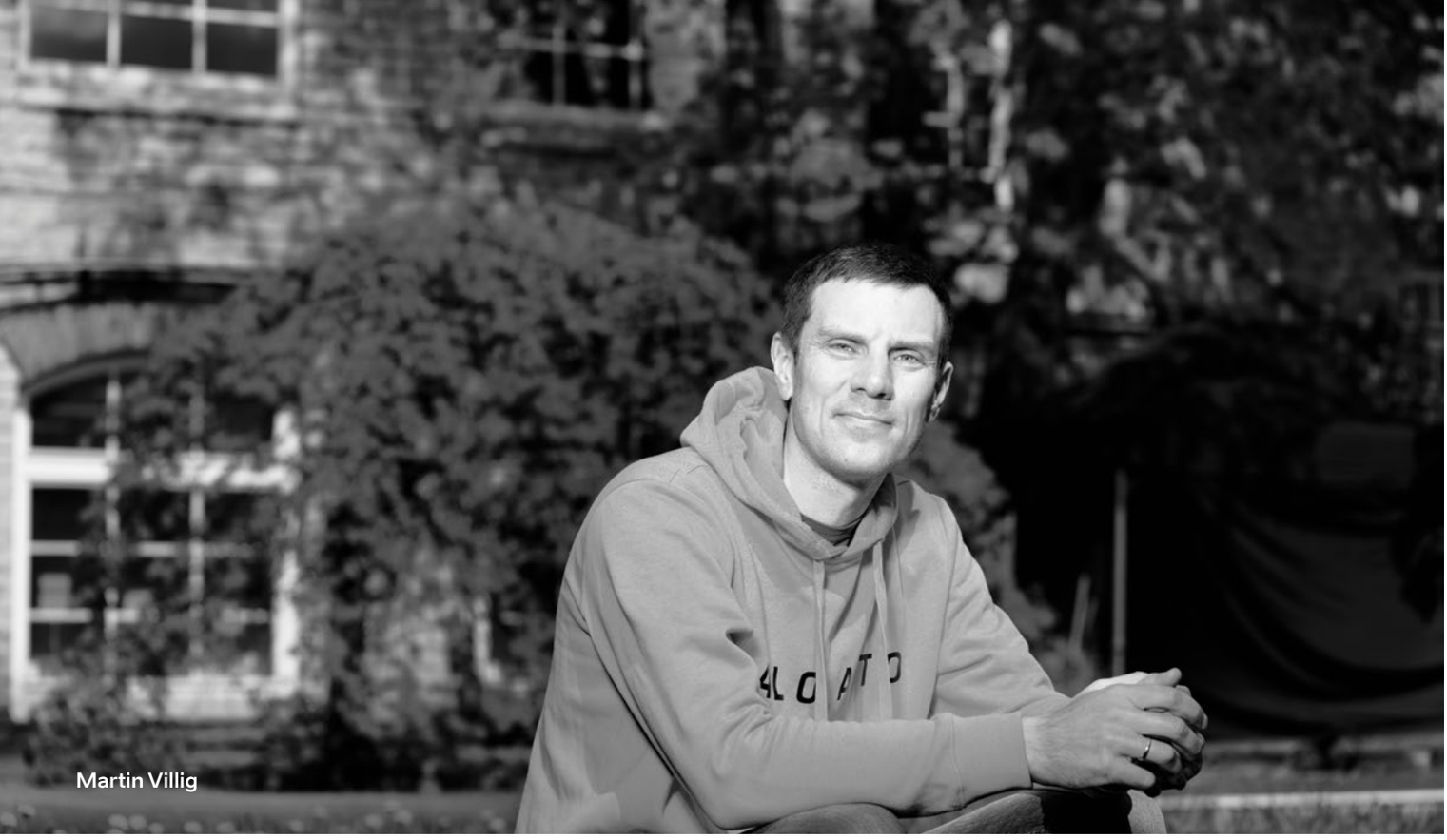
What is the main problem you are trying to solve?

Based on the conversations, education statistics and analysis we identified four areas to focus on with the Education Fund: first — to increase the number of new teachers; second — to raise the quality of school leadership; third — to minimise dropouts from education after the mandatory level (9th grade); and fourth — to improve the learning of STEAM skills. In addition to funding projects, we as entrepreneurs dedicate our time and knowledge to advise initiatives and help shape the educational policy in cooperation with the Ministry of Education and Research and local municipalities that are actual administrators of schools in Estonia. It looks like, within the last one and a half years, society has started to appreciate the Education Fund as one of the contributors and developers of the education field.

Is technology offering the 'magic wand'?

The majority of contributors to the Good Deed Education Fund are startup founders or technology companies that understand the possibilities of technology in solving the problems of the world. As digital services are widespread in Estonia, education is also tapping into technology more avidly than in many other countries. Most schools use **eKool.eu**, we have digital textbooks (**Opiq.ee**, **e-Koolikott.ee**), virtual reality solutions are being developed, as well as online testing and statistics (**haridussilm.ee**).

Technology can support innovation and change but all processes are led and used by people — teachers and students. Estonia has many EdTech companies that have received international attention due to the current crisis and hopefully will be able to grow faster due to this.



Martin Villig

Photo by Atko Januson

Which of the projects supported so far seem most promising?

The Good Deed Education Fund has so far supported seven initiatives with 500 000 euros. I would point out **99math.com** as a project with great international potential. It gamifies learning mathematics, enables real-time competitions in class and between schools and gives access to learning analytics to the teachers. **HK Unicorn Squad** is a technology school for girls that today operates as an extracurricular activity but which could be part of a general curriculum and offer engaging technology education universally.

Several initiatives of the fund address the lack of teachers. **'Teach for Estonia'** (*Noored Kooli*) has brought several hundred young teachers to schools and **the substitute teachers programme** (ASÕP) helps to find short-term high-quality teachers. We support the faster growth of both programmes.

All projects funded so far: **www.heategu.ee/educationfund**

Could the current experience of forced-upon remote work and remote learning accelerate technological solutions and create a wider understanding of the need for change?

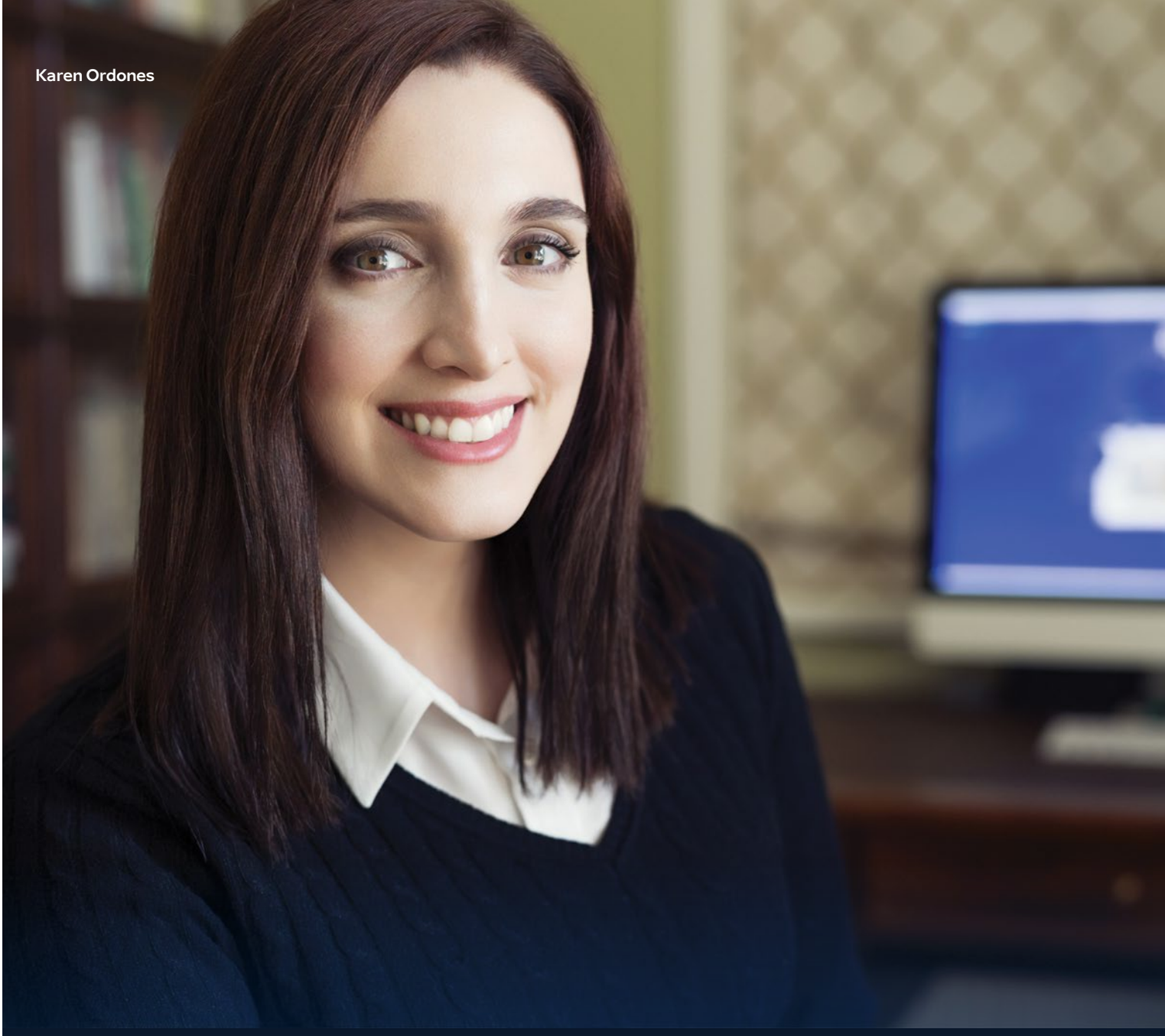
Remote learning has certainly forced many teachers and students to try out many more e-learning solutions that otherwise would have spread a lot slower. We will see over time if some or all of them will become permanent parts of the education system, but for sure it's a useful experience. For example, kids with a mild cold can easily continue studying from home online and families could live-learn-work from the countryside or from abroad for a while if needed. Remote learning will be viewed as normal.

All in all, remote learning has been a valuable experiment that we can all learn and draw important conclusions from. Within a few months, we have tested many hypotheses that otherwise would have taken years. One important conclusion is that just as we are moving towards more differentiated learning in class, this also needs more attention in remote learning. What is suitable for one child and a family might not work for another. Technology can help, but all of this has to be thought through thoroughly, also from the aspect of the content of learning.

How can Estonia make the most of the sudden demand for educational innovation?

As the first country, Estonia offered its e-learning solutions to the whole world for free and gained a lot of positive attention and enhanced its image as an innovator. Our EdTech companies are small and thus need to move fast to use the current momentum both for product and business development. Vast funds are being invested in education technology right now and all technology giants, starting from Google and Microsoft see a role in it. Competition is tough and the development has accelerated within the recent months but we don't know yet who will win this race or with what solutions.

EdTech is an area of high potential and it's really worth leaving no stone unturned. In order to get a foot in the door a lot of work and, foremost, cooperation is needed. Not just within the technology sector but much more widely between all actors in the education field — test, try out, brainstorm, develop, involve. The past two months have given us a vast amount of experiences that need to be collected and analysed. Let's hope that this is an area we will be able to prioritise at the highest possible (governmental) level.

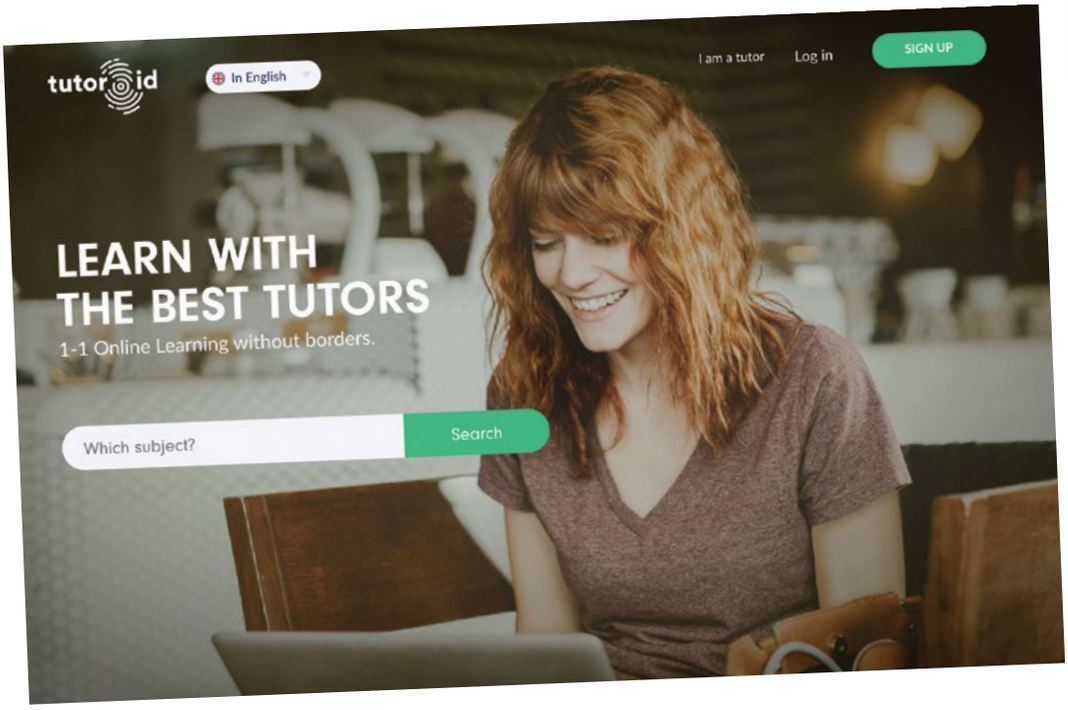


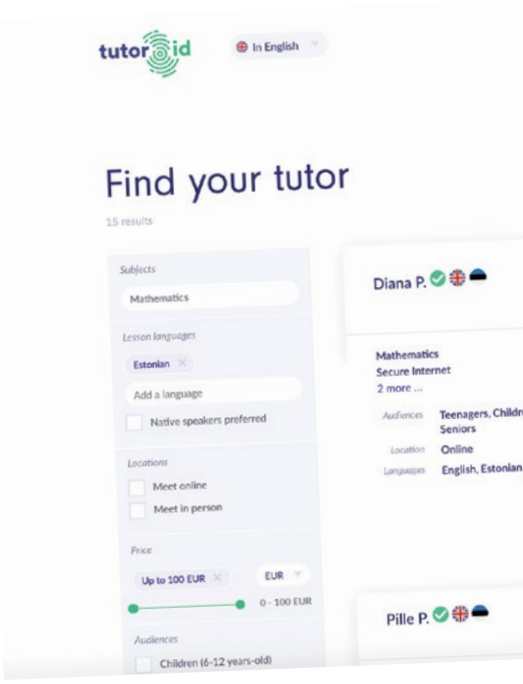
Karen Ordones

Photo by Rene Türk

Personal experience led an e-resident to develop an online service for tutoring

By Ronald Liive





Karen V. Ordones (32) is a Brazilian expat living in Estonia. For the past ten years, she has had a higher than usual interest in Estonia and tutoring. The first is thanks to the country's culture and the friends she has made. The latter is because she comes from a family of teachers: her parents and grandparents were teachers.

Her personal experience in the tutoring business led to the development of an online service that helps tutors to manage the business side of tutoring. Ordones developed the online tutoring platform **Tutor.id** and it has seen big growth in the past months especially in North and South America. Compared to the beginning of the year, the employee count has more than doubled. The company is looking to expand the business even more.

Interest in Swedish led her to study in Estonia

About ten years ago, Karen was keen on the Swedish language and was looking for a Master's degree program she could attend in Sweden. While looking for options, she found the **University of Tartu** instead and was impressed at how they handled the process of relocating her as an international student. So, she chose Estonia over Sweden and landed at the University of Tartu in 2010 where she began the Baltic Sea studies with a concentration in business administration. By then she was interested in businesses and how to manage things.

"I had a great experience at the University of Tartu. It was not an easy program, which is good because I wanted to be challenged to learn new things. I liked the model of the University; you can use the credits as you wish. There were a few mandatory subjects but you could craft your own curriculum. In Brazil, you don't get that chance. I liked the freedom," says Ordones.

After her studies in Estonia, she moved back to Brazil in 2013 and started to work in a language school because of her interest in languages. As she is fluent in English, while only a fraction of Brazilians speak it, she chose English to be the subject she taught. Although she loved teaching, she was not happy with the slim pay she received.

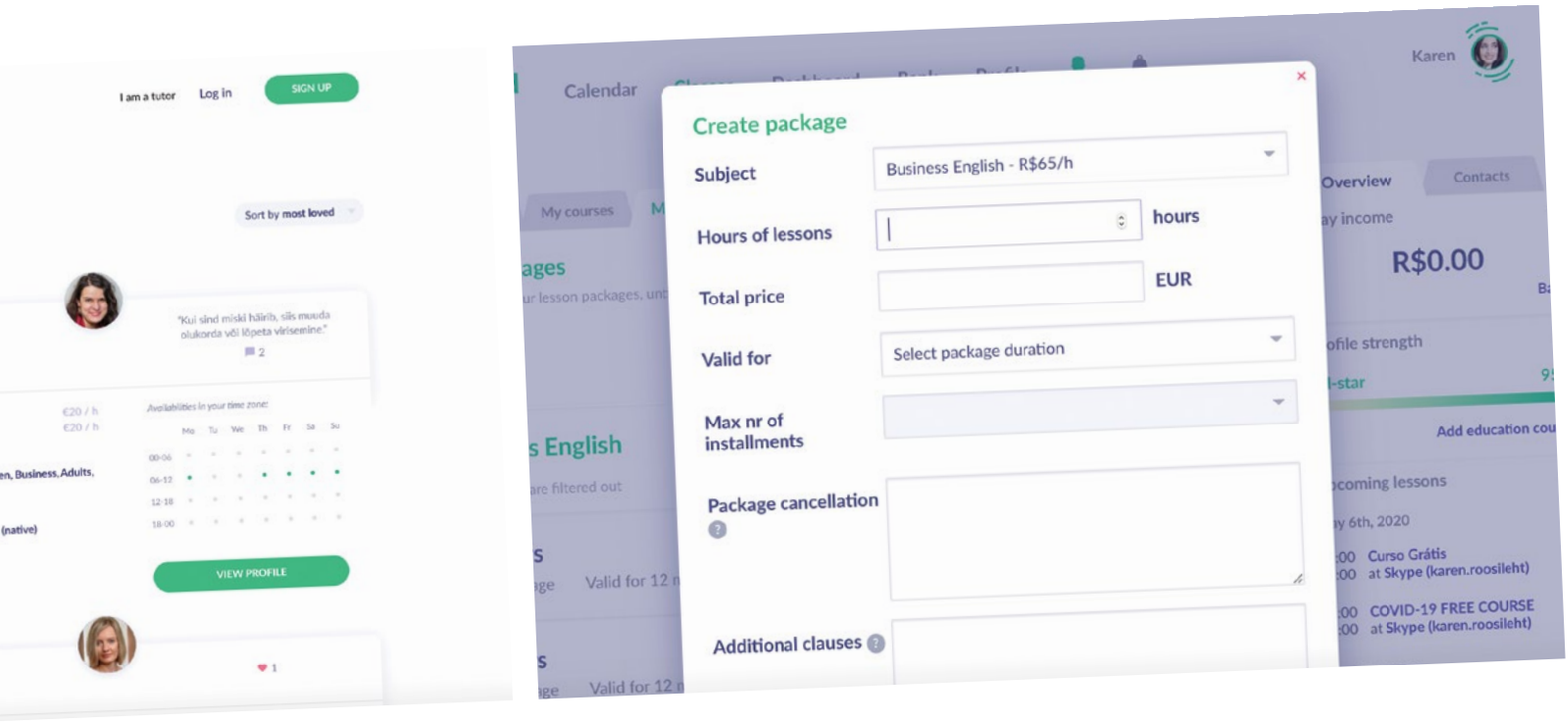
"So, I decided to become a private teacher. Within three months and through word of mouth recommendations from students that were happy with me I had a hundred students. My business grew pretty fast," she describes.

Apart from English, she started to offer lessons in Brazilian history and literature, the same subjects she was really good at school herself.

To manage the business she came up with a unique idea

According to Ordones, she had many challenges on the road and had to overcome a lot of problems through pain. The biggest obstacle was related to managing the business. How to get new clients, how to hold the ones she had, general management, sales, and marketing. As she comes from a family of two generations of teachers, she has had close, personal contact with teachers from the day she was born.

She saw an opportunity to use the degree she got from the University of Tartu. In early 2015, she had an idea for an online marketplace that would help out teachers and tutors. She named it Tutor.id after she moved back to Estonia to become an e-resident. Ordones saw the complex bureaucracy in Brazil as one of the reasons she decided to become an Estonian e-resident. To clarify, e-Residency does not give you residency in Estonia. Ordones' personal life just happened to coincide with her becoming an e-resident.



Although there are other online marketplaces for tutors, Ordones was keen on building a new and better one that would simplify the managerial side of the business. Now, Tutor.id has helped to manage over 16 000 bookings and over 24 000 hours of lessons have been taken through the service. There are over 200 subjects available on Tutor.id and most of the tutors offer their first trial lesson for free. The student can set the price they are comfortable with, when they have time, and what age group they represent.

For example, if you have always wanted to learn Estonian, you can find Pille from Pärnu. She has a BA in English Language and Literature from Florida Atlantic University and a bachelor's degree from the University of Tartu. She is willing to teach you her native language for 8 euros per hour. Polyglot Dalisa feels confident enough to teach you Spanish, English, and Estonian. She herself speaks four languages and is working on her fifth. Examples abound. Karen herself has taken tutoring lessons in Estonian.

In the past few months, Tutor.id has grown quickly with an active user count of around 5000. The general number of visitors to the website has skyrocketed but not all of the visitors end up signing up for the service.

During the coronavirus pandemic, the company decided to lift the normal fees they take from the tutors using the service. Although for potential new investors it would be great to show large sales growth numbers, Ordones sees that education is also a very altruistic area. Unpredictably, during the pandemic, the service has seen the most interest from Africa.

"We are happy to help both teachers and students during this difficult period. We are recommending that teachers lower their fees because a lot of people have no choice but to study at home. And they have done that," said Ordones.

Thanks to the growth, the employee count has gone up from three to seven employees and the company is looking to hire more people.

According to Ordones, the unexpected growth and competitiveness of the job market in Estonia has caused the team to be scattered all around the world, with people working remotely from India, Brazil, Dubai, and elsewhere.

Looking for new investors, hoping to expand to Asia

At the moment, the company is in talks with potential investors and hopes to close the next round by October. Ordones hopes they can expand to Asia soon.

"The biggest tutoring markets are in Asia. It is a part of their culture to have a tutor. They spend 10% of their household income on tutoring on average, which is a lot."

Ordones recognises that the biggest lesson she has learned was not to build a company with only junior professionals but to add seniors to guide the young talents. Now, the company employs senior professionals to lead the core areas (Development, Product and Marketing) to grow the business, and to provide faster results due to their industry expertise — essential for startups that wish to be competitive in the market.

Tutor.id is registered in Estonia. Although from Brazil, Ordones is hoping she does not need to move her company to another country and can continue to benefit from Estonia's streamlined tax system. "We are excited to continue disrupting the industry by empowering tutors to build their brand and grow their one-man (or woman) online tutoring businesses," says Karen, full of optimism. They are planning to accelerate hiring with new investments.



From left: Timo Timmi, Anastasiia Kuchynska, Ain Arend and Tõnis Kusmin

99math creates games to make mathematics interesting

By Ronald Liive

Video game and mathematics enthusiast tied his interests together and founded a startup that has raised 500 000 euros.

Tõnis Kusmin (35) has had a healthy interest in video games and mathematics for a while. To combine two of his favourite things in the world, he came up with a startup idea that has now raised 500 000 euros in funding.

Kusmin is the founder and CEO of **99math**, which develops online games for teachers and students. About a year ago, they ventured into eSports with their mathematics league. In the last few months, the user base has grown around 250%.

Successful startup from another business

99math got its start from Kusmin's other startup, **Tebo**, which focuses on solutions to make teachers' lives simpler and students' lives more interesting. At one point during the development of Tebo, he was talking to a mathematics teacher and saw the need for an online solution for teachers to make classes more interesting and interactive.

"We quickly developed the minimal viable product to see how the teachers and students accept our solution. As it was received very well; we decided to continue developing it," says Kusmin.

The MVP, as startup people call it, was launched back in October of 2018. The critical mass of users was reached quickly and it was love at first sight for teachers. To gather more teachers and students the team behind 99math sent out letters to teachers telling them about the new online tool.


Tõnis Kusmin

"When we saw that we were doing well in Estonia we decided to translate 99math into English. Now, most of the user base is from the United States of America. We've got users from all around the world with the main markets being the USA, Turkey, the United Kingdom, Estonia, and other European Union countries," tells Kusmin.

Shift into eSports

The team participated in **Ajujaht** in 2018, the largest business idea competition in Estonia. They managed to reach the top 30 teams but did not advance in the competition. Nonetheless, Ajujaht, which in English literally means Brain Hunt, was quite beneficial for them.

"While at Ajujaht we presented our idea and mentioned that we do online math competitions. At that time our peak user base was 10 000 unique users competing in the competition in real-time. All of the students were online and even their parents joined them from their offices to see how their offspring were doing. Ajujaht's jury gave us an idea to do more competitions and, as they were popular, we decided to focus on them," describes Kusmin.

From that point on they decided to market their game as an eSports league; that decision landed them a 500 000-euro investment back in January of this year. The round was led by **Change Ventures**, a venture capital seed investment fund focusing on all three Baltic states.

A fund, the **Good Deed Education Fund**, created by many notable and successful Estonian startup veterans, TransferWise's co-founder **Taavet Hinrikus** and Bolt's (formerly Taxify) co-founder **Martin Villig** to name a few, also joined the investment.

The decision to focus on eSports also lies in the fact that a lot of kids like to play video games but are not so keen on mathematics.

"We're making a math video game that is entertaining. We organise eSports matches, where students compete with other schools. That's how math becomes playful and exciting for them. The goal is that they will enjoy doing math. If they like the game they will get better at math. The world needs more people who are strong in math. More scientists, technology, and economics people. We need more people who can think critically and solve challenges, math is the first thing we learn to solve problems. Math provides a solution for logical and critical thinking," says Kusmin.

New game for students to play at home

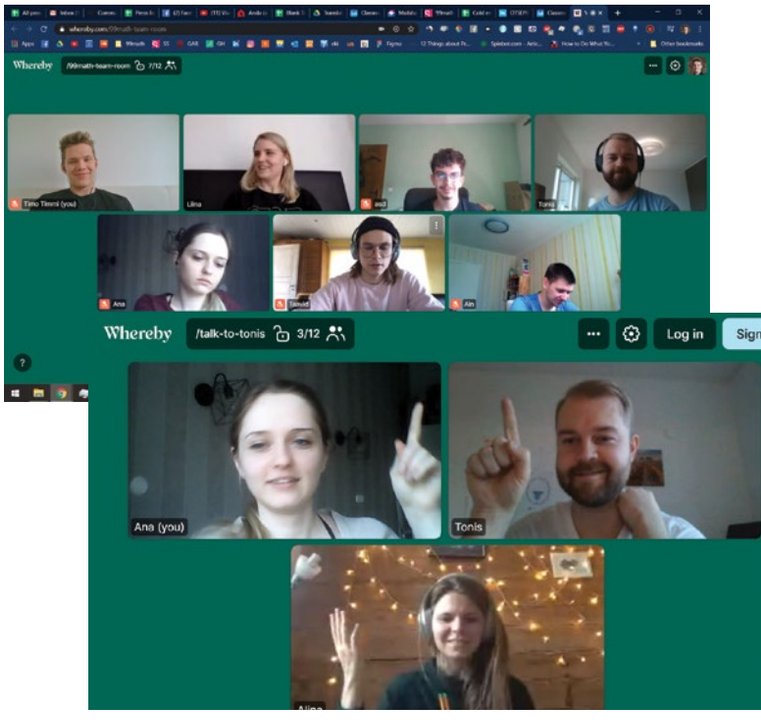
Over the last months, the 99math's user base has grown by 250%. Kusmin is not eager to give an exact number of how many users they have because that is not relevant for them. The number they are eagerly watching indicates how many users are using 99math at a given moment in time. The maximum number was 30 000 students from 20 countries, all using 99math at the same time.

The back-end of the website is built on Amazon's cloud solution and thanks to that there has not been any trouble with the website's uptime during peaks.

Right now, the seven-person team is using the raised money to reach new users and develop a new game that students can play at home without the participation of the teacher.

"Right now, we have four math subjects and are planning to add 20 more. Different subjects that can be used from classes 1 to 6. The home game solution is meant for students to play at home with friends because math is cool and they would like to advance in it," says Kusmin.

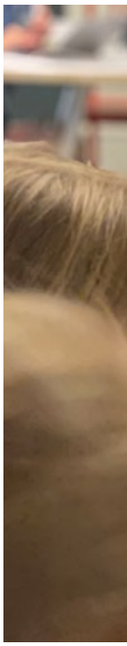
The goal for this year is the development of the playable, at-home game which needs to be as entertaining as possible so students will not feel that it is an extension of their school studies.



Bringing more girls into tech

By Ede Schank Tamkivi

It's a well-known fact around the world that women and girls are far less likely than their male peers to pick a career in IT. The stereotypes start early in our childhoods. An Estonian initiative called the Unicorn Squad is tackling this issue by offering hands-on activities for girls to get more acquainted with robotics and tech and bust the myth that technology classes are for boys only. In fact, boys will not be allowed in at all.





Photos by Unicorn Squad



HK Unicorn Squad in numbers:

80 clubs in 46 locations across Estonia
1000 girls attending classes

The topics covered so far have been divided into the following categories:

electricity/electronics
physics
multimedia
programming/robotics







In a dark corridor inside a former factory building in central Tallinn, a group of pre-teen girls is running around in led-light encrusted costumes, giggling in excitement as they form enlightened creatures in the dark corridor. It took them an hour to solder the led-strips together, attach a battery, and glue the whole system on their dark clothes.

This was one of the many classes spread all across Estonia where girls in the age range of 8-12 would meet once a week to take on challenging problem-solving in the context of real-life phenomena such as electricity, magnetism, sound, and speed. In some of the most exciting classes the girls built their own speakers out of cardboard and magnets, carved musical instruments out of carrots, flew drones through assigned tackle courses, and chased two-wheeler robots they built themselves. All the necessary materials for a class fit in a regular plastic box and each class would be conducted with the help of 2-3 volunteers, most likely parents of the girls, but also teachers or just active members of local communities.

"The girls and the emotions were up in the sky," exclaims Urve, a group mentor from Kuressaare, after a class where the girls could test how a compound lever mechanism works by hoisting each other up in an empty canister tied to a rope. "The fantasy of the girls really starts running wild once they realise what they can do," adds another teacher from Elva, a small town in Southern Estonia. The mentors, most of whom have no background in tech, are all there from pure enthusiasm and willingness to learn on the go. The learning goes both ways: the grownups assist the kids with using the tools and safety rules while the girls tend to be much more acquainted with using apps on mobile devices and finding tutorials online.

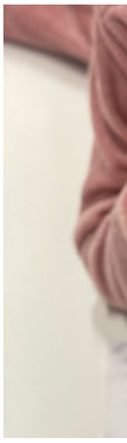
Frustration leads to new solutions

"A few years ago, my then 10-year-old daughter was kicked out of her robotics class because the school had to cut down on the capacity of the after-school activities and had to get rid of the 'less active' students, which included both of the girls in the club. This made me wonder why tech-classes are so gender-biased and what makes the girls less active in the classroom," says **Taavi Kotka**, an entrepreneur and the former CIO of Estonia, who is the mastermind and the key force behind the movement. His frustration with the system led him to come up with a girls-only technology club: "We decided that the content would have to be based on gamification elements that would be attractive and available to anyone who's interested."

That is, anyone, besides the boys. Because the presence of boys tends to 'shut down' the girls since the boys are expected to be — and quite often are because of the very same expectations — much smarter when it comes to using technology. When there are no boys around to tell them how they do it all wrong, the girls feel much safer in opening up to learning new skills.



Photos by Sigrid Kägi



HK Unicorn Squad (the abbreviation refers to Taavi's daughter Helena Kotka) started off in their own basement with 17 local girls who would meet once a week to solve practical problems Taavi, his wife **Kerstin Kotka** and their neighbour **Liis Koser**, would come up with. Now, Liis has become the executive of the movement that has 1000 members and 150 mentors in 80 clubs across Estonia. From the very beginning, Taavi and Liis would prepare the classes with tutorial videos and boxes filled with all the necessary materials, which were rotated from one class to another. The logistics are obviously quite a headache but there have only been a few instances when the box did not reach the remotest corners of Estonia in time (due to postal service errors), with active groups in places like Kihelkonna, Põlva, and Kolga.

"Our goal is to reach an audience of at least 3000 girls, every tenth girl in that age group in Estonia," Taavi explains. "That equals the number of boys going through after-school robotics classes in a year so far." He refers to programs like the international First Lego League program, which usually attracts around an 80/20 ratio of boys/girls, which, according to the organisers of the FLL movement in Estonia has already 'changed a lot' from 90/10 in the past decade, but it's still mostly boys going for the robot challenge and girls preparing the presentation portion.

Taavi claims they are especially happy that most of the Unicorn Squad clubs are located outside of Tallinn and other bigger townships, therefore catering for the apparent hunger of age-appropriate and immersive tech activities for girls. It's not unlikely that the Unicorn Squad curriculum could soon replace the outdated arts and crafts classes in schools where, in many cases, the boys and girls are still segregated into two groups: while the boys learn how to operate modern technology like the 3D printers and CNC-machines, the girls still do embroidery, sew pillowcases and cook... and the boys get to eat what the girls cooked.

The initiative, going from just one club to more than 80 in less than 2 years, has already been noticed and applauded by other players in the field as a necessary means to change the stereotypes. So far, Taavi Kotka funded the whole movement by himself, but as of this spring, the **Good Deed Education Fund**, set up by entrepreneurs (from IT backgrounds mostly) have decided to pitch in and support the further development of the Unicorn Squad with 100 000 euros. "What the Unicorn Squad does is to teach girls the necessary skills for the 21st century — how to take initiative, solve critical problems and do it with different STEAM tools," says **Pirkko Valge** from the Good Deed Education Fund. "We hope to see that their lessons will be integrated into the school curriculum and every girl and boy will have the Unicorn Squad experience in their lifetime."

Positive discrimination

The need to solve a problem does not come from personal experience and frustration only. Based on most recent statistics, the otherwise booming ICT sector is still heavily male-biased with three men per one female dominating the industry. Although some IT companies boast 38% female ratios, and women are obtaining executive roles more often instead of customer support positions only, the overall picture still looks rather grim. A recent study that was commissioned by TransferWise from researchers at the Institute of Educational Sciences and the Institute of Computer Science of the University of Tartu, conducted among 740 9th and 12th graders in Estonia concluded that only 21% of girls — as compared to 53% of boys in the same age group — would see their future in the field of ICT. The reasons for not being interested, they pointed out in the survey, span from boring programming classes to not having any positive female role models.

Although Kotka is adamant that the Unicorn Squad classes remain exclusive for girls only, in **Vivistop Telliskivi** the mentors experimented with a mixed group next to the girls-only club. "It's probably too early to make any conclusions yet but based on our observations, boys enjoyed the classes just as much as the girls, and since our kids are used to working in mixed-gender teams, we really did not see any difference in the results," claims **Mari-Liis Lind**, the cofounder and CEO of **Vivita**, who has been one of the mentors of the girls-only club for more than a year now. "But it depends on far too many aspects like the drive of the mentors, the individuals in the group, etc."

Yet, the feedback that Liis Koser has collected from the mentors over the past year points to high levels of satisfaction: "Based on the data we already have, we can say that girls only groups really work. Our lessons are looked forward to and we don't see any decline in the girls' motivation. We basically don't have absences — girls miss the class for health reasons only."

One course covers ten classes and usually runs from September to December and/or March to May. All the groups that started the first course have continued to the second, i.e. there has been a 100% continuation rate on groups who have moved from the second course to the third course as well. "Only 4-5% of all girls quit after the first or second course and usually not because they have lost interest or they didn't like it, but because they have moved away or some other after-school activities like piano or ballet lessons don't allow them to continue," Liis concludes. "Once the parents have seen that the technology classes are here to stay, it will hopefully be easier for them to decide to choose the clubs for their daughters and we will earn an equal standing among the more traditional after school activities."







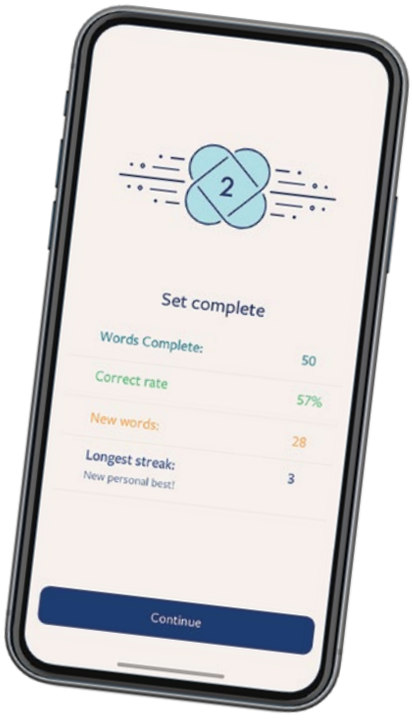




Photo by Jack Farra

Anybody can be a linguist. With Lingvist

By Maris Hellrand







Languages:
English, Spanish, French, German, Russian

Headquarter:
Tallinn, Estonia

Office:
London, UK

Founded:
2013

Registered users:
4 million

Lingvist has been selected by UNESCO as one of the 10 best educational ICT apps in the world

Mait Müntel was stranded at a train station near Mont Blanc in France one misty Sunday evening after having found out from the guard on duty that the last train had left for the day. Their only means of communication was body language. This was a *eureka* moment for the CERN physicist — it must be possible to use AI to help a STEM-person like himself learn a foreign language more efficiently than through a traditional textbook. He created a prototype and used it to learn French. Soon after, **Lingvist** was born.

Lingvist, today the biggest EdTech company in Estonia is using AI to create individual paths for learning and has accelerated the speed of language learning by four times according to a study by the University of Tartu. The ambition is to accelerate human learning 10 times, which is urgently needed when the world around us changes so fast. The AI adjusts the pace and content to the individual learner, offers topics that interest the particular person, and reminds the user to repeat new vocabulary just at the right time to make the most of the individual's memory capacity.

With currently just under 4 million registered users, Lingvist is operating on the global market with a strong focus on Asia. Unsurprisingly, English is the most popular language.

Ott Jalakas, a co-founder of Lingvist, explains the mission: "English is the most dominant language — the majority of high-quality education is in English in the world. So, if someone wants to achieve equal opportunities in education, English is the language to focus on. Our impact is to create equal opportunities while also earning profit as a company."

During the COVID-19 related global lockdown, Lingvist, like many other EdTech companies, has made its resource available for schools free of charge. While the predominant education system in the world is still schools, Lingvist's business model is focusing on the consumer. The individual learning and consideration of personal interests and needs is the new trend, now more than ever enhanced by the lockdown and remote learning. That's exactly the logic of Lingvist — the algorithm is personalised; the student learns exactly what he or she needs at a pace that is adjusted to the individual. March 2020 has resulted in record sales of subscriptions as people seem more eager to make good use of the free time.

Jalakas explains that approaching customers directly has worked best as a learner can quickly decide whether the app works for them and then make the decision to upgrade from the free version to a paid full version: "This is the shortest sales cycle. If he likes it, he buys it. If he is unhappy, he gives us feedback immediately."

Lingvist is also available for classroom use and Jalakas relates one of the best experiences from Desert Ridge High School in Phoenix, Arizona. "The students took part in the Arizona State French Competition last fall and to the surprise of everyone won the first three prizes — something that has never happened before. They are our best sales agents, as they have seen the effect."

Teacher **Sarah Cooper** is convinced this success is due to Lingvist. She uses the app for a part of each lesson and combines it with teacher-led learning. And a large part of the homework is done through Lingvist. The teacher can create vocabulary for a specific topic in the app and students learn via the app ahead of the next lesson. They don't need to waste time on vocabulary in class but can go straight to conversation and text analysis.

In order to benefit from this technology, the teachers need the freedom to set the curriculum and choose the tools that they trust. Jalakas recommends: "Trust teachers to select the best tools for their students. So far, the teachers using EdTech have been pioneers and kind of rebels — brave enough to try out new approaches."

Tech empowering teachers

When talking about EdTech and the future of work the topic often arises — will technology replace people? Jalakas thinks technology can't replace the teacher: "Tech can empower the teachers by freeing up time from routine, like learning vocabulary. Technology helps to add value to the time spent by the teacher. We have seen that language tutors who use Lingvist can actually ask a higher teaching fee because the value added by each lesson is higher."

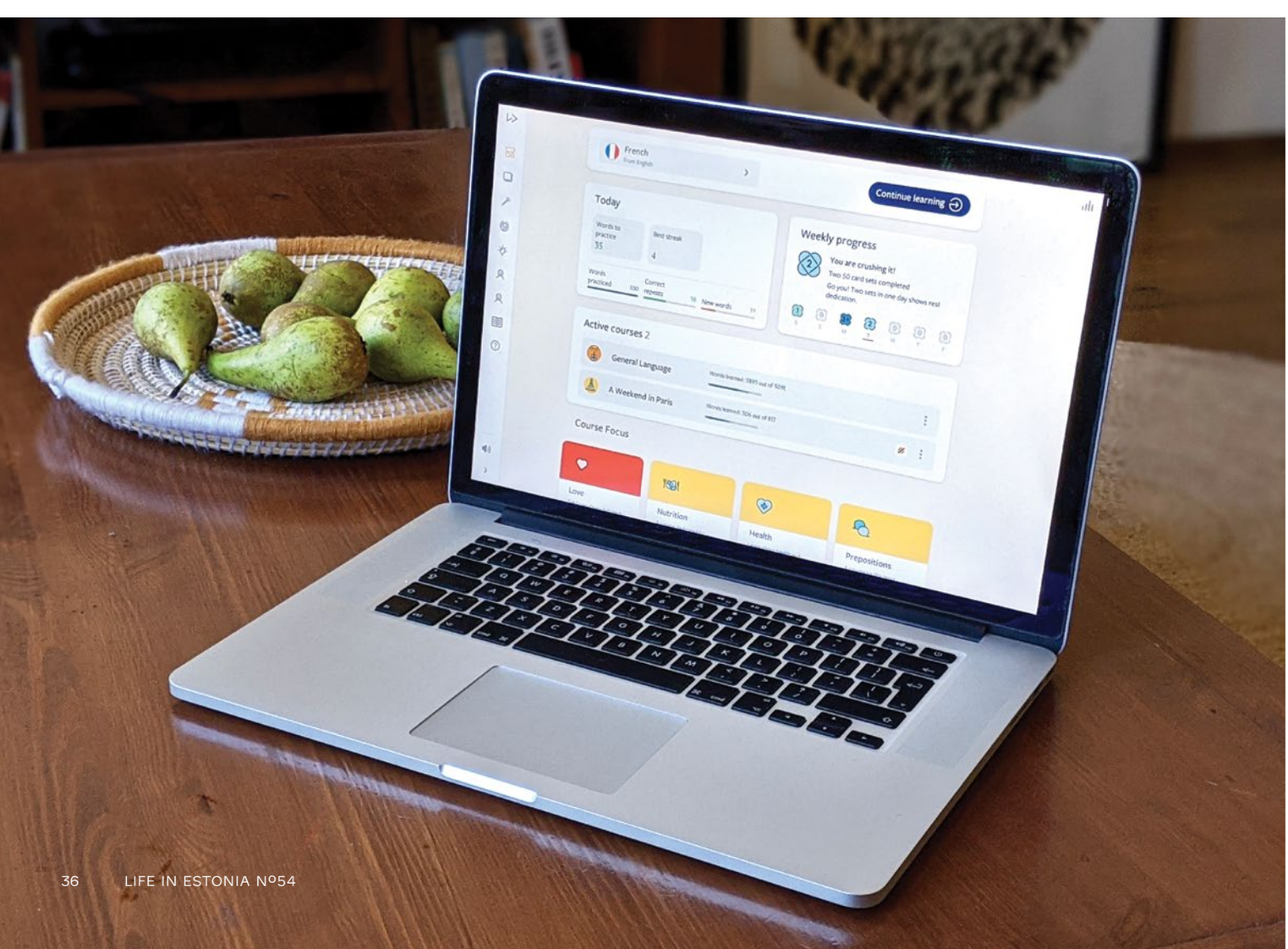
Lingvist has a rational approach to language learning and to its own business strategy. Therefore, schools so far have not been the main focus of sales as the sales cycle is long and complicated. Nevertheless, there are schools in the USA, Canada, Germany, and Estonia that use Lingvist for language tuition.

The biggest market now is China, up at the top are Taiwan, Germany, Japan, and the USA. While English is still the main language taught, Spanish and French are following. According to Jalakas, a new interesting trend in the USA is learning English based on Spanish: "This is largely investor-driven, it targets Latin-American immigrants and helps them integrate into US society. This is very attractive for investors and funds that value the impact on society. Integration, equal opportunities for the immigrants, affording wellbeing through education."

Another big focus market is German-speaking countries — Germany, Austria, Switzerland, where the rational image of the company helps — pragmatic, powerful, hardworking to achieve success.

While sales soar during the lockdown, startups are facing hesitation from investors. Lingvist was hoping to close a new funding round this spring as the company is still in a fast growth phase, however, it has had to look for new investors amid the looming economic crisis. Nevertheless, Jalakas is confident that this is a good situation for investors who have otherwise not been able to compete with large Silicon Valley or London funds for potentially successful companies. Lingvist is hoping to reach break-even this year.

While focusing on languages for now, Lingvist founder Mait Müntel has stepped in again as a Guinea pig to test the possibilities of using the Lingvist algorithm to learn other subjects. He recently passed the pilot exam on the first try after adapting Lingvist to learning facts about flight technique, navigation, and weather. From here, the sky truly is the limit.



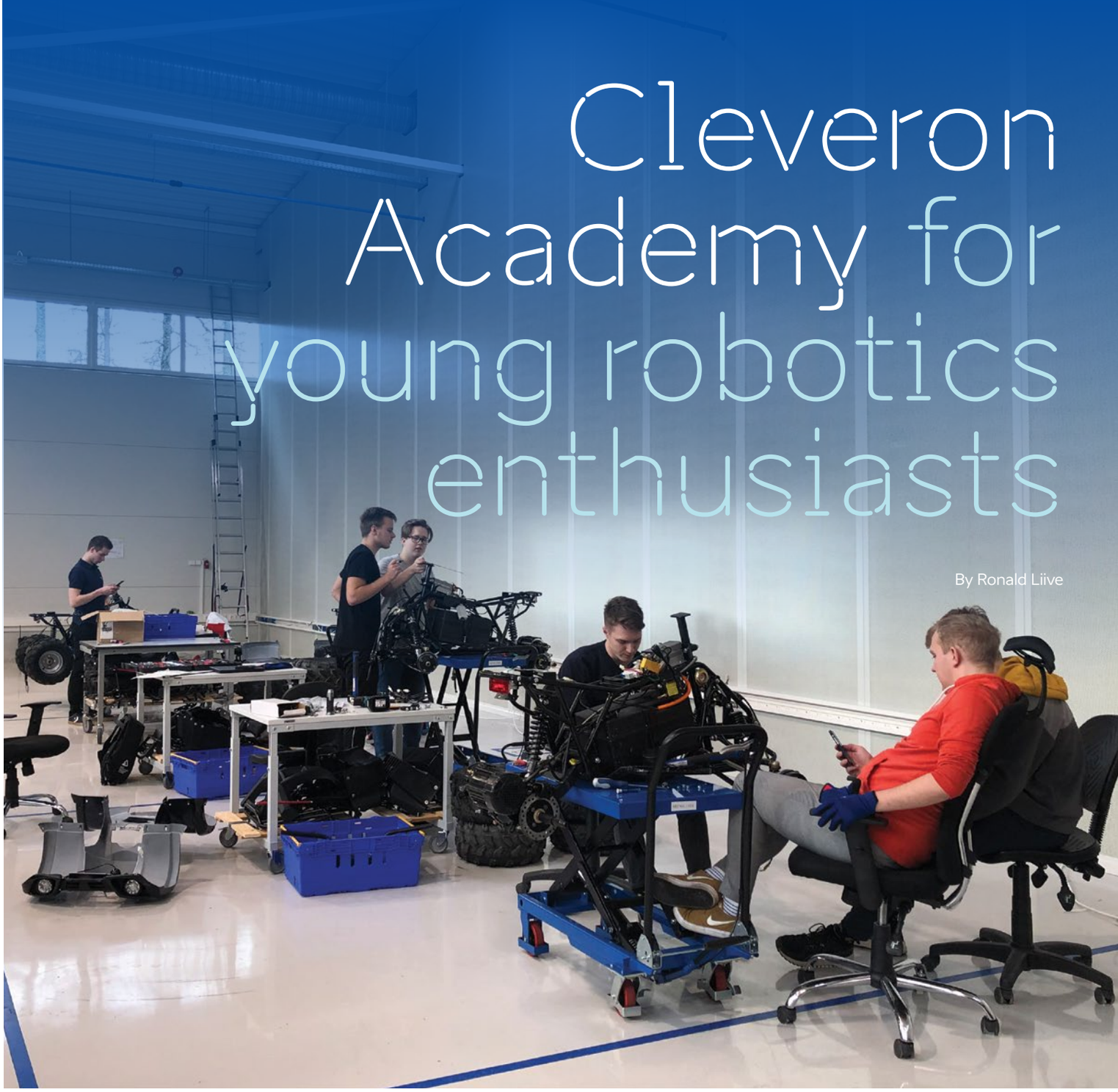


Photo by Cleveron

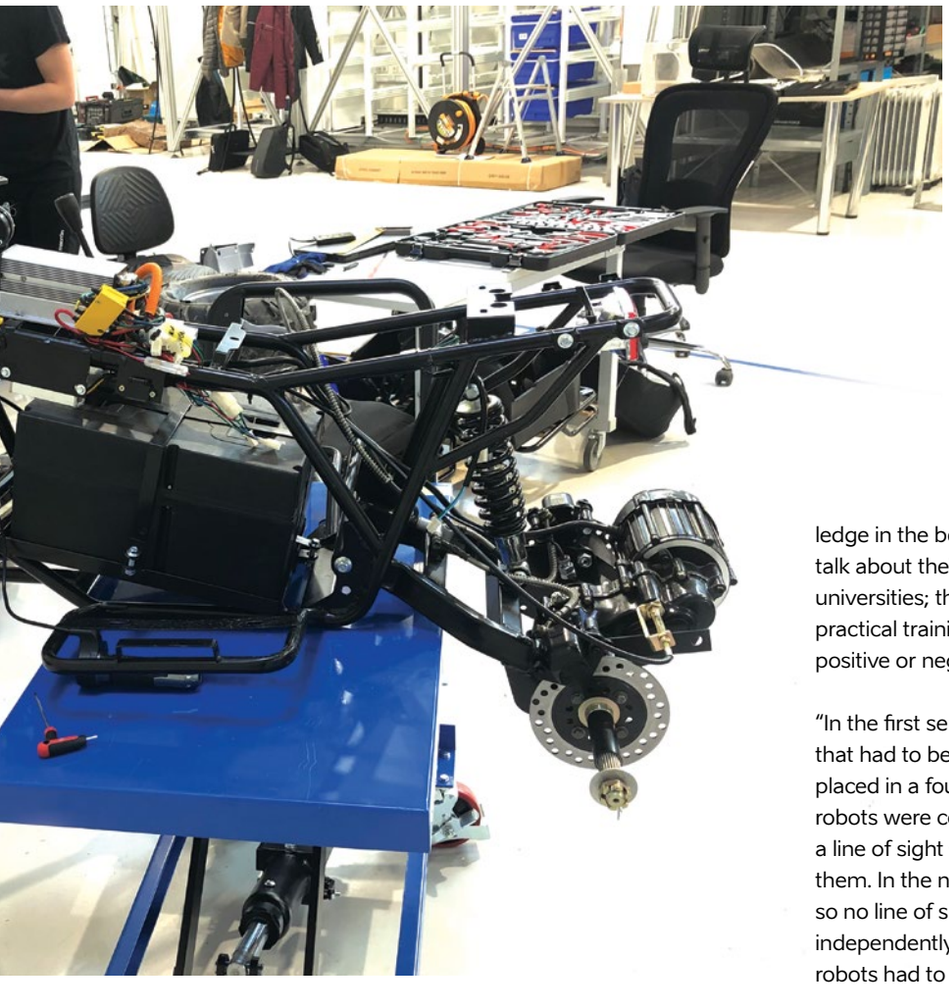
Cleveron Academy for young robotics enthusiasts

By Ronald Liive

Cleveron, which develops and constructs parcel robots, started something last year in Estonia that has never been done before. In cooperation with the Estonian Entrepreneurship University of Applied Sciences, the company started an applied higher education curriculum called the Cleveron Academy. The academy aims to train software developers with a specific focus on self-driving cars.

There was already enormous interest in the **Cleveron Academy** in the first year with a total of 101 candidates applying for 20 places. Although it's a private school, all of the tuition fees (5500 euros per year) are paid by **Cleveron** itself. On top of that, all of the students get free housing, free lunches, and a monthly stipend of 400 euros.

The focus is self-driving cars: Cleveron is developing a parcel robot that is based on one. Even if you have not heard of Cleveron, you still might have used their robotic parcel terminals without your knowledge. Cleveron's solutions can be found in **Asda** stores around the United Kingdom and the world's largest fashion retailer **Inditex** has used their click and collect pickup solutions in many different countries. To date, their biggest international client has been **Walmart** with 1600 Cleveron terminals around the USA.



Cleveron CEO **Arno Kütt** has stated that the aim of the academy was for education and business to go hand in hand. According to Kütt, students of higher education often take internships in companies that are not related to their studies and only start them after the theoretical portion of their training is coming to a close. At Cleveron Academy, the theory and internship are equally proportioned and start right away.

Cleveron Academy, like Cleveron itself, operates out of the small, southern Estonian town of **Viljandi**, known internationally for the Viljandi Folk Festival and other cultural events. **Laido Valdvee**, the academy's internship coordinator, talked with *Life in Estonia* about how students are converting an ATV into a self-driving vehicle.

Learning together with the students

Laido Valdvee previously worked at Viljandi Jakobsoni School as well as vocational training institutions; Cleveron asked him to join. His decision to join came quickly, said Valdvee, because he wanted to be a part of something that had never been done before in Estonia. He started last October and since then time has flown.

"As an internship coordinator, time has passed quickly for me. Just like the students I've also had to learn a lot. A curriculum like ours has never been done before in Estonia. A great deal of emphasis is on practice. The weekly study session is divided by three days of practice and two days of theory, the following week is vice-versa," says Valdvee.

Practice started right off the bat alongside theory, which are balanced 50/50. This means that students may not have all the theoretical knowledge in the beginning to use in practice. Valdvee says that students talk about their friends who study similar curriculums at well-known universities; they say that they do not receive a comparable amount of practical training and mainly use simulators that do not represent the positive or negative effects of the real world.

"In the first semester's practice, the students got a miniature robot car that had to be rebuilt so that the robot could deliver small balls that were placed in a four-metre diameter circle into smaller circles. At first, the robots were controlled by the students via a computer, they maintained a line of sight with the robots by standing next to them while operating them. In the next stage the control had to be done via a camera image, so no line of sight anymore, and in the third stage the robots had to independently bring five balls together in one circle. That meant the robots had to understand where they and the balls were and where the circles were," Valdvee describes.

Most of the students were successful with these tasks. Valdvee made an interesting observation during the presentation. While the systems were checked and the students were evaluated everything worked without any problem, but the next day when they decided to perform a race against time, the robots started to fail.

During the described practice, the students also created their own navigation system, a homemade GPS so to speak. To achieve this, a camera was placed at a height, markings were affixed to each robot, and the balls were identified by colour.

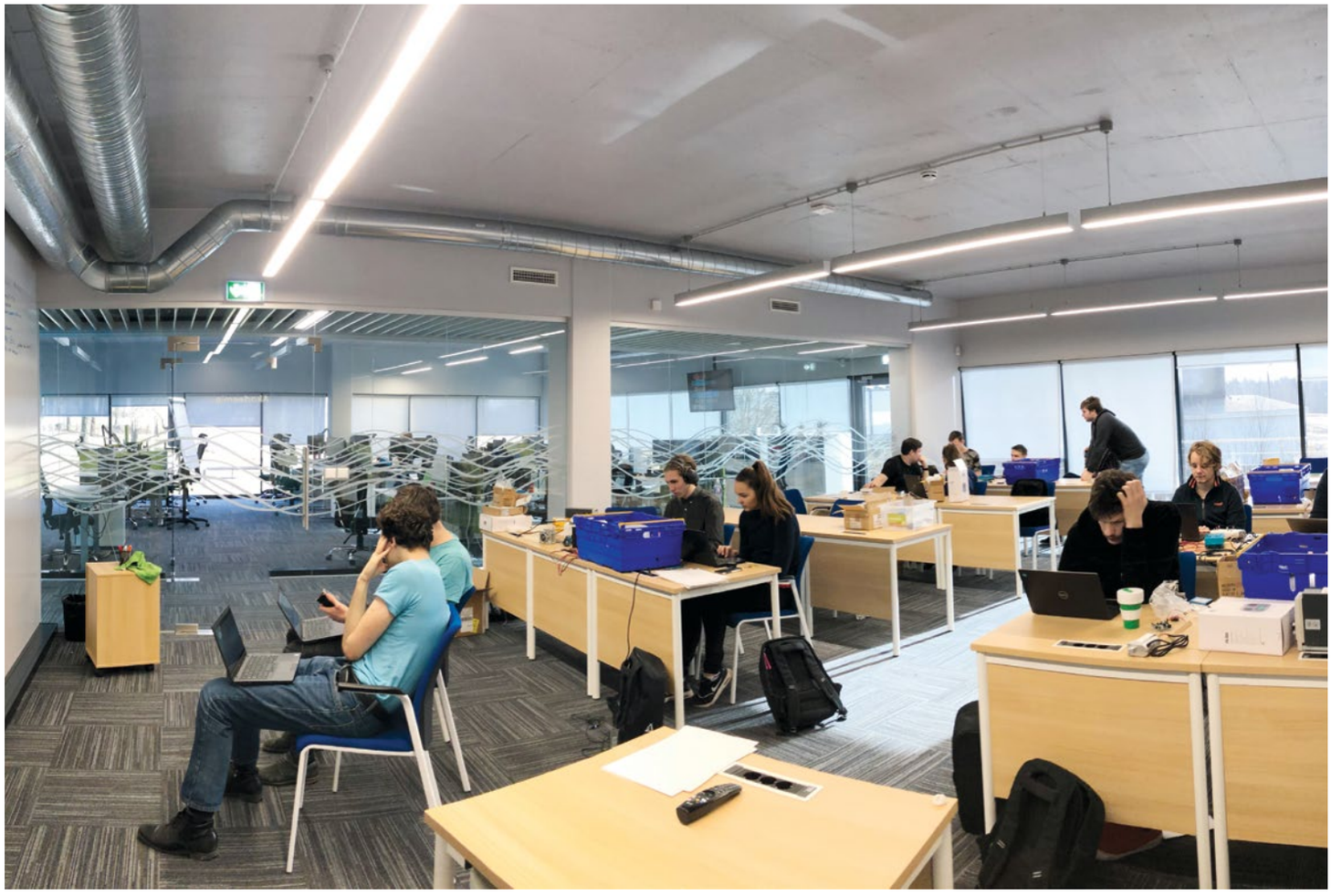
"The built system shared real-time information about where the balls, robots, and circles were located. The robots were programmed to go to the nearest ball or the most easily accessible ball," says Valdvee.

At Cleveron Academy the students are presented with a problem and the solution to it is wholly up to the students. This makes students keener to work on cooperation and creativity skills.

The second semester's practice was remarkably bigger — the students were given an electrically powered ATV and different tasks they needed to achieve with the ultimate goal of making a self-driving ATV that can be used for parcel freight. Unfortunately, the coronavirus pandemic affected studies, and the task was put on pause until August of this year when studies continue.

Their first task was to make the ATVs controllable via remote like drones. All of the functions such as indicators, horns, brakes, and accelerator pedals had to be functional via the remote. The internship supervisor has big plans for the ATVs.

Photos by Cleveron



"At first, the ATVs have to be controllable via remote control. In the next phase, the students need to add a computer to the remotes so the vehicles can be controlled via Wi-Fi. The ATVs will then have cameras attached and the driving needs to be done through a steering wheel that is connected to a computer. This was meant to be ready by this spring," describes Valdvee.

As mentioned, the final goal is to have a self-driving parcel freight vehicle based on an electrically powered ATV. To test all of the self-driving capabilities, a mini-city will be built next to Cleveron's factory in Viljandi with crosswalks, roundabouts, and other real-world obstacles.

Cleveron and its Academy working hand-in-hand

During the first weeks of the emergency situation that was announced by the Estonian government on the 12th of March, Valdvee provided the students with **Arduino** development boards so they could continue to work on their practical skills. As the aim is to teach students skills to develop a self-driving car, the lecturers quickly decided to put the practical portion of the studies on pause until the situation settles, then resume in August.

Like many schools in Estonia and around the world, studies had to be carried out online. It's too early to say what kind of an impact the distance studies had on students, but Valdvee sees that students are coping with it differently — some of them enjoy it, but some are not so keen on the idea. Every week the students meet with their lecturers through video conferences.

Even though Cleveron manufactures robotic parcel terminals of different sizes, Valdvee does not want to use the students in manufacturing during this difficult time as it would not fulfil the purpose of the learning objective.

The Cleveron Academy and Cleveron itself are intertwined, which means that the students and workers share working and studying facilities. It also means that when a student or a group of students develop something that could be used in Cleveron's products then they can start using it.

"The students work side-by-side with Cleveron's self-driving car team. We share the rooms in our office. The students see daily what the employees work on and vice versa. That means they can ask for help from each other. This should be a very good added value as you are not somewhere in the lab but part of the real development process. Maybe thanks to immediate feedback, you will have a better idea, and you can implement it immediately," says Valdvee.

Based on his previous work experience in vocational education institutions, Valdvee points out that the motivation of the students enrolled in the Academy is considerably higher. This is also reflected in the fact none of the students have dropped out by the end of the first year.

The next batch of students will be admitted to the Academy in 2021 but whether the focus will be on self-driving cars or something else is yet unknown. Although a large proportion of the programs the students need to work with are in English, the studies are conducted in Estonian, which means that a person interested in attending the academy needs to be proficient in it. There are no other limitations for candidates.



Photos by Henry Narits

Hedi Peterson showing the spread of coronavirus on the map of Estonia

Study on COVID-19: predicting possible scenarios

By Sven Paulus

As coronavirus began its spread in Estonia, scientists at the University of Tartu launched an anonymous online survey to map the symptoms and risk factors associated with COVID-19.


Jaak Vilo

Coordinators Professor Jaak Vilo and Senior Research Fellow Hedi Peterson from the Institute of Computer Science agreed to share the results of the study.

Your interdisciplinary research team is collecting, modelling and analysing data on the spread of coronavirus. What have you been able to find out so far?

We were seriously affected by the sudden unfortunate explosion of virus infections in Estonia and the apparent lack of information about the many important parameters of the disease's spread and progress. We applied for ethics committee approval and quickly launched a national online survey platform for mapping COVID-19 symptoms and risk factors, as well as collecting information on where the affected are and how people change their behaviour during the crisis. With this study, we are linked to an international consortium that has done similar apps or data collection activities worldwide. This is extremely important, as otherwise the data of Estonia could be too small. The survey and other tools can be found from the web page **koroona.ut.ee**.

How many people have answered the questionnaire and what is their background?

For now, we have had over 4000 people answering the questionnaire, mostly during the very peak of the infection's spread. As time goes on, we do not know if there ever will be second and third waves or many small, new hot-spots. So far, Estonia has had a rapid, strong and successful response limiting the spread of the virus efficiently. In this fight, Estonia has used a hybrid of citizen-centric and government-imposed limitations.

Note that our survey is based on answers from voluntary and anonymous participants. This can be partly biased, but we do not know yet how much. We have had people taking the survey from all over Estonia. Since we took the approach of minimising the amount of sensitive content, we do not ask so many specific, potentially identifiable questions such as the profession of the participant, for example.

How does this study help to map and model the COVID-19 disease?

The main unknowns were really related to how and which symptoms were developing for people in Estonia; what were the associated risk factors; and whether people really changed their habits after the special measures and applying self-discipline. The study shows that people responded quickly, they were worried and took action, and that the 'flu-like' symptoms are quite similar in positive-testing and negative-testing participants.

However, we also detected a few very specific symptoms that occur with 2-3 times higher frequency in positively diagnosed COVID-19 cases. The loss of smell and taste is one such example, widely discussed in the literature as well. Contrarily, smokers were underrepresented in that cohort, leaving many questions such as whether it actually protected some or whether they got a stronger disease and were not able or interested in taking part in the survey.

By tracing the voluntarily reported symptoms from all people, not only those with official tests, we also get a 'map of potential disease severity' in different regions. We can assign different weights to different symptoms and trace their spread throughout the country.



Photo by Henry Narits

Jaak Vilo is playing a board game with the symbolic name of 'korona' (or Baltic billiards as it is sometimes called)

Does this knowledge help to predict possible scenarios?

Yes, sure, this is the goal. We have learned a lot in this process and can now be much better prepared for future outbreaks, or next waves of COVID-19, if needed. Also, we can show how voluntary data collection through such a 'diary' system could be done in an anonymised form, yet make useful reports to the people themselves as well. Data entered by people belong to people, they can come back and edit and update it anonymously. Or even send a link to their report only to their physicians, if they so wish.

What are your future plans with the study?

We want to compare the spread of the virus and take approaches internationally. We partnered up with a consortium that does similar studies in different nations, on different platforms. We can learn from those experiences and also study how to analyse data in a distributed fashion while maintaining the data in each country.

Secondly, we started development of the visualisation tools for international data on disease spread trajectories. Thirdly, we have contributed to the modelling and prediction of the disease's spread in Estonia. This activity is complex and requires help from data engineers to prepare data that is easy to use for statisticians or data modellers, for example. We have helped the modelling team led by professor **Krista Fischer** and **Mario Kadastik.**

There are also other studies on COVID-19 at the University of Tartu, for example, the cross-sectional study on the prevalence of COVID-19. How is the Institute of Mathematics and Statistics contributing to this project?

We (the Institute of Computer Science _ed.) and the Mathematics and Statistics institute contribute primarily to data management, data engineering, visualisation tools and dashboards, and of course the statistical analysis and interpretation of the data. Our initial study design with voluntary questionnaires is used as the basis for this new representative sampling-based survey and testing process. In this way, we can get a better estimate of the true spread in each county, and hence the entire country.

This new study is a multi-institute collaboration, led by professor of family medicine **Ruth Kalda**. Quite recently the first data was released, indicating that the expected number of COVID-19 infected people is actually not very wide-spread. The confidence intervals are quite broad, but most likely the true number is around 0.1% of the population.

Do you keep an eye on this kind of research in other places in the world?

Of course, we try to monitor what is happening worldwide and in our closest collaborative networks of **ELIXIR**, the pan-European bioinformatics research infrastructure, for example. At the moment, we do not have Estonian local viral or human host DNA yet, but once we do, we can help with data analysis pipelines and international collaborations on those fronts as well. Our workload over the last 6-8 weeks has been incredibly high, while also working from home. But the results are also rewarding. All the scientists in the world can help to understand and fight the disease, while the governments face very hard decisions on the policy-making front.

We will primarily follow two collaborations — similar studies on the spread of the disease and participant-reported data, and secondly, understanding the progress and specific risk factors of the disease and potential future complications from the medical records. For this, we follow international standards of health data mapping and put them into a format in which they can be analysed safely and in a distributed manner in many countries and across large data sets. One does not need to give away data or even bring together the anonymised data, so long as each database can be mapped within the same structure.

Then, the same tools can be used for analyses across different data sets and the aggregate results compared. On the other hand, even rather complex questions could be asked regarding the best practices for the cure, or increased risks or adverse events using some treatments over others. For such studies, usually very large data cohorts are needed, and such clinical trials would be almost impossible to conduct.

Combining forces for the analysis of real-world data from many countries and data sources can give us the needed statistical power to validate or reject hypotheses. In a way, this is like planning for many *in silico* clinical trials at once. In future, the main conclusions of the clinical trial will be made by a team of interdisciplinary scientists sitting together in study-a-thons and carefully formulating the study protocol. The answers to such a protocol can actually be obtained immediately across many databases.

This reduces some studies from many years of conducting down to merely a few weeks while offering a much higher number of cases and statistical power for the conclusions. This real-world evidence is being embraced worldwide by the **OHDSI community** (OHDSI.org) and we are happy to help develop those tools and approaches through an **EHDEN Innovative Medicines Initiative** collaboration project.



Photo by Atko Januson

Future learning and education will be co-creative

What should be taught at future universities so that people can solve diverse and wide-ranging societal problems? The fresh collaborative project SHIINE, which is comprised of researchers from 40 countries, is looking for an answer to this question.

Life in Estonia **spoke to project manager Katri-Liis Lepik, who works as an Associate Professor of Management at Tallinn University.**

By Sven Paulus





Meeting of the COST Action CA18236

What are the main objectives of this network project?

The global network for 'Multi-disciplinary innovation for social change' links social impact businesses, policy-makers, academia, and citizens together to influence the way students are educated at universities, policies are formulated and solutions are turned into sustainable businesses. It is a multi-disciplinary and inter-sectoral innovation for societal change. The development of social enterprises in the educational landscape has revealed that students need complex skills to cope with future issues. We have also seen how differently they are currently taught across Europe. The project is inspired by our own practical experience of project-based teaching and social entrepreneurship.

We want to explore how different universities conduct project-based learning and how they develop students to cope with the challenges to create social business ideas that address societal and environmental issues. We will include companies, higher education institutions, and the public sector in this project because some of this will also affect policy-making. New solutions offered by students could also reach the public sector.

The project has direct links to future education and its impact on the surrounding environment, but what is future education in general, and what are these links?

Half of the time this project has been in operation, it has been impacted by the global pandemic situation. This has changed our working procedures and being engaged in educational systems has required swift and dramatic adaptation. Anyone with children at any level in the education system has suddenly been turned into an educator and a support person in the home setting. Suddenly, we found ourselves in both roles simultaneously — as learners trying to cope with the new situation and as teachers and lecturers.

There are largely two approaches to define the future of education. The lockdown and related digital learning has narrowed the world even more and made the knowledge and lectures of global experts accessible to everyone straight from their home sofas. The booming of various e-learning tools and platforms has brought the teachers and learners closer together.

Remote learning has actually brought us closer and given insight into everyone's life, straight into our very private spaces which had otherwise remained discrete. On the other hand, the other approach is that a post-pandemic situation might even further encourage individual learning and one-to-one tutoring tailored to the needs of each learner.

With this project you try to find solutions and knowledge that should be taught in universities in the future, but how has the knowledge of the future been mapped?

Education will be ever more a co-creative endeavour in the future and not just about passing knowledge over and sharing the wisdom of a more experienced individual. Co-creation has proven to be possible via digital channels, but it is still easier to be creative having physical contacts and seeing people's immediate reactions and responses.

The role of the university and any educational institution will be about enabling learning and progress to take place. It will be about inspiring and giving the students some direction, clues, and hints on how to research and find out more themselves. Future learning will be more focused on finding solutions to the problems that are not embedded in a few disciplines and, in order to solve issues, we are all forced to cooperate and search for team members for joint efforts. We are trying to encourage the role of mentors as helpers in developmental journeys of individuals or teams.



Photo by Atko Januson



Katri-Liis Lepik

According to this project, we will face new social challenges. Please describe them.

Currently, COVID-19 has posed the biggest new societal challenge of our time. Several researchers in our project are researching the impact of the crisis and pandemic situation from a wide variety of angles. The social sciences allow us to approach the post-pandemic world via multiple lenses — either the impact on the economy, resilience, people's behaviour and mindset, etc.

The SHIINE project started in October 2019. What have you achieved so far?

We have mapped and collected information in our network of 38 countries about the research which is currently being done around the pandemic situation, which is having or could have an impact on society in global contexts. There is a wide range of research on rural resilience, the impact on global industries, and the state of the health care systems in European countries. We have launched our website, social media channels, and blog to promote the work being done in our network.

How has the current coronavirus crisis affected your progress and activities?

In the current lockdown situation, we had to adapt our activities and turn our events to digital. The closest event will be happening on the 5th of June and the webinar is dedicated to 'Multidisciplinary Innovation in Pandemic'. We'll analyse the social innovation in the context of crises and the role the academic sector can play with other sectors.

What have been the results of the social hackathons you organised?

We have piloted social hackathons in Estonia in Võru county. As a result, we have designed the concept of a social hackathon with the purpose of creating appropriate methods to support the co-creation of new and innovative services and solutions with all stakeholders. The most relevant topics for our pilot were stakeholders' and end-user engagement and creating a supportive environment for participating teams, thus ensuring a solid platform for them to work with the ideas after the event.

We adjusted our guiding materials, worksheets, mentor work and the infrastructure to suit the needs of everyone, as we also included disabled people in the co-creation processes. In order to offer social hackathon experiences successfully, we continually re-design this co-creation method according to the results of our activities, feedback, and new knowledge.

We pay a lot of attention to understand the process of co-creation during the hackathon and we try to systemise this knowledge into patterns that could be replicated in other countries. We've managed to start convincing public sector representatives that co-creation with all stakeholders is a useful and normal process of developing services for the future. Perhaps the experience of SHIINE in the context of COVID-19 will accelerate the adoption of this approach.

Estonia's biggest data centre opens its doors in 2021

By Marian Männi



Photo by Atko Januson

Estonia's biggest data centre was born through a 100-million-euro Finnish investment, hard work, and some luck.

Kert Evert

Photo by Raul Mee



Kaimar Karu, former Minister of Foreign Trade and Information Technology, and Kert Evert, celebrating the start of the construction of the MCF Data Centre

A small office room in Estonia's capital Tallinn was stacked with servers. These were heat-emitting, humming machines that belonged to a major telecommunications company. If something had happened to those servers — a neighbour had started a fire, the room had become too humid or dusty — the whole company would have collapsed like a house of cards.

Data is everything these days. Every YouTube video, profile picture, email and website is stored somewhere, in a real physical place — even if it all seems seamless and wireless to us when we browse. Data is the new gold. And just like gold, it needs a secure vault.

That's why the company's infrastructure manager **Kert Evert** was told to find the machines a bigger, safer place to be.

Evert realised that Estonia, one of the most tech-savvy countries in the world, as the New York Times called it, doesn't have any large-scale specialised data centres. Evert started dreaming of creating one. It was by accident that he met **Leif Hildén**, vice-president of a Finnish pharmaceutical company, who wanted to buy a summer house in Estonia and grow vegetables in a greenhouse. The Finn asked Evert to translate for him. "I didn't know him, but of course I was willing to help," Evert said.

The act of kindness paid off. As they got to know each other better, Evert trusted Hildén with his crazy-sounding idea. He said he would like to build a data centre where the servers´ heat would warm up a greenhouse next to it. "We would both win!" he claimed. Hildén could grow vegetables and Evert could start something of his own that Estonia needs. The Finn didn't know anything about data centres, but stopped by his neighbour, a well-connected and experienced investor **Tero Viherto**.

Viherto agreed to hear Evert out. The Estonian then drew up his first plans, jumped on a ferry to Helsinki and presented his ideas to Hildén and Viherto. They remained sceptical. If big data centres are the future, why aren't there any in the Baltics already, they wondered.

Meanwhile, back in Estonia, Evert started creating a small data centre for his telecommunications company where he then still worked. He planned every detail. Evert had spent years taking care of data and keeping machines safe, he knew what mattered.

We rely on invisible data

He took Viherto and Hildén for a visit to the first data hub he created for his employer in 2016. The Finns were impressed. Evert had thought of everything. He had even installed systems to muffle the sound because loud noise can cause data loss. According to Bloomberg, that's what happened in a Swedish data centre in 2018 when a fire suppression system emitted loud sound and destroyed the hard drives. Nasdaq Nordic couldn't start trading operations and many markets were affected.

People depend on those humming servers in almost every aspect of their lives, especially in a digitalised country like Estonia where almost everything can be done online. 99% of services are delivered electronically. Vice News once even called Estonia 'a country in the cloud' and 'a country of the future'.

A data centre seemed like the most natural next step for e-Estonia.



Location is crucial

The Finns were now on board, so the work could finally begin. But before that, another unexpected turn happened. Every year, **Tero Viherto** goes to Lapland together with a group of friends. One of them, **Osmo Koskisto**, is a leading data centre expert in Finland, who had been involved in finding locations for almost all the data centres in Finland. Viherto became aware of this after getting involved with the MCF data centre and invited Koskisto to become one of the first investors in Estonia's first-ever large-scale data centre.

"I wanted to invite people with skills, not just money," Viherto, a private investor and entrepreneur explained.

The **MCF Group Estonia** was founded on Evert's birthday in summer 2016. 28 shareholders — 22 Finns and 6 Estonians — joined in. Evert became the CEO, Viherto the chairman of the board. Even Hildén, who only wanted a summer house in Estonia, became one of the investors and found himself involved with something much bigger. The shareholders included experts from many fields.

Viherto was surprised by the enthusiasm he faced: "Only two investors we approached said no," he said. Enterprise Estonia, a national foundation that supports foreign investments in Estonia, jumped in to help.

"It's extremely easy for a foreign investor to enter Estonia's market," said **Pilvi Hämäläinen**, the Estonian Investment Agency's Director of Business Development in Finland. "Everything goes very fast: it's all online."

Even during the current coronavirus-related crisis, Estonia moves on in full swing. As a small country, Estonia can react quickly to a changing situation. Just think about the world-wide movement **'Global Hack'**, which kicked off in Estonia. Besides, as a digitalised society, Estonian residents have strong IT skills and can generally continue their work from home offices.

The government offers strong support for foreign investors. "We help develop the business, negotiate with public and private sector partners and overcome any obstacles there may be," head of the Estonian Investment Agency **Raido Lember** said.

The Estonian government was interested in supporting the MCF group, bringing with them one of the most important foreign investments in the IT field in recent years. The data centre will hopefully attract more investors too, Lember said. Knowing they would have a safe place to keep their data in Estonia makes it a more attractive country for foreign companies with IT-sensitive activities.



Photo by Atko Januson



What also made Estonia a good target for a data centre is its attractive and company-friendly taxation system. The economy is stable and Estonia has a good reputation in the region. Or as Viherto put it, Estonia is a gateway between the east and the west. He is hoping that their future clients will come from all over Eastern Europe.

Meanwhile, as the investors were coming together, Evert pulled in a list of potential 'anchor clients' and started designing the data centre together with them. Having a list of key future customers, in return, helped Viherto to bring investors on board.

The data hub will be spacious. Altogether, the MCF Data Centre is designed for 3300 data cabinets with 135 000 servers and 42 000 square metres of floor space. That is on par with an average European data centre.

It took the company two years to find the perfect plot of land. Finally, they chose a location near Tallinn, in **Saue**. It's close enough to potential customers but also excluded enough to be safe.

The land they chose lies near the power lines of **Elering**, Estonia's national transmission system operator for electricity and natural gas. The centre will be directly connected to Elering's network. The power needs of the centre will be comparable to a whole suburb of Tallinn.

Saue's mayor **Andres Laisk** happily welcomed the data centre with open arms. Not because it would bring many jobs, but because he 'always liked people with big visions', as he noted.

A comfortable place for IT staff

Evert knows how uncomfortable it can be for a technician or an IT guy to visit a data centre and configure their servers in person. Sometimes it can mean sitting next to a cupboard in a cold room for hours.

His data centre will have office spaces that the clients can use. They will have a kitchen and resting areas, a catering service, and even a self-service shop. But most importantly, as the spaces have movable walls, they can be modified according to the client's needs. Smaller companies can rent a space in a rack and share it with others. Bigger companies can have the whole room. In this way, as the company grows, the server space can grow with them.

For now, the greenhouse idea has been pushed to the background, but they do plan to use the emitted heat to warm up residential houses nearby. The focus on sustainable and green solutions has not changed.

"We are not just providing Estonia with the infrastructure they need for their e-country ambitions," Viherto explained. "We will make Estonia green again!"

Therefore, the MCF team will use green energy, less energy, and use the waste heat to warm up the houses nearby. When it's completely ready, the centre will cost up to 100 million euros. "It's a pricey project," Viherto admitted.

Many have tried to build a real data centre in Estonia but without luck. Viherto summed up the MCF's recipe for their success: "Sometimes it's pure coincidence, sometimes it's hard work. In this case, it's both."

The first part of the largest Baltic data centre will open its doors in the beginning of 2021, three months earlier than planned. The construction was sped up because of the coronavirus crisis that clearly illustrated how crucial secure and smooth e-services are.



Photo by Stina Kase

Kaupo Kikkas: music portrait photographer who receives inspiration in the forest

By Kirke Ert

Kaupo Kikkas, one of the most acclaimed music portrait photographers in Estonia, was supposed to become a clarinet player or singer. But at a crossroads, he became fascinated by photography to the extent that it led to the painful decision to give up his career in music.

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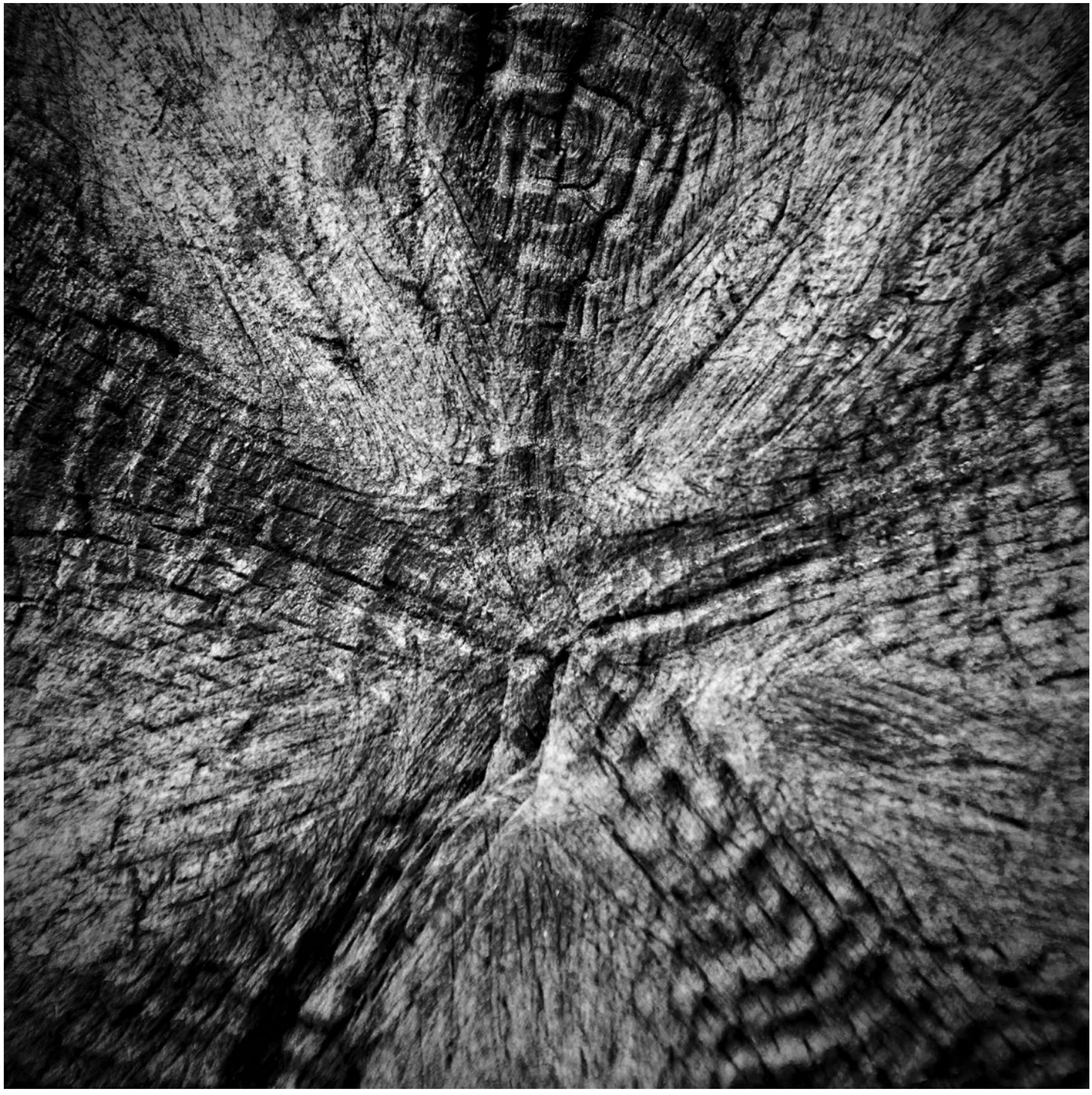
Portfolio. Kaupo Kikkas
Treescape



Soundtrack, 2015



Rowing Boats, 2016



Through the Kaleidoscope, 2014



Das Wohltemperierte Klavier, 2016



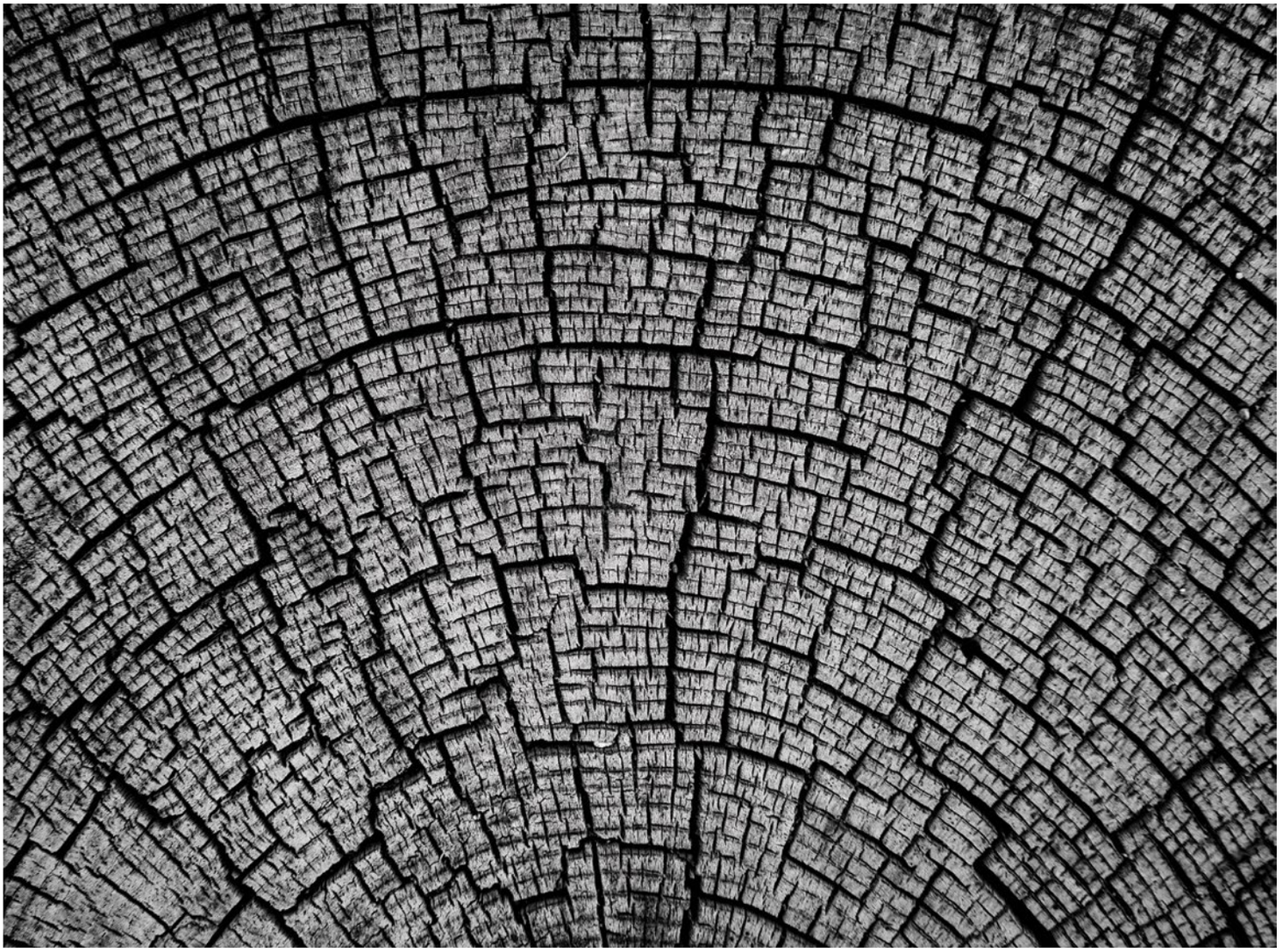
Heart of the Tree, 2014



Pillars of the Sky, 2013



Aspen, 2013



Sunset, 2015



Paavo Järvi

"Passion and the — at that time — totally unjustified belief in all the things I could accomplish in photography, helped me to make that choice. It is not possible to have two parallel careers at the top. Music leaves no space for compromises and often no space for a life."

But when you have been deeply involved in music, there is no complete way out. Hence it was logical that after the glamorous world of advertising and some experience as a press photographer, **Kaupo Kikkas** found his way back to music. The young man met the music manager **Kevin Kleinmann** who introduced him to some famous musicians. This step helped to slightly open the door into this world.

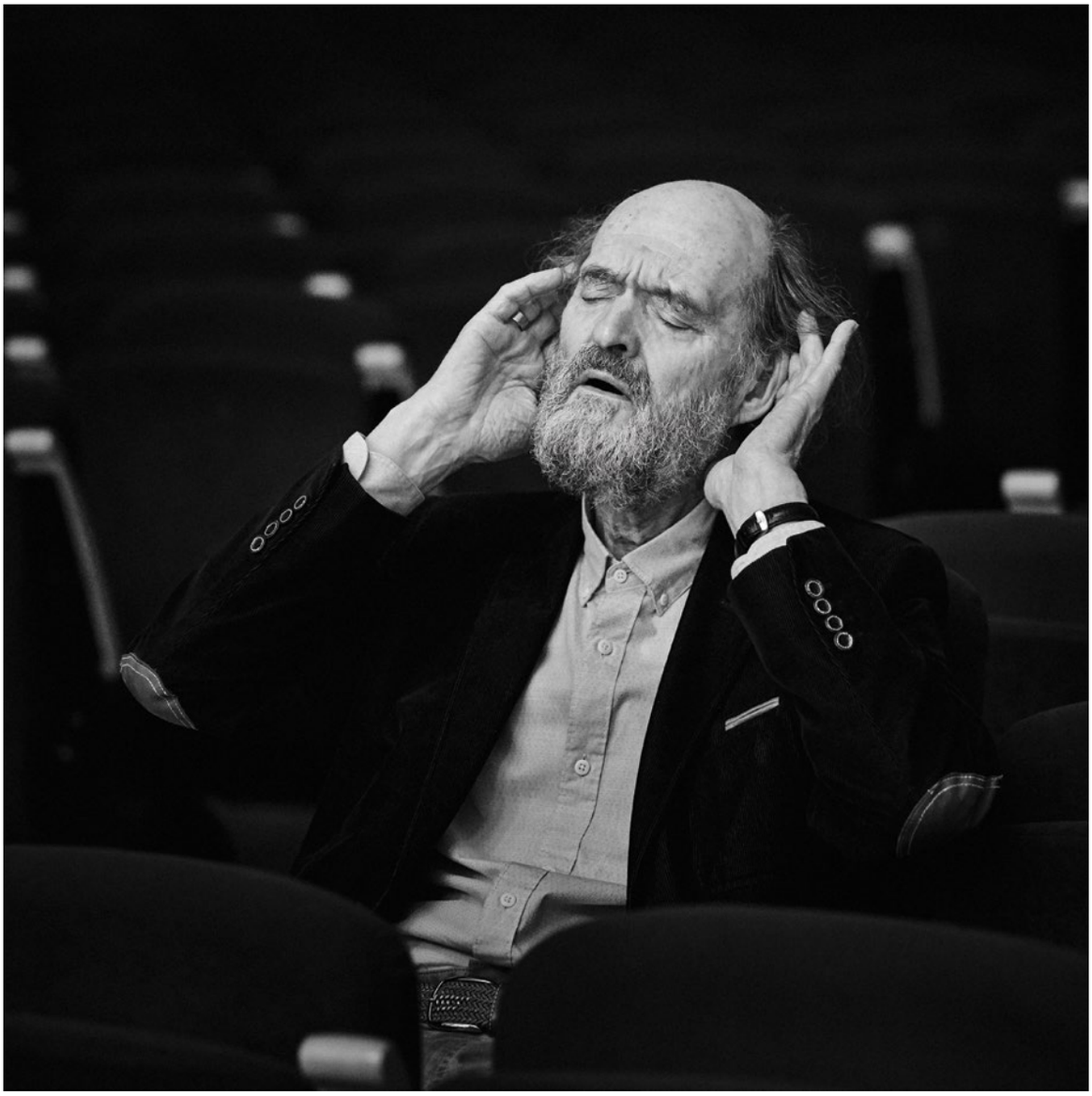
"It was really important, because I had my first photo sessions with the cello player **Leonard Elschenbroich** and violinist **Nicola Benedetti**, and I took some great photos. It is an unfortunate fact that you can show hundreds of pages of photographs of Estonian artists, but unless you have some photos of world-renowned musicians, your career will not take off."

Albeit this significant step did not fast-track his career, it allowed the slow climb to start. Years of collaboration with Estonian cultural ambassadors like **Arvo Pärt** and **the Järvi family** has helped to introduce Kaupo Kikkas' name and work. His photographs of Pärt have been published in all continents and in most reputable publications in the world.

"Pärt is my mentor and greatest inspiration. His personality and the world behind his music has taught me more than life," says Kikkas gratefully. "With such grandmasters, a photographer cannot intervene, direct or add his own strong vision because it dilutes their essence. Sometimes one needs to really prepare and get onto the right wavelength with a person in order to take their photos, but it is not so with Arvo Pärt. It would just get in the way. The best way is to be in the same room as him and to get a glimpse of his heavenly honesty and authenticity. Nothing other than acceptance by him is necessary."

Kristiina Poska





Arvo Pärt



One of five in Europe

Today Kikkas is one of only five people in Europe who are fortunate enough to have a career as a professional music photographer. His work often takes him abroad, but many leading classical musicians are willing to travel thousands of kilometres to his studio in central Tallinn in order to have him take their photographs. Needless to say that he has portrayed most leading musicians in Estonia.



Niklas Liepe



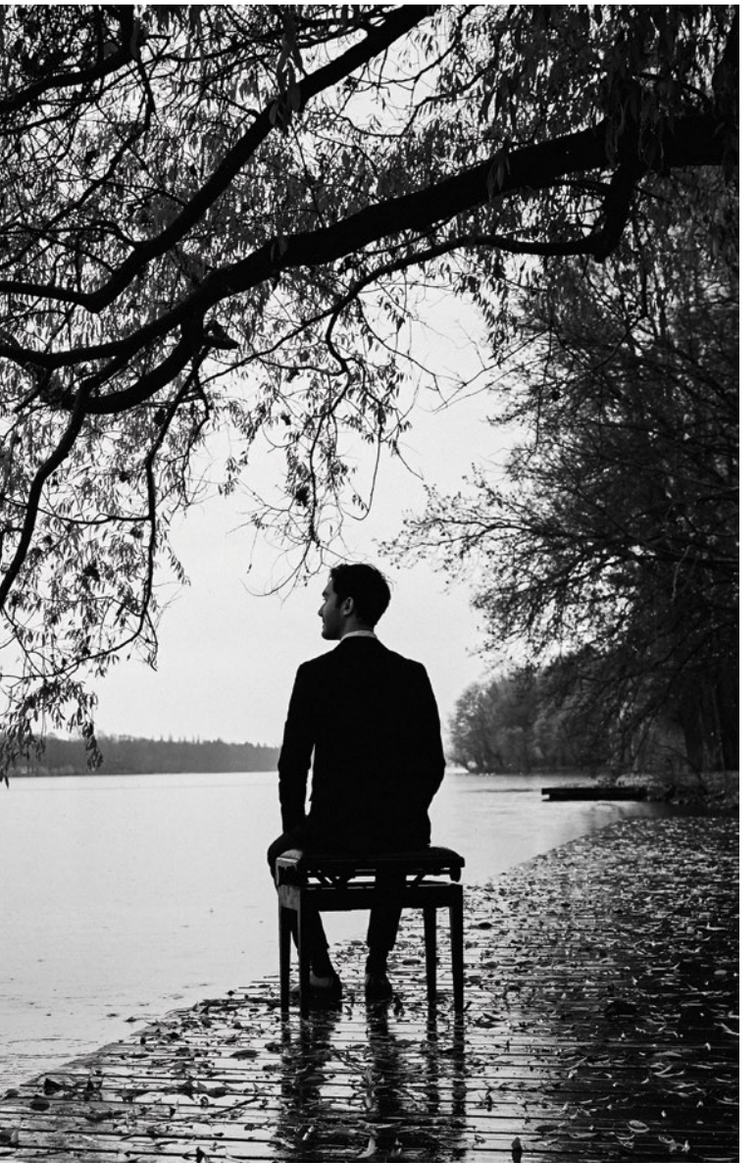
"You have to earn the trust of musicians, it's not something that just happens. Classical musicians have to be convinced that the best and most honest way to portray them is to do it without smoothing their imperfections. Opera primadonnas who are used to theatricality and make-up are different, of course. The editing to perfection of their portraits is something of a standard," ponders Kikkas. "Many top names in the world of music are used to having a leadership role and they have a difficult time giving it up. But in photography, we are in a situation where I lead and I do it with confidence. People need to be approached gently because photography is an aggressive act and nothing good will come out of pouring oil into the fire. It is a very exciting psychological and chemical process between people."

Kaupo Kikkas (1983)
Estonian photographer and teacher of photography

Studied at Tallinn Music High School, the Estonian Music Academy and the Institute of Visual Communications in Finland

Most acclaimed for his portraits of musicians and other cultural personalities

Personal exhibitions:
"Ansel"
"Treescape"
"Saja Lugu" / "The Story of One Hundred"
"Kaevur / "The Miner"
"The Statue Project"
"Sugartown"



Mario Häring



Paul Lewis



The Verona Quartet

Over twenty years, the collection of photos taken of Estonian musicians alone had grown so large that this piece of cultural history needed to be preserved. This is how the book **'Estonian Music Portrait'** was born. The photographer himself calls it a book of people and music. It was very difficult to select the photos that made it into the book. As an author, Kikkas first set down the criteria. The first people to be included were the 'big shots' — musicians who have become Estonia's business card in the world, who deserve to be seen and who people also want to see.

"I wanted to balance those big players with young up-and-coming talents, who may not be so famous but who are on their way to a great career. Another important keyword was the people who are no longer with us, but whom I have had the honour to work with. Their creative heritage remains with us forever, but life has shown that people are forgotten and the creators become anonymous behind their creations. A book connects us with them visually. Emotionally their portraits are very lively and for some time they will have the impact of people who are still among us, not like the engraving of Ferenc Liszt with a large mole on the wall of the music history classroom."

The emotional feedback from the book, which has received a lot of publicity, has been warm from the start. "As a realist, I understand of course that this is not a bestseller that can be sold in thousands of copies."



Ragnhild Hemsing

The mysticism of the forest

Recently, Kikkas opened a personal exhibition called **'Treescape'** at the Untitled Gallery in Rotterdam. This is a long-running successful project in which he combines photography and old planks of wood, discovering an indescribable world of the trees through his imagery.

"It all begins with walking in nature, discovering places, and thinking. Nature sends mystical signals which the brain catches on a totally different wavelength," explains Kikkas, who normally calls himself down-to-earth. "In the forest, you try to shake off your daily worries and joys and await inspiration from the trees. It is not possible to release everything, but my hand holding the camera has its own muscle memory and it starts to capture things which my heart or mind sense."

The planks of wood that Kikkas collects in old farmhouses and on which he exhibits his photos, turn the 'Treescape' into a spacious object where the old wood and the images start to communicate with each other. "Many people say these are frames, but I see the wood as a three-dimensional way of mirroring some feeling. The photograph is a window into nature. In combination, they help people fly far away in their thoughts."

The black-and-white graphic photos are often created using the double exposure technique, which provides a level of abstraction and takes them away from traditional nature photography. Kikkas fondly recalls the opening of the exhibition where the audience held their breath listening to the photographer, watched and analysed the photos and afterwards came to share their emotions and experience with the creator. It was only possible to visit the gallery for a couple of days before the coronavirus crisis took over the world.

"Creating an exhibition is a huge undertaking which takes years and tens of thousands of euros. Therefore, I am very sad that 'Treescape' was only open for a week. The prevalent thought in Estonia is that being an artist is not real work and people often find it difficult to understand why art is so expensive. Fortunately, there is a gradual shift and people are starting to realise that buying art and thereby supporting the author is the only sustainable way to keep the world of art alive."

"It is no secret that hobby artists tend to pay in order to pursue their hobby. Luckily, there is more talk about there being nothing negative in asking for money for your creation and there are more and more people who can afford this luxury called art. This helps us creative people to somehow survive during difficult times."

Silvia Ilves





The Last Prometheus, project 'Ansel'

Saved by nature

The emergency situation which has locked down the world has totally influenced Kikkas' working life — he had only one work project in the normally densely packed April. In the beginning of the lockdown, he was certain that he could carry on with his existing projects, but in reality, he has received totally new ideas whilst spending a lot of time in nature. Those ideas are waiting to see the light of day.

Last year, Kikkas delivered a grand project entitled **'Ansel',** which was inspired by his great role model, one of the most legendary landscape and nature photographers: **Ansel Adams**, who proved to the world that a landscape photo can be art.

In 2021, the next large-scale undertaking with the working title **'Homo Deus'** should come into existence. This is inspired by **Dr. Yuval Noah Harari's** work with the same title which questions what it means to be human, asking the most humane questions about history and placing them in an epic, not a directly personalised environment.

Many famous people in the world have stood in front of Kikkas' camera, but there are many more that he would like to portray. "Just out of a sense of duty I would love to photograph Philip Glass and Steven Reich who have already reached high age and who I really admire and consider to be intelligent composers. Also, the musically very important cellist Yo-Yo Ma. It is a dream of mine to be able to photograph my favourite film director Wes Anderson, whose films full of goodness are an endless source of inspiration for me."

A sense of not knowing and uncertainty about the future is part and parcel of a freelancer's life. This creates worry and as a person who tends to be a worrier, those times are stressful and full of anxiety for Kikkas.

"I care about what happens in the world, therefore I force myself not to think about all of this too much every day. Which does not mean that I manage to do it," he laughs. "I truly care about nature and it offers the only thinkable balance to my work with people. I cannot imagine how I would have kept sane if I had to stay at home during these times or be responsible for the livelihood of many people. Nature has been my saviour."

You can find out more about Kaupo Kikkas' photography on his homepage **www.kaupokikkas.com**

Castles, project 'Ansel'



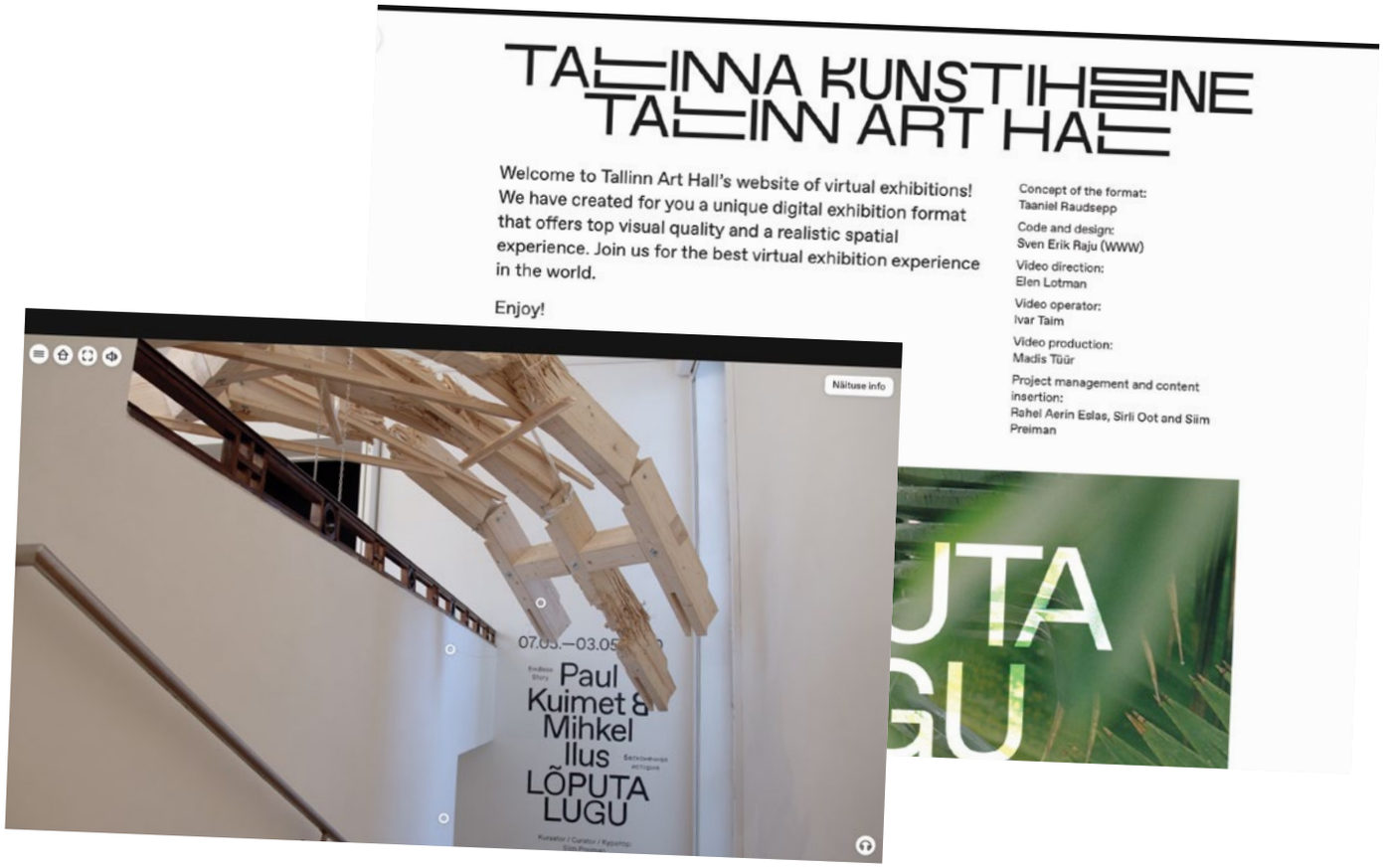
The Year of Digital Culture – an unexpected acceleration of digital innovation in the arts

By Maris Hellrand



Martin Aadamsoo

Photo by Atko Januson



Tallinn Art Hall's virtual exhibitions

When the Estonian Ministry of Culture decided to dedicate 2020 to digital culture a few years ago, nobody in their wildest dreams could imagine the incredible acceleration that the worldwide COVID-19 lockdown would force upon digital culture. In March and April 2020, the whole world witnessed a total disruption to the art world with theatres, cinemas, museums, libraries, and galleries closed, festivals and concerts cancelled, people confined to their homes. A self-fulfilling prophecy of the year's theme.

The art world has reacted with resilience, enthusiasm, and inventiveness. Theatres started streaming plays, musicians performed online from home, museums and galleries created virtual tours, libraries stepped in with public services beyond lending books.

Tallinn Art Hall already started to prepare virtual access to its exhibitions in 2019, not in anticipation of a pandemic lockdown but rather as a way to widen accessibility to people who couldn't come to its exhibition halls, either due to physical impairment or lack of time. This way, the gallery hoped to bring contemporary Estonian art to art lovers and busy art critics around the world. The lockdown was the perfect opportunity to launch the virtual exhibition platform; its four current exhibitions have already been praised by the New York Times and Wallpaper Magazine.

New York Times: "... the smartest museums are thinking beyond the 'virtual visit'. Since the coronavirus outbreak, the best on-the-fly digital exhibition conversions I've yet seen come from Estonia — the world leader of high-tech living and governance, where the Tallinn Art Hall has revamped its entire spring program for the web. Instead of dubiously 'interactive' 360-degree views, Tallinn Art Hall has produced high-resolution video walk-throughs shot from fixed positions, within which you can click any object to pause the pan and scrutinise each sculpture or print."

Taaniel Raudsepp, creator of the virtual exhibition platform, explains: "We chose a radically different approach to transmit the exhibition and space. Instead of technology-centred solutions, we use methods of traditional cinema to create space by moving the camera just like in film or a computer game. The interactive layer helps to navigate and use additional material." Tallinn Art Hall hopes to develop the virtual exhibition platform further and offer it as open source to other institutions worldwide.

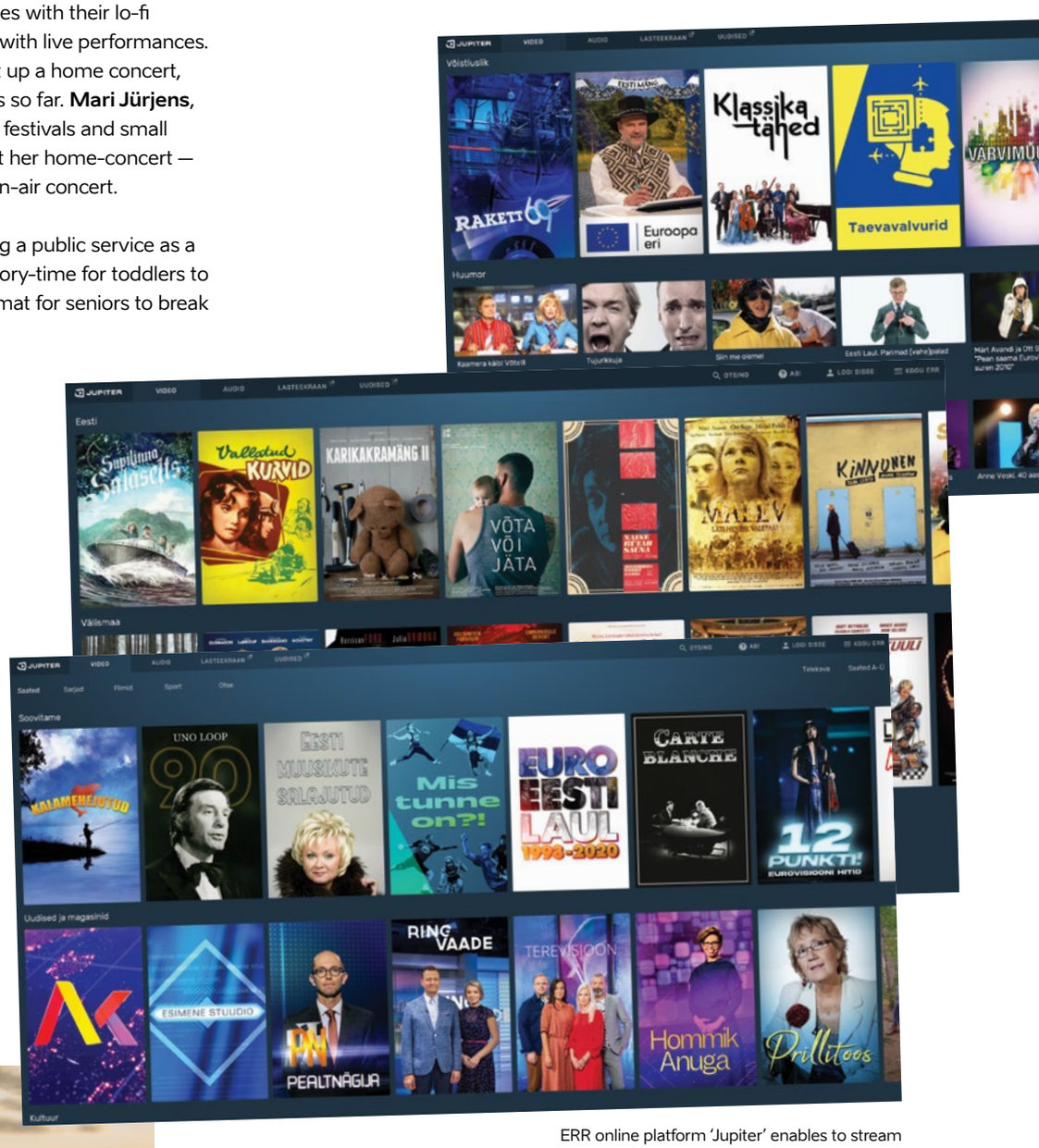
Estonian musicians have reached larger audiences with their lo-fi production home concerts than they ever could with live performances. Singer-songwriter **Orelipoiss** was the first to set up a home concert, which has attracted more than 100 000 viewers so far. **Mari Järjens**, a ballad singer who usually performs at intimate festivals and small venues had more than 50 000 online viewers at her home-concert — more than the Rolling Stones at their Tallinn open-air concert.

Tallinn City Library was also quick to start offering a public service as a community hub — by setting up a tailor-made story-time for toddlers to give parents a break alongside a Skype-chat format for seniors to break the loneliness of isolation.

All of these examples emerged as a quick reaction to the lockdown while the 'Year of Digital Culture' initiative aimed to get more digital accessibility and innovation off the ground.

Martin Aadamsoo coordinates the digital culture year. He has set out to kick-start projects that would show their true impact over many years rather than traditional conferences and discussions accompanying the theme years.

The Year of Digital Culture is a partnership between the **Estonian National Library**, **Estonian Film Institute**, **Estonian Heritage Board**, and **Estonian Public Broadcasting (ERR)**. This combination gives an idea of the different pillars of the project — books, films, music.



ERR online platform 'Jupiter' enables to stream the Estonian TV and radio archive

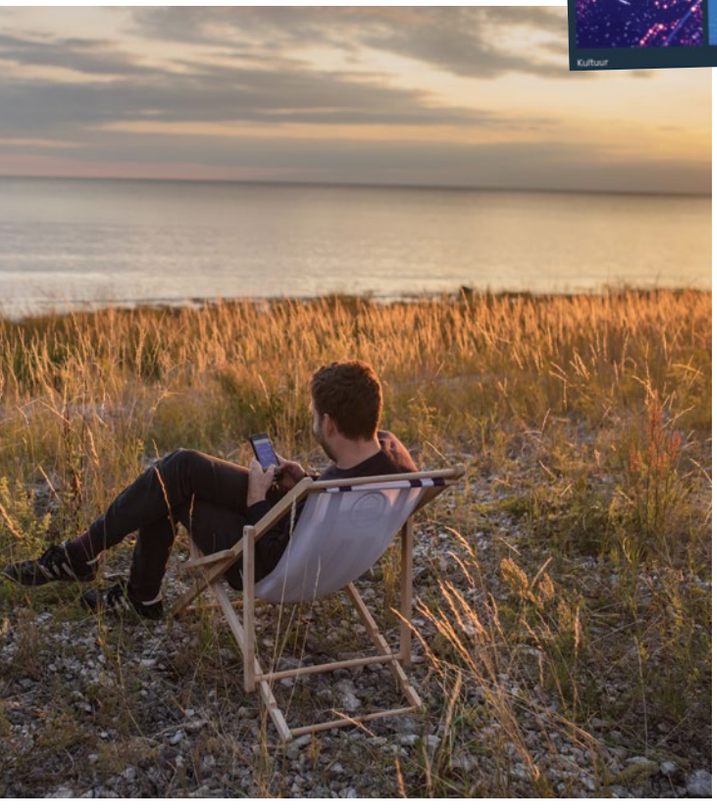


Photo by Renee Altrov

Literature — e- and audio

According to Aadamsoo, the COVID-19 lockdown has given a boost to many digitisation projects that had been in the pipeline for a while but with rather low priority. "Estonia's audiobook market is non-existent. Now we are launching a series of Estonian literature audiobooks. We have used the lockdown to give actors the opportunity to record Estonian literature while their regular work is at a standstill. The first books will be launched in May."

Creating a comprehensive and accessible e-book library is a more long-term endeavour. "We see an e-library as a kind of human right, a citizen service. Hopefully, all Estonians can access Estonian language texts by the end of 2020 everywhere in the world." Aadamsoo points out that the 895 libraries across Estonia make up the biggest physical social network, which has great potential to offer services beyond lending books. Libraries have to come up with a new model — it's not going to be enough to administer shelf space in the future. A library can also become a co-working space if needed and adjust to the new and changing needs of people.



Netiraadio.ee

Treasure troves of music and film

Estonian music and films should become digitally accessible as well. We have become accustomed to artists releasing their new albums on Spotify or Soundcloud, the latest films being streamed on platforms, but a vast treasure or music and film heritage is not accessible via modern tools. This is the case for most of Estonian music and films from the 20th century; the only way to listen to oldies might be to call a radio show on Estonian Public Broadcasting. The archives of ERR hold hundreds of thousands of pieces of Estonian music but they are not accessible on demand. **Netiraadio.ee** was a first quick fix with a simple technical solution but it is incomprehensible. So, Aadamsoo is working with ERR to extend its access.

ERR opened an online platform called **'Jupiter'** to stream the Estonian TV and radio archive in April. Aadamsoo hopes to include the content of the film archive by the end of the year: "This is a massive treasure of documentaries and old chronicles. It is very valuable for teaching purposes as a great source of visual material. All the chronicles and black and white documentaries should be made accessible but something like this is hardly a commercial project."

To address digital development obstacles of cultural institutions, the Year of Digital Culture project has come up with so-called digital residencies or the 'hacker-in-residence' concept. Via matching funds, a museum or theatre can engage a developer or designer for a short-term residency to look at some issues with a fresh view and offer solutions that haven't occurred to permanent staff. One such project is the 'smart ticket' developed by the **Estonian National Museum (ERM)** in Tartu.

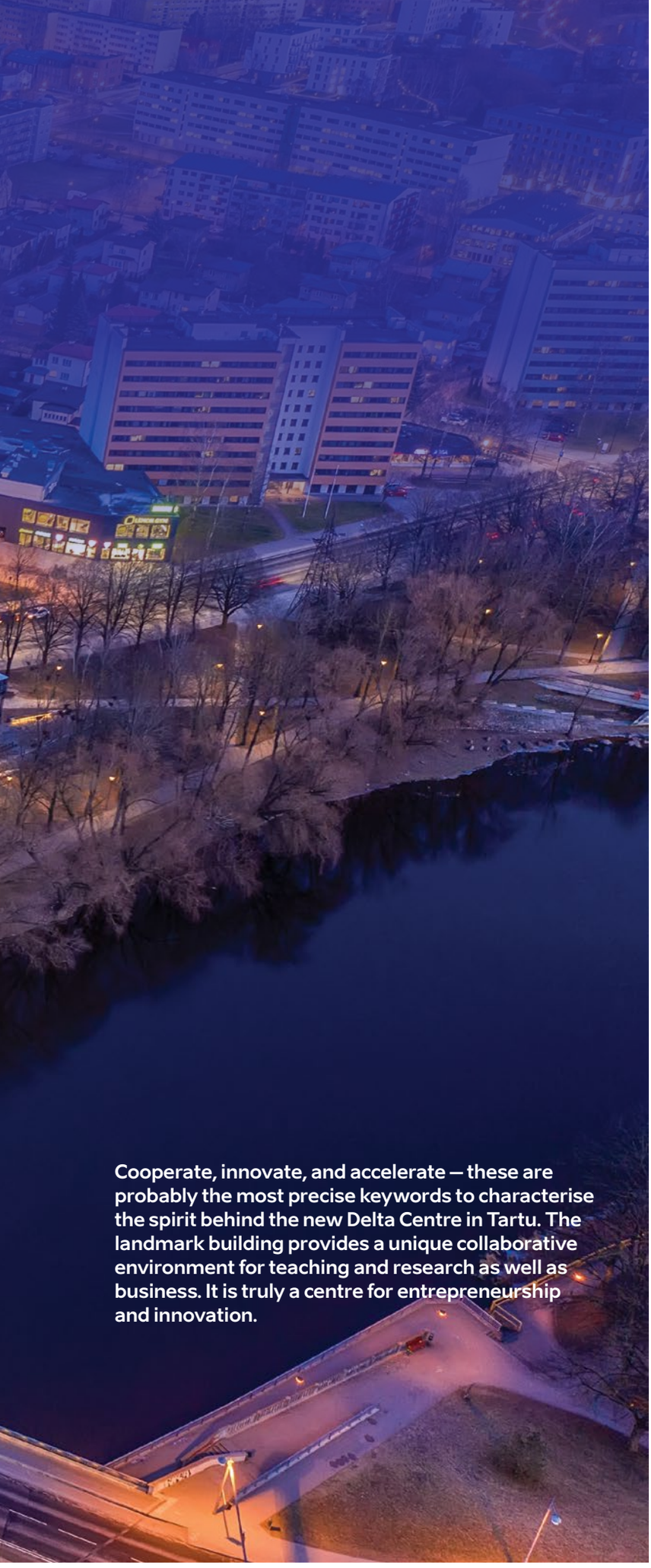
In cooperation with **HITSA** (Information Technology Foundation for Education), the digital culture year is developing a free toolkit for kids to promote digital creativity. "Kids can just as well be involved in the 3D modelling of a skate park for their hometown instead of just consuming online content created by somebody else," says Aadamsoo.

The lockdown has offered great incentives for the fast development of digital culture. For Aadamsoo, the question is what remains of all these new approaches after the fog of lockdown lifts.

New Delta Centre unites the past and the future

By Sven Paulus





Cooperate, innovate, and accelerate — these are probably the most precise keywords to characterise the spirit behind the new Delta Centre in Tartu. The landmark building provides a unique collaborative environment for teaching and research as well as business. It is truly a centre for entrepreneurship and innovation.

Photo by Ragnar Vutt



Photo by Henry Narits

The **University of Tartu** celebrated the opening of the city's outstanding, shiny Delta Centre at the end of January 2020. It took eight years from idea to completion. The newly opened centre was soon temporarily closed due to the corona pandemic, but scientists and students did not sit idly by — within a few days, all of their work and teaching was converted into a remote regime. But let's go back to the beginning.

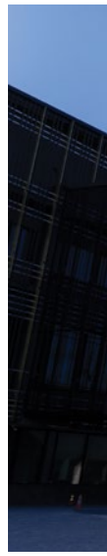
"The one-pager vision that I wrote in 2012 about the need for a new research, education and innovation centre, with companies embedded under the same roof as the university was appealing enough to do most of the work," says **Jaak Vilo**, the mastermind behind the Delta Centre and **Professor of Bioinformatics** and **Head of the Institute of Computer Science**. The institute was placed as number one in Central and Eastern Europe by The Times Higher Education rankings in computer science.











Photos by Henry Narits

Professor Jaak Vilo, the mastermind behind the Delta Centre

Ten years ago, their premises were rather small, but Vilo recognised the need to rapidly increase teaching IT: "To my surprise, the minister responsible for telecommunications and exports recommended us to increase the number of students even further." So, he envisioned a building that would suit Tartu's ambition as the leading IT education and research centre in Estonia.

In the beginning, there were many challenges to meet. The first was the initial uncertainty of the funding and the potential cost at the time of the economic boom. Vilo also had to convince many people that the planned size was not exaggerated, that new students would be actually attracted and staff would be hired — even if it required importing teaching and research staff from abroad. He had to prove that investing in IT education in Estonia is beneficial for the entire country: "If 400 people receive a professional higher education with which they can produce added value, then their total annual added value is about 20 million euros per year. This is much higher than the university's budget for teaching them."

Construction of the building began in 2018, two years after the name was chosen. Delta was selected through an idea competition in which over 90 names were proposed. The Greek uppercase letter Delta resembles a triangle and represents change or difference in scientific terms. "Resembling the architecture and capturing the essence of the spirit of the building it was easy to select it as a winner," Vilo says.

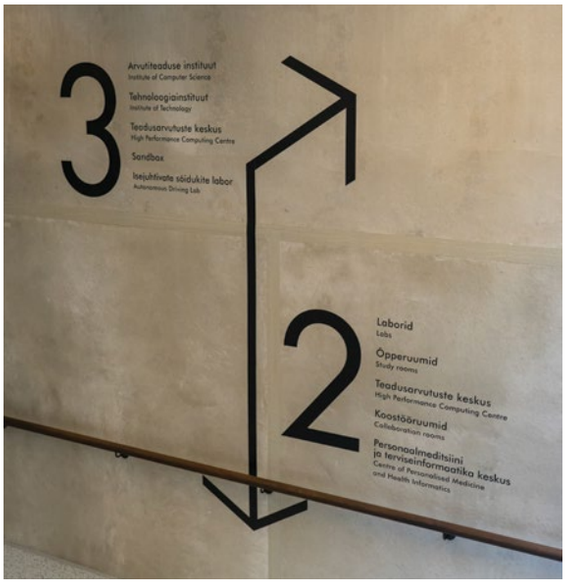


"The synergy is achieved by people actually working together, listening to each other, valuing each other's expertise and uniqueness," says Vilo. "This synergy and spirit are going to be developed step by step, through systematic work, over the many years to come." The overall environment supporting the work, collaboration, and relaxation makes Delta an outstanding centre, which has already won the title of the best new building in Tartu.

Currently, there are many ongoing R&D projects and activities creating new companies and spinoffs. Just a month after opening, the Delta Centre hosted a hackathon. In addition, the Institute of Computer Science has launched more long-lasting collaboration formats. One example is the industrial MA programme in which students not only participate in their studies but also carry out technological development for companies over three semesters. This is possible via a trilateral agreement between the student, the company, and the university.

"We have also joined the **Aalto Design Factory Global Network** offering student teams novel educations in digital product design and management. For that, we partner with companies to solve their challenging ideation, concept development, and validation phases," describes Vilo.





Endless opportunities in the coolest environment



The central location, by a beautiful bank on Emajõgi, has already made the centre a new hotspot for students and citizens despite the COVID-19 outbreak. "It is probably the coolest learning environment in Estonia thanks to the endless possibilities in the building. It's truly a privilege to be able to study there," says **Marten Türk**, BSc student at the Institute of Computer Science. He said that moving to the new building benefited students' lives more than one could imagine. "Before, our classes were spanned out all over Tartu and you had to walk a lot. Being close to the new entrepreneurship building we now have a chance to work with different companies located there."

Delta symbolises trilateral cooperation, bringing information and communication technology, economics, and mathematical statistics under one roof. Physical proximity and shared spaces for these disciplines plus entrepreneurship and innovation form the core of the academic building. The centre hosts more than 3000 students, teaching staff, researchers, and the development employees of companies.



Photo by Karli Sauli





Photo by Henry Narits

Serving the whole university

As one of the most modern centres for digital technology, analytics, and economy in the Nordics, Delta also serves as **the Baltics' largest computing centre**. The most important services for the entire university and R&D are the CPU and GPU compute cluster and cloud instances, the storage, and the network. "This is all based on human capital — proper system administration and consultancy offering robustness, security and support for the entire university. Our High-Performance Computing (HPC) competencies have grown rapidly under the leadership of the head of the centre, **Ivar Koppel**," says Vilo.

Therefore, all the disciplines of the university use the HPC, be it the video lecture servers or its own cloud storage, the digital humanities or social science data collections, number-crunching for chemistry and physics, or modern deep-learning-based artificial intelligence services. "Plus, the vast amount of the health data and human genomes from the **Estonian Biobank** and **Faculty of Medicine**," comments Vilo.

Delta offers much more than contemporary supercomputers. The centre has a museum, which started as the private hobby of **Meelis Roos**, who began to collect old decommissioned computers of historic importance. Now, visitors can find bits and pieces from the very first digital computer in Estonia, the Ural-1 from 1959. Fun fact: programming was already taught at the University of Tartu several years before this computer arrived in Estonia. "That was the reason why the Ural-1 was given to Tartu within the Soviet Union in the first place," reveals Vilo. Due to size restrictions, most of the exhibits in the museum are various personal computers representing different generations.

Vilo believes that although nice, modern, and shiny, the Delta will also at some point become a historical building and their current computers will become a 'laughing matter'. "But the change that we can achieve in educating generations who can truly leverage technology and make new conceptual developments will leave a great mark on Estonia's economic and scientific development," he says.



Photo by Andres Tennus

And it has already left a mark, as most Estonian startups and unicorns have been developed by alumni of the aforementioned disciplines. “It shows that the analytical thinking, mathematics, statistics, programming skills, and interdisciplinary opportunities offered by a ‘classical university’ provide a truly unique basis for being successful in many areas of future work life,” Vilo says.

Many people seem to be convinced that universities will lose out to Internet-based opportunities to study online. However, Vilo thinks it is actually the universities that create such content in the first place. He is sure that universities will not go out of fashion: they create new styles and adapt to the changing environment while also holding on to classical and robust methods, supporting the individual development of all students.

More information on the Delta Centre can be found at **delta.ut.ee**



Illimar Truverk,
partner/chartered architect
at bureau Architect 11

What challenges did Delta’s design present for your bureau?

Our wish was to create a new and outstanding building for the University of Tartu, but at the same time something calm, noble, and suitable for the centre of Tartu. It was necessary to figure out how to get the functions of the building to work compactly and how to create such a large building that would also suit the surrounding environment. But first of all, we thought of young people who would like to come to this house at any time in the future, to ‘live’ there and feel proud to be studying or working in this building.

What inspired your design?

It is a combination of many sources of inspiration and values that we also wanted to express in the architecture of the building. We got inspiration from the river and bridge next to the centre, the peaceful vibe of Tartu, the IT world, and computers. Of course, one source was the position of the University of Tartu as a provider of Estonian education and IT education at the world level. This also results in the rising line of the whole building in the direction of the main facade. It is a calm and clear plan solution, subject to a certain hierarchy. The ribbed treatment of the facade refers to computers in which the mathematical code, with its perforation, is also encoded. The dignified choice of facade material changes over time and with different weather conditions, it is supported by lighting and adaptation to the landscape. These were the result of the joint thinking of the whole creative team.

What makes the Delta Centre stand out as a building?

It is the compatibility of the whole with the function and purpose of the building. A clear and logical plan solution with a distinguished and very fine choice of conceptual material on the facade. A little more vanity.

‘Global Hack’ – an Estonian way to fight the virus virtually

By Ann-Marii Nergi





Photo by Garage48



Examples of successful ideas from 'Global Hack'

SunCrafter — Solar Powered Light-Disinfection
SunCrafter is a Berlin-based solar startup producing grid-independent solar systems for simple and clean energy access in urban environments and rural communities. By coupling UV lamps with upcycled solar generators, the hand disinfection stations are easy, affordable, and barrier-free access to everyone.

Isonation
Though the total usage of streaming services has surged by between 50% and 70%, starting from January 2020, most of the popular platforms are still hard to monetise as they do not offer a pay-per-view option and their links are easily sharable. Isonation brings artists and fans together.

Act on Crisis
Because of the global lockdown, approximately 360 million people are experiencing strong emotional imbalance. Yet they don't have access to secure online emotional support that fits their cultural background. AOC is a platform that identifies your current status and provides you with personalised emotional support.

"We Estonians don't know how to just stay still and do nothing in the midst of the crisis — we act and we hack!"

With ten years of experience in organising hackathons, Estonian-based **Garage48** together with the programme **Accelerate Estonia** have put together an online hackathon in record time, in order to tackle the coronavirus pandemic crisis and emerge from it stronger than ever. At the time, no one could imagine that soon after the first event, they would be organising another with a global reach.

First, there was **'Hack the Crisis'.** On the 13th of March 2020, the day after the Estonian government had declared an emergency situation because of the virus, 'Hack the Crisis' was the first virtual hackathon to begin. It was endorsed by the President of Estonia **Kersti Kaljulaid** and strongly supported by the then Minister of Foreign Trade and Information Technology**, Kaimar Karu.** More than 1100 people from over 20 countries and 14 time-zones gathered to develop solutions to help Estonia emerge from the crisis. In addition, many countries organised their own hackathons.

Less than a month later there was **'Global Hack'** with over 12 000 participants from almost 100 countries. Everyone in their own homes, in lockdown all over the world, came together to work out new ideas and solutions.

"The organisation of this hackathon was a hackathon for us," says **Kai Isand**, the main coordinator of 'Global Hack' and Member of the Advisory Board of Garage48. "After the first hackathon, countries organised their national ones and I thought that the global one could take place in May or June. But the more we discussed the idea, the more we realised that it needed to happen quicker, like right now."

Kai Isand explains that the global event was pulled together in only three weeks with mostly the help and know-how of more than forty volunteers. Even modest estimates show that the hackathon, which took place in April, reached tens of millions of people. The invitation to participate was even shared on CNN news and most larger media channels all over the world covered the event. "It was a bit magical that it all came together so fast and so successfully," says Isand.

Before coronavirus, the charm of hackathons was in bringing people together in one space for 48 hours — the energy was born on location. Are virtual hackathons here to stay? And when will the next one take place?

Kai Isand says that 'Global Hack' will not be the last one, but at the moment all energy is spent on helping the winning themes of the hackathon and bringing them in contact with potential partners.

"I hope that real-life events and online events will become a hybrid. We thought of quite a few new solutions which were born out of the situation and need — what kind of tools and communication channels to use, how to manage and mentor online, and so on. In the case of hackathons, it is important that people come together. We definitely proved that it is possible over the web, but it doesn't quite replace the energy and magic which is born through one-to-one communication."

‘Hack the Crisis’ success story – chatbot SUVE

Suve (State Universal Virtual Estonian) is an automated chatbot; it was one of the ideas that started at the ‘Hack the Crisis’ hackathon. Its main task is to make sure that everyone living in or visiting Estonia can get their questions answered from official sources. Suve has been integrated into several public websites. During the emergency situation related to COVID-19, she helps to provide accurate and trustworthy information in English, Russian, and Estonian.

“The idea of a nationwide chatbot service circulated even before the crisis, but the hackathon enabled us to quickly put the idea into action, and hopefully, it will reduce the burden on hotlines,” said **Michaela Snopková**, one of the creators of **Suve**. As a consultant to foreign specialists, she has noticed that people often have questions that do not require a personal consultation, but rather they need to be directed to the right information.

Kata Varblane, Sales Support Manager of the Estonian Investment Agency, is also on the team of Suve. Varblane says that the usage of Suve was record-breaking in its first week after going public: the emergency situation in the country was novel for everyone and the number of inquiries from people jammed all official channels. “We can say that the rapid introduction of Suve was really the right step. The solution that was created on the initiative of volunteers at the hackathon really offered relief at a very critical moment,” says Varblane in praise of the solution.

What do people ask from the chatbot?

“From the very beginning, the main topic has been coronavirus, the number of infected people and other statistics, questions regarding travelling and the situation in the country. The themes discussed are directly linked to the news and to restrictions/alleviations, hence they are changing daily depending on the current status.”

As mentioned by Snopková, people have also had recurring questions before the crisis, therefore the plan with Suve is to move from emergency situation issues towards the management of an FAQ. For example, in the near future, Suve will start to respond to questions regarding company support themes of Enterprise Estonia.

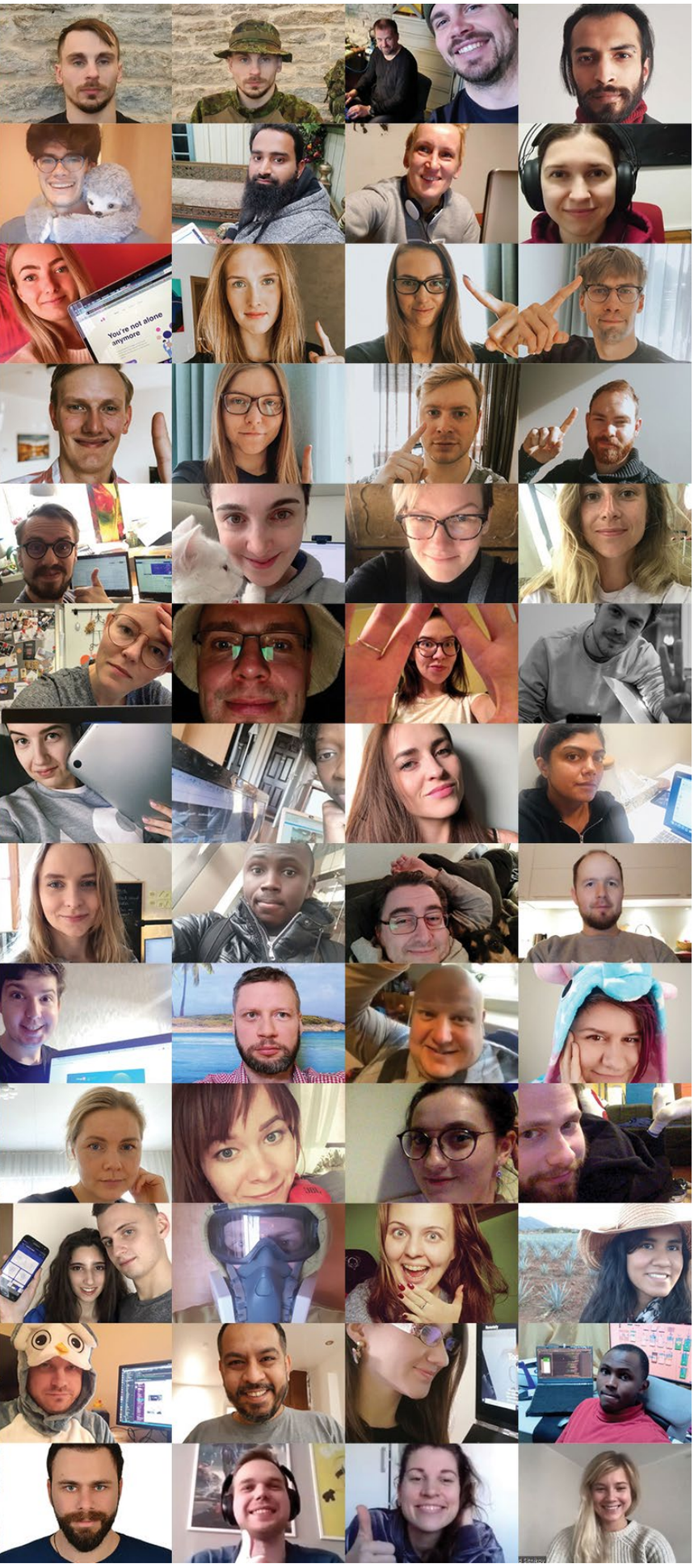


Photos by Garage48

This year, Garage48 celebrates a decade of activity. Six successful Estonian startup leaders are founding members. At the time of its birth, hackathons were nothing new in the world and the founders wanted to bring the hackathon culture and the Silicon Valley approach to Estonia and the surrounding region to stimulate the local startup environment. The Garage48 team has organised 200 hackathons in 45 different cities and 21 countries all over the world in its ten years of existence.

“Until today our vision and mission remain the same. It is to demonstrate that in the space of a mere 48 hours it is possible to test your idea,” explains **Merit Vislapu**, Project Manager of Garage48. “The principle is that when you come to the hackathon, you will immediately realise whether your idea can be sold, whether people would use it. Instead of a slideshow, we want to see the real building of a product, be it an app or a landing page or something similar. There needs to be proper market research and the product needs a marketing and business plan and replies from specific clients.”





Participants of 'Hack the Crisis: Estonia'

Since March 18th when Suve went live until May 6th, the figures were as follows:

21K+ conversations
55K+ messages
i.e. generating approximately 2.58 messages per conversation

Language use of Suve customers:
75% Estonian
20% English
5% Russian

Approximately half of the conversations (49%) take place outside working hours.

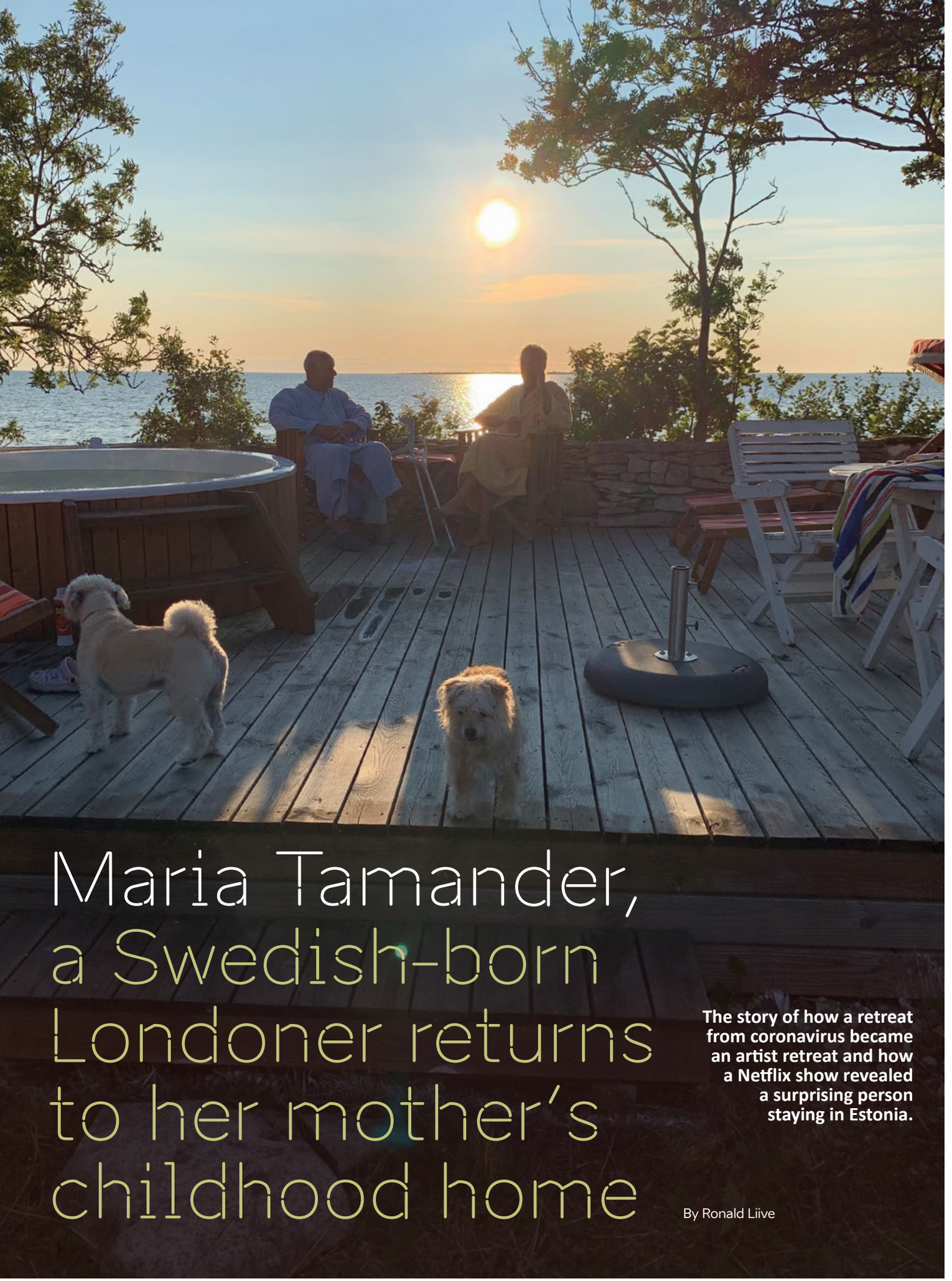
Currently, the most popular questions are related to the coronavirus outbreak — what coronavirus is and how many infected people have been confirmed in Estonia (or the world). The range of questions is very broad and depends on governmental changes; details change over time.

Garage48 success story – Masquerade

How to build an app that reaches 1 million users in less than two months and gets acquired for more than 100 million dollars by Facebook just 4 months after its creation? This is the story of the fun face filter app MSQRD, which was started at the Garage48 **GameHack** in **Minsk, Belarus** back in November 2015. It got more than 1 million downloads in its first month after the release. Now it is in the top free iPhone apps in the USA and is the top app in more than 50 countries.

Albeit Garage48 has organised hacks in Scandinavia and Asian countries, the focus is on foreign- and development collaborations in those countries where the culture and startup know-how is lacking. Great cooperation has been created with the Ukraine and Moldova, in collaboration with the Estonian Ministry of Foreign Affairs, the hackathons will spread to Africa. Estonian hackathon organisers are already in Uganda and Rwanda. "It needs to be emphasised that we always want to organise events in cooperation with the local community and local partners and take on more of a supporting role ourselves."

Vislapu emphasises that hackathons are not startup factories. The main thing is to help promote entrepreneurship and a sense of teamwork in people, but they do their best to help future entrepreneurs to continue with their projects after the end of the hackathon.



Maria Tamander, a Swedish-born Londoner returns to her mother's childhood home

The story of how a retreat from coronavirus became an artist retreat and how a Netflix show revealed a surprising person staying in Estonia.

By Ronald Liive

Photo by Ronald Liive



Maria Tamander and her husband John Mathieson. Tamander is holding their dog who Mathieson used in the shooting of Pokémon Detective Pikachu

Photos by Toomas Tuul





This is one of the recently built houses on the property that the family uses to host dinner parties

Maria Tamander (56) is a Swedish-born entrepreneur, investor, pub owner, and film executive. Normally, she lives in London with her husband and two daughters. During the pandemic that the whole world faced this spring, her family had the choice of where to ride it out. They decided on Saaremaa, Estonia's biggest island, where they have been since the end of March.

Maria Tamander's mother is from Saaremaa but in 1944, during the war, her family emigrated to Sweden, specifically to the island of Gotland. Their seafront farm along with their house, barn, sauna, and boathouse were left behind. Many years later, Maria's mother and aunt were thinking of selling the property — there were no buildings left, only some foundations remained that were hidden in the overgrown grounds.

A bit over ten years ago, Maria decided to pack her family into a camper van and drive towards her mother's childhood home to see if there was anything they could do with the land. Surprisingly, they fell in love with the place and Maria started to rebuild the family farm with her partner in 2007.

I (the author of this article, Ronald Liive _ed.) found out about Tamander through Netflix's "Million Pound Menu" in which one episode featured her as a potential investor looking for a new eatery to invest in. Since I also live in Saaremaa, a few days later I found myself sitting next to her. Maria Tamander was more than happy to talk with *Life in Estonia* about her career and plans for the future.



Photos by Maria Tamander





A lampshade made of two old paintings, two photo drying racks Maria found in a closed art school outside London where they did a commercial, tissue paper, bleach and paint

From music videos to real estate

Maria started her working career in marketing and music videos by founding a production company in the early 1990s in Sweden. She moved to London in 1998 when her eldest daughter was born. She has created ad campaigns for Dolce Gabbana, Versace, Lancôme, Nokia, and many more notable brands. Her company also worked on the Spice Girls' first music video "Wannabe". She is active in the field up to this day.

Later she ventured into real estate. In 2014, she and two other families bought a building in London's Paddington area that housed a pub called "The Cleveland Arms" with 166 years of history on the ground floor. She built the place up and ran the pub's day-to-day business until last November. She has also invested in some small businesses in Estonia, the United Kingdom, and Sweden and maintained a perennial interest in handicrafts and helping young creatives, for example, her photographer-daughter Isla, a young jeweller named Jay, and many others.

Right before the pandemic hit the whole world, Maria and her sister Anna were looking for properties in Tallinn to fix up so that she could rent them out and open a café or restaurant on the ground floor. Just like she did in London's Paddington area. Her London pub is now a well-known place in the area. Due to the ongoing situation, she had to freeze everything and close the pub for a while. Some of the staff were let go.



Maria and John together with their daughters Isla and Iona, and their new friends Olga Temnikova, Indrek Kasela and their daughter Vera



Photos by John Mathieson

A sculpture that the couple's daughters Isla (21) and Iona (16) made of the skulls of seals, foxes, deer, and moose they had been collecting in Saaremaa over the years

Retreats in Saaremaa for creative people

She is currently offering a hospitality service in Saaremaa through Airbnb but she's got bigger plans for the place. Additional information about the property can be found at hylgeranna.com.

"We came here when the lockdown was in effect so we had to have a valid reason to come to Estonia. Our reason was the renovation works going on and preparations for receiving guests that were to arrive in May. We got special permission from the Estonian police and border guard. We are going to build an artist studio in an old Soviet military building, and some other houses as well," says Maria.

If everything goes according to plan then they are going to start film and photography retreats in Saaremaa from this autumn. She's also keen on the idea of different workshops or retreats for people interested in production, art, writing, and other topics. Maria's partner, world-renowned cinematographer **John Mathieson** (59) is also involved with the works and plans going on in Saaremaa.

Mathieson is a frequent collaborator with director Ridley Scott and was the cinematographer on "Gladiator (2000)". He also worked as the director of photography on "Robin Hood" (2010), "X-Men: First Class" (2011), "Logan" (2017), "The Man from U.N.C.L.E." (2015) and many other Hollywood films. He was supposed to be in Los Angeles right now working on Marvel's upcoming movie "Doctor Strange" but as the shooting was put on hold, he was able to enjoy his time in Saaremaa.

"The writer's retreat will start in autumn. It's going to be run by a woman who organises the same kind of things in the UK. She and her partner, a scriptwriter from Los Angeles, are friends of ours. There is also going to be a poetry group," says Maria.

The retreats will be multi-day events and they will be hosting a maximum of 10 people per retreat. Maria will provide all attendees with accommodation, food, and transportation.

Although they will be inviting their friends and people they have worked with to attend the retreats, the events will also be open to the general public so anyone interested may attend them.



Photos by John Mathieson

"Sea you next year, summer" – saying goodbye to summer

The world is a small place

Maria has been flirting with the idea of staying for a full year in Saaremaa. Although she has stayed there for a few months now and is planning to spend her whole summer there she is still planning to go back to London at some point this year.

"My parents usually come here mid-June and stay until August. My sister and her family would also come for a few weeks. We also have quite a few friends coming out here."

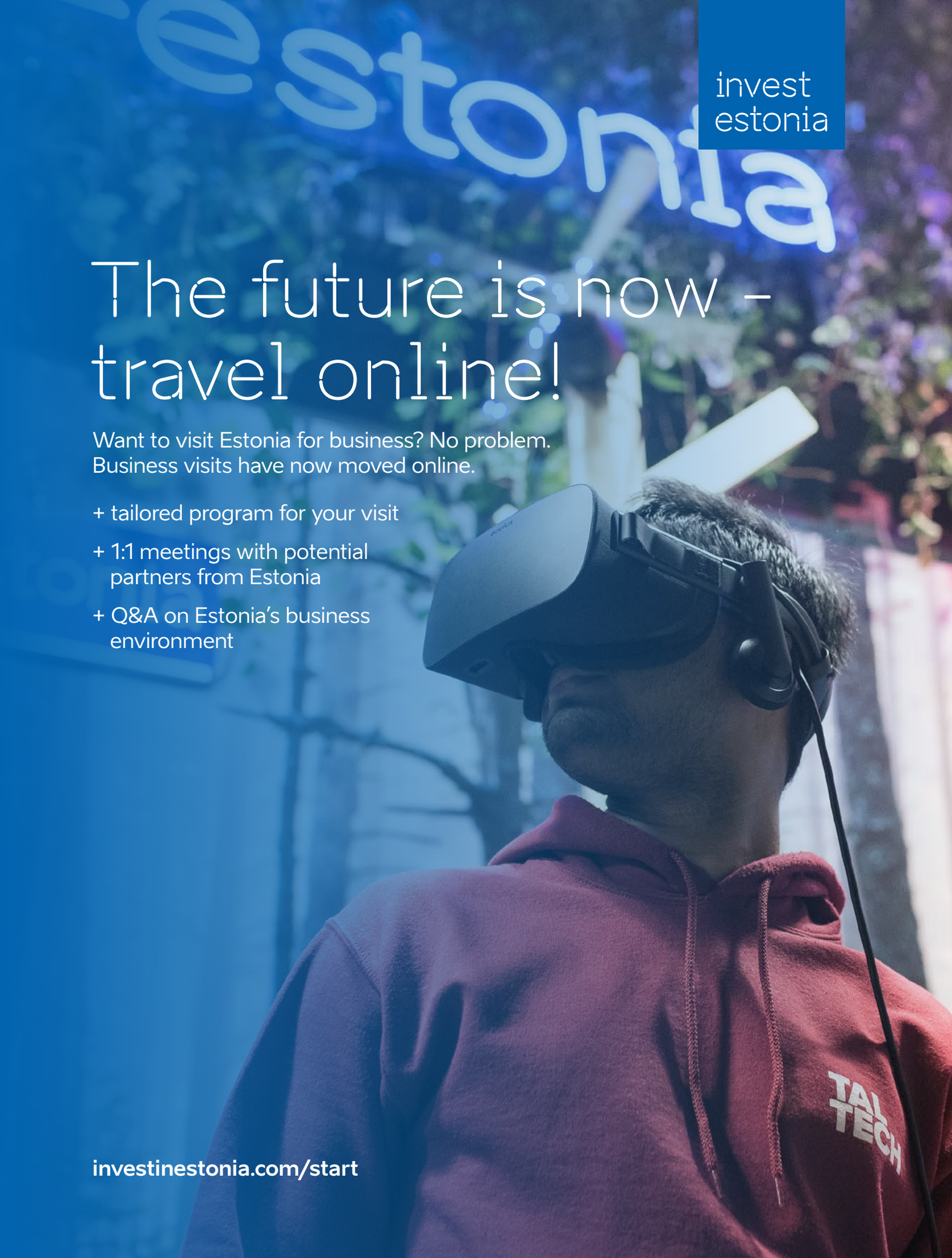
Just by accident, during one of her stays in Saaremaa a few years ago, she was greeted by a gentleman taking a stroll in the area. After starting to talk with him they became friends. At first, neither Tamander, her husband nor the gentleman wanted to mention their professions. However, once the friendship grew stronger and the barriers fell, it turned out that the stranger was a well-known Estonian, serial entrepreneur and investor **Indrek Kasela** (48); he is also involved with the arts and owns a cinema in Tallinn.

Thanks to the new connection, Kasela has been able to talk Mathieson into giving talks at the Black Night Film Festival in Tallinn. Kasela spent his childhood in the area where Hülgeranna is located.

An airway between Kuressaare, the capital of Saaremaa, and Bromma near Stockholm was supposed to have started this year but was postponed until next spring. Tamander sees that airway as a good solution for international tourists to come to Saaremaa and for locals to stay well connected to big airports around the world.

To visit Saaremaa, you need to board a ferry by vehicle or you can fly from Tallinn and Kuressaare. To get to Hülgeranna you need to drive from Kuressaare centre for about 45 minutes.





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