

The future of health

- is it really all about the data?



Owners



Collaboration partners



FRONT COVER: Everdrone is automating healthcare transports. PHOTO: Sören Håkanlind

It's time for some speed and action

In all the conversations, panel discussions and network meetings that my Sahlgrenska Science Park colleagues and I are involved in, the feeling is always the same. It's time to walk the talk.

Everyone wants the same thing. We need to get moving and get things done to seize the moment and the unique opportunity we currently have.

To achieve necessary change in health care to the benefit of companies, organisations and patients.

It is not just me and my colleagues who are experiencing increasing levels of impatience and an urge for action. The same feelings are shared by the insightful people from different parts of the life science sector who are interviewed in this extensive report on the future of health.

The report aims to collect and highlight perspectives on the challenges and opportunities we are facing. We want to inspire collaboration and action – coaction.

Major issues need to be addressed in a long term and sustainable way. Important structures must be built up and crucially important decisions for the future must be made.

So, let's do it. Let's get moving. Let's show courage, decisiveness and the ability to continuously improve short-term action plans in relation to a rapidly changing reality and a long-term vision.

The stakes are high. Sweden's competitiveness within life science, including research, innovations, jobs and growth, depends on us.

We also need to embrace a necessary transition towards a more efficient use of resources and a smart adoption of

digitalisation, which will fundamentally change people's lives and the ways things are done in life science and healthcare.

Together with Lindholmen Science Park, in an earlier report* we identified six key trends that are influencing our industry. These position Sweden well in a global perspective.

In particular, I would like to remind you of three of them:

- Sectors that are particularly strong in West Sweden are converging. The same specialists in data analysis, 5G and AI who develop self-driving vehicles, are also developing innovations that are transforming life science. New products and services are also totally cross-industry.
- Open innovation and open collaboration between companies is a prerequisite – and to a large extent a key Swedish attribute.
- Large companies are opening up to small companies. The dependency becomes mutual. Industry needs innovators in the startup sector to create the necessary change and to increase the pace of development. Companies in startup and scaleup phases need access to networks, market channels and research resources.

Neutral arenas are also in demand, with the ability to connect the various parts of the system and to see the potential of the infrastructure in place. The entire innovation environment around Sahlgrenska Science Park is based on precisely these needs. Here, there is support for companies in the various phases of their development. With direct links between research, healthcare, innovation companies and the large established industrial players.

Let's get moving. Faster and together!

1. It's time to pick up the pace
2. The opportunities are great
3. Sweden has a unique starting position



Charlotta Gummeson

CEO at Sahlgrenska Science Park

*) Sector convergence – a significant growth opportunity (2019)

THE LIFE SCIENCE INDUSTRY

Slow speed is biggest risk

Recently, Sahlgrenska Science Park has been picking up an alarming signal from the venture capital market, which should worry everyone who is putting their faith into innovations being the answer to tackle the healthcare challenges we are facing.

The speed of public sector transformation is too slow.

It is so slow that private investors who are to finance the innovations are getting cold feet.

They are increasingly cautious before taking the risk of investing money in startup companies with business models focused on public health care.

When they evaluate return on investment potential, the sluggishness of the public systems becomes a major, swelling and worrying red item warning sign in the risk calculation.

If such a negative spiral gets a firm grip, this would be devastating for the transformation of healthcare. Without venture capital, no innovations. Without a curious and quick recipient of new ideas, no capital.

Everyone's talking about speed

The issue of speed is omnipresent throughout the in-depth interviews that Sahlgrenska Science Park has conducted with informed stakeholders with different perspectives on the future of life science.

On the one hand, there's a need to take our time.

This relates to how we regulate the use of the 'data gold' generated through the Swedish national identification number (personnummer); what role AI should play in our lives; and the sustainability of new payment and business models.

At the same time, urgency is also required. If the health-care sector is to cope with the resource challenges and skill gap, the changes must be accelerated.

Moreover, if Sweden's life science industry is to capitalise on the opportunity to take a prominent position in the global digital race, there is not much time to lose.

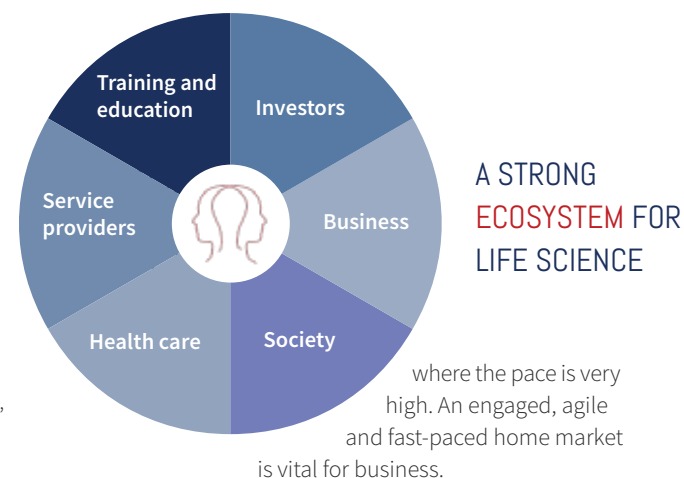
Strategies, structures and collaborations need to take shape. Trust needs to be created for new ways of working, new digital tools and new business models that upend old truths.

Vital for business

The transformation of healthcare is urgent. Politicians and civil servants at a regional level and many employees fully agree. We need to be able to offer an aging population care with a continued and increasing high quality and, at the same time, optimise how our tax-financed resources are used.

Add to this aspects of equality and sustainability.

For the life science sector, industry and startups, it is also about creating an environment to be able to take innovative services and products to an international market



Last but not least, speed is also an issue for Sweden as an innovation and export nation. Year after year, Sweden occupies a top spot in the list of the world's most innovative nations. In the EU ranking of the most digitally mature nations in the EU, Sweden is in second place and is challenging for the number one position.

In an international perspective, Sweden currently has an extra strong competitive opportunity. This is based on a clear industry shift, sector convergence, which is particularly evident in West Sweden and the Gothenburg region.

Here, there is a business community with complementary skills. Mobility, IT, data analysis, AI, 5G and life science. It's all connected.

Link this to a long tradition of successful company building, an innovation environment with test beds, a successful tradition of collaboration and a stated willingness on the part of large companies to open their doors to small, innovative, disruptive, startup companies.

There you will find people who are impatiently longing to make efforts to transform healthcare and to improve other people's living conditions

Not tomorrow. Today.

The team at Sahlgrenska Science Park

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Jenni Nordborg, Director & National Coordinator, Life Sciences: “Incredible engagement in national strategy”

All input regarding the work to develop the Swedish national life science strategy shares one common denominator: It is imperative to develop infrastructure for how health data is shared and used.

TEXT: KENNY GENBORG

Despite favourable conditions and a long tradition of major export successes, strong company development and a top ranking as an innovation nation, it is a challenge for Sweden to compete with the world's leading life science regions.

One reason that is often mentioned is the inability to package and clarify Sweden's offering in the life science area.

Jenni Nordborg is the Director & National Coordinator for Life Sciences at the Swedish Government Offices. She is leading the work to develop a national life science strategy. This assignment includes coordinating, prioritising and increasing the speed of the transformation process. As well as promoting national and international collaboration.

At stake are the prerequisites for business competitiveness and a healthy research climate. As well as the opportunities for healthcare to make the necessary changes based on innovations and new working methods.

A long-term, overall goal shared by politicians, academia, business and healthcare stakeholders will be developed.

“It is also a way to market and be seen in the global arena. To be successful, we need to collaborate with the other

Nordic countries so that together we become a significant critical mass. This is not easy, but we have a lot in common,” says Jenni Nordborg.

“Denmark has a strategy that is very successful, for example, when it comes to clinical studies. There is much to be gained by working together with them. Finland is very prominent in the use of data, and has developed data management infrastructure, in a way that we could benefit from through collaboration.”

Even though Sweden has a good reputation when it comes to research and innovation, we must also be better at telling the world about what we aim to be really good at in the future, according to Jenni Nordborg.

“In global competition we must of course be clear with what we want and where we are going, in order to be able to make efforts to attract more investments to Sweden.”

What's missing in Sweden?

“Much of the infrastructure work needed to make better use of health data, is missing. We are known for being collaborative. The perception exists that Sweden has a lot of patient inclusion, but we need it even more.”

1. Urgency to structure the use of health data
2. Sweden needs to get better at marketing
3. Necessary to develop Nordic collaboration



Jenni Nordborg

Role: Director & National Coordinator, Life Sciences at the Swedish Government Offices.

Background: Head of Vinnova's Health Division. PhD at Chalmers University of Technology, Inorganic Chemistry with focus on Non-Linear Optics for Innovative Laser Technology.

Currently: Leading the work on a Swedish national life science strategy.

36.4

billion SEK

Sweden's export of pharmaceuticals during the first four months of 2019

Source: Statistics Sweden

- We cannot compete with the largest investments internationally in terms of money. But we can be very smart when it comes to collaborations. We are an agile country, a forward looking people who are tech-savvy. We have every opportunity to take advantage of our people's capacities."

Health data is a question that the business community highlights as being crucial for Sweden's competitiveness. What do you see must be done?

"We have received a lot of input regarding the strategy work. Everybody raises the use of health data as an important foundation that we need to get right. We may need to update laws and regulations, for example, relating to sharing data, working methods of the authorities, and the infrastructure at regional and national levels."

Where are the challenges?

"It is very important that the infrastructure we build is sustainable in the long-term. When we work with policy development in terms of data usage, it also needs to be relevant on the international stage. You can't have separate solutions that only work in one place and one time frame. They must be able to work long-term and scale both nationally and internationally."

"Of course, there needs to be an adaptation to Swedish conditions, but if we are to be attractive in a global world, we must be able to link our data to networks of global healthcare data. Not least when it comes to working with rare diseases. In this case, you cannot work regionally or nationally as a small country."

Isn't there a risk we're moving too slow, considering how things are moving so incredibly fast elsewhere?

"It is a challenging balance. We must constantly increase the speed, whilst maintaining robust and secure systems. There is a sense of urgency around us needing to gather or collective force to work much more on how we use health data and how we work together. Everyone agrees. But the world around us is running faster and faster. Since we do not currently have the relevant infrastructure in place, we are faced with the reality that we're already moving too slow."

Isn't this a discussion we should have had several years ago?

"We had it several years ago. Now we're more focused on making the activities happen."

Why aren't the activities being done?

"It's only now the new health information systems are being implemented. That's an important part. The regions tried to coordinate this work, but it didn't work out so well. It may still be a future-proof solution. It's definitely an important infrastructure."

"Then, there are many things that haven't become clear until now. To maintain quality and efficiency in healthcare, we need to start working in new ways."

What other structures are slowing down the development?

"What the regions usually point out is that they have a lot of systems that do not work together. The same

"Startup and growth companies have a very large role to play in driving development forward. They come up with disruptive new working methods that challenge the system."

thing applies by us having separate quality registries and separate structures for biobanks."

"We have access to all the information. We have to remember that. The Swedish national identification numbers enable us to build infrastructure and track data. We have been very early to embrace digitalisation, but we didn't do this in an international perspective."

Why is Finland better off?

"Finland and Estonia, together with Singapore, are very far ahead in terms of building infrastructure for national health data. They have also worked extensively with business collaborations and have new legislation on secondary use of data."

What have they done differently to Sweden?

"They have worked fast. They may have been more forceful to bring about action. We have a different system in Sweden with the municipal self-governance. We have to work with the system we have."

"Startup and growth companies have a very large role to play in driving development forward. They come up with disruptive new working methods that challenge the system."

#1

Sweden is the EU innovation leader 2019

Source: Statistics Sweden

What interests and agendas need to be balanced?

“The national life science strategy must be common in relation to long-term goals. It is not possible to have a national strategy in isolation and a regional strategy for itself. We need to have objectives that are firmly anchored between the national level and the regional level, as well as academia and business.”

“We need to work together for this.”

Haven't you done this before?

“There are a lot of good collaborations, which we now need to link together in a joint strategy work. The purpose of a national life science strategy is to create better conditions for a common development process.”

What are the conflicting interests that need to be balanced?

“We have relatively few conflicting interests. Based on the input we have received for the strategy work, all stakeholder groups have provided a clear message that this work must be broad in scope, with clear rules of play between the stakeholders.”

What's the interest in participating?

“There has been an incredible commitment and interest. There is a respectful understanding that this work is genuinely difficult. Strategy work in itself does not mean solutions, but rather it is a process for getting to grips with the really difficult issues we are facing.”

How does the new structure of business affect this?

“Startup and growth companies have a very large role to play in driving development forward. They come up with disruptive new working methods that challenge the system. This is where we can bring about a transformation. These types of companies are also much faster at capturing the population's expectations of getting access to new solutions.”

“In recent years we have also seen very good examples of how large and small companies collaborate in new ways. The AstraZeneca Bioventurehub is an excellent example of this, where it becomes very clear that global companies and smaller growth companies are learning how to work together. It's a win-win. It has also generated interest and value inside and outside Sweden. More and more companies want to work this way.”

Another trend is that industries are shifting to be closer to one another, or converging, for example, mobility, data analysis, connected things and life science.

“We talk a lot about precision medicine, as well as preventive health, rehabilitation and habilitation. Here we need to look at a lot more data than just health data. In this respect, you can see a super convergence between different industries and stakeholders.”

“The concentrated effort at Lindholmen regarding AI Innovation of Sweden is also important. Several different industries, together with the life science industry and Region Västra Götaland are joining forces to pool data to really walk the talk when it comes to using artificial intelligence.”

Do you see that Sweden could claim this as a unique position?

“This is an area that requires system innovation and there is a real opportunity for Sweden to take a prominent position. So many of the global stakeholders are active in our innovation system, and we also have a great opportunity to work with system innovation.”

Do we have more opportunities than other regions?

“The trust we enjoy with the population, the collaboration climate we in fact have, and the opportunity for collaboration in the ecosystem all work to our advantage. We are not unique, but we are very good at it.”

7.1 %

Pharmaceuticals' share of Sweden's total commodity exports in the first four months of 2019

Source: Statistics Sweden

A **NEW** REALITY TO DEAL WITH

+100 %

Double as many 80-year
olds in 2040

WE LIVE LONGER

1 OF 2

Every other Swede has
a chronic condition

MORE OF US ARE
CHRONICALLY ILL

8 OF 10

Believe that digital
solutions will become a
part of the care for those
with chronic conditions

DIGITAL SOLUTIONS

85 %

The chronically ill account
for 80-85% of Swedish
healthcare costs

COSTS ARE INCREASING



The figures above are for Sweden. The trends and challenges look the same in many parts of the world.

Source: Number of 80-year olds, chronically ill, care costs: SALAR's financial report May 2019.

Source for digital solutions: PwC study "The digital patient is here" (2016).

Pia Sandvik, RISE: “Be vigilant when new rules are created”

An overly rigid application of privacy protection puts Swedish competitiveness at risk. This is the concern of Pia Sandvik, CEO at the Swedish national research institutes, RISE.

TEXT: KENNY GENBORG

“We risk losing what the real focus is and instead have to spend time and energy on a lot of other things to meet the legal requirements. In this case, we will be heading in the wrong direction. There has to be a balance between people's right to integrity and competitiveness,” she says.

We met up with Pia Sandvik in RISE's head office at Lindholmspiren in Gothenburg. We looked into the future and discussed skills in AI, data analysis and mobility. Areas that overlap the technology-based development of products, services and businesses in healthcare.

Integrity issues are a common theme in our conversation, as is Swedish – real or perhaps imagined – competitiveness.

At the heart of our conversation is the question of speed, and the major issues of democracy. The balance must be found between daring to test new things at speed and safeguarding against the abuse of an individual's data.

Data is a precious asset when developing new services, and as a commercial commodity.

Therefore, you need to be very vigilant when the regulations are set up and applied, according to Pia Sandvik, who is deeply engaged in privacy and integrity issues.

Not too fast, but not too rigid and slow. Not too generous, but not too fearful.

“The risk is that the application of the legislation becomes too rigid. Then you have a lot of small business owners sitting and thinking about GDPR instead of focusing on competitiveness,” says Pia and warns that Swedish business will have completely different rules in this area than the rest of the world has.”

“We need to zoom in on what in the legislation strengthens personal integrity and doesn't stifle the competitiveness of business life.”

How do we find the balance?

“The legislators need to show some agility. Access to data is changing rapidly. As are the opportunities to analyse data and business models. We need to test our way forward and weigh different aspects against each other.”

Do the politicians understand the issues?

“These are difficult issues for us all. We need to dig into them properly. But things need to be tested so we can understand them better. Sometimes things should be allowed to whizz off in a certain direction and then slowed down if it turns out that was the wrong direction.”

1. Integrity must be balanced against competitiveness
2. Legislators need to be agile and fast
3. Collaboration needs to reach new levels



Pia Sandvik

Role: CEO of Research Institutes of Sweden.

Background: CEO at Länsförsäkringar. Deputy Chairman of the Board of KTH Royal Institute of Technology. Board member of Almi and the Royal Swedish Academy of Engineering Sciences, PhD from Linköping University, Quality Control Technology/Technician.

Currently: Leading the Swedish national research institutes, RISE.

"If there is to be innovation, you can't go around being afraid all the time. You have to be brave and daring. Both business and the public sector must also dare to stretch the boundaries."

Do we have politicians driving things forward?

"I am concerned that competition and growth issues have been received too little focus on the European agenda. There are so many other things being managed there, such as Brexit and refugee issues, which are also major issues."

"We need to accept that we have been late in Europe and Sweden with AI. We have woken up now, but we're five years late to the party."

Isn't democracy supposed to be a slow-moving system?

"It's not just the politicians. The whole structure hasn't really understood what has been happening. Having said that, we will need politicians who are much braver, more quick-footed and more forward-thinking who can think further into the future than the four years to come after the elections. Much of the legislation that needs to be changed is based on a long-term perspective."

"It won't matter how skilled we are at technology development and innovation if policy and legislation can't keep up."

How good are we at collaborating?

"We have a good tradition of collaboration, but the collaboration needs to reach new levels."

Collaboration is one of the major competitive advantages that we usually highlight. Are we satisfied and proud, without realising that more is needed?

"Yes. I think so. It's also about re-evaluating our mission. I'm thinking of academia, with universities and colleges that need to be much more agile. Both in basic research and lifelong learning."

"They need to more quickly understand what new skills are needed to meet societal and business challenges" says Pia Sandvik, who specifically mentions Chalmers as "a shining star in this context."

Would this be about shifting the focus from basic research to meeting societal needs?

"We need to think carefully about that balance. We need basic research as well. We can't believe that, at any given point, we know everything and what awaits us in the future. But we also need more applied research to be based on the challenges we face."

What corresponding requirements would this place on business?

"Business must focus on what it believes will increase competitiveness. We can't tell them what they need. We have to assume they know this best. There is greater responsibility on us who have a social duty, which the universities and research institutes have."

Don't you think industry should open up more?

"They could be even better if they did that. In that case, it should be done with the aim to develop their business."

"There is an increasing curiosity to enter into discussions where the consequences are not always easy to predict in the short term. Many understand the need to embrace new technology areas. I can see a tendency for increased openness and curiosity in more areas and more strategic partnerships."

Therein lies the trend of open innovation and larger companies seeing a need to invite smaller innovators to co-locate with them.

"Exactly, you can see that with all new types of innovation hubs, for example, AstraZeneca's BioVentureHub here in Gothenburg. You need access to the strong innovation power that large organisations have a difficult time managing."

32 %

of Sweden's R&D investments in the private sector are made in the Gothenburg region

Source: Business Region Gothenburg

"It's in the synergies between startups and large global companies where things happen."

Has Sweden come far with this and gained an advantage with the open environments?

"No. We haven't. We're on our way, but it needs to go much faster to scale up from idea to implementation."

"Business also has an important role to play in making sure regulations land well. You can develop fantastic products, solve ethical dilemmas and develop functional and safe technology but, without legislation, you don't get the products on to the market. You are not allowed to use them. Self-driving cars can't drive on Swedish roads today, without exceptions being made."

Is this also about the courage of the politicians?

"In this case, it's about industry needing to collaborate much more. If they don't get politicians to understand, it doesn't happen. They probably need a broader impact arena than they have had in the past."

"The same thing goes regarding the integrity of AI. Industries need to agree on how to behave ethically."

110

billion SEK

Companies' R&D expenditure
in Sweden (2017)

Source: Growth Analysis

So Sweden's not quite as good at collaboration as we say we are... and we're not that good at open innovation environments. So there's really not much to brag about?

"We have to take things to entirely new heights. For things to go faster, we need to integrate and interact much more purposefully. It is clear that we have something to build on here compared to many other countries."

"With the current pace, we have to turn it up a notch and think about how we can be faster in all decision-making."

The third advantage we usually emphasise is that in Sweden we have all the necessary skills gathered together. Is this the unique advantage we believe it is for Sweden?

"Absolutely. We have entire value chains and industries that are undergoing major transformations. Obviously, there is plenty to learn from what is happening in the automotive industry in many other places as well. I am absolutely convinced about that."

Is it then correct to say that it is a great advantage for other Swedish industries that the automotive industry has developed as it has done?

"I would like to say that it is a great opportunity which we must take advantage of."

What overlapping areas do you see?

"Take measurement technology as an example. Data is generic knowledge nowadays. How do you collect, measure and analyse data? It is clearly the same skill used in mobility that goes straight into life science."

"In the digital meetings that are being developed now in healthcare, there are IT security issues and integrity issues that can be directly linked to challenges in the

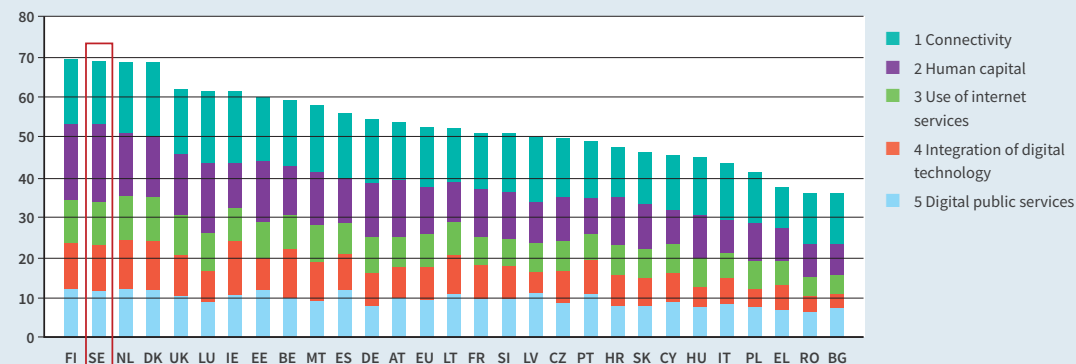
automotive industry. How do you secure data? It will be exactly the same things that are relevant there."

"Whereas previously there used to be a small common interface between life science and automotive, things are now completely converging. The list of shared issues that need to be dealt with is becoming longer and longer."

What is the next step?

"On the life sciences side, it is about how to manage large amounts of data and also about automation. A number of new services aim to support healthcare roles where there are high rates of sick leave, stress and patients who experience long waiting times and overcrowding. We will need to automate a lot more."

Digital Economy and Society Index (DESI) 2019 ranking



Sweden ranks second among the 28 EU Member States in the European Commission's Digital Economy and Digital Society (Desi) index 2019. Progress is in line with the EU average.



"It won't matter how skilled we are at technology development and innovation if policy and legislation can't keep up."

Stefan Larsson, AI researcher: “Would you trust a diagnosis made by AI?”

Imagine a doctor's appointment. You are told you probably have cancer. You ask, "why do you think I have cancer?" The answer you get is a test of your trust; "Because the computer said so".

TEXT: KENNY GENBORG

Would you trust the diagnosis without first understanding how the computer has come to a conclusion that will be life changing for you?

A probability assessment has been made based on a large amount of data. However, it's not your doctor who has made the analysis.

Can you trust the quality of the input data, the security in the systems, and that the diagnosis is not manipulated or influenced by erroneous preconceived sentences?

Somewhere therein lies part of the answer as to whether artificial intelligence, AI, will live up to the soaring expectations that are now being set. It also provides a glimpse into what it will take to assert Sweden's competitiveness in life science.

Basically, it's about trust.

That's the opinion of social science-focused AI researcher, Stefan Larsson, in an interview with Sahlgrenska Science Park, which also addresses the balance between democratic processes, personal integrity, societal value and commercial opportunities.

And speed. Fast and sought-after speed.

"One way to build trust in your computer's judgement is to enable the public to understand more of the process behind it," says Stefan Larsson, who points out that it's time to highlight AI from many more scientific perspectives than just the engineering ones.

The same conclusion is reached in a Vinnova-funded report from the AI Sustainability Center to which Stefan Larsson is affiliated. There, large stakeholders from the business community collaborate with researchers from different disciplines to lay a sustainable foundation for rapid AI development.

The turbo-charged speed is a great opportunity for life science, healthcare and the Swedish business community. However, it also brings with it enormous risks.

If the technology goes wrong and people don't feel they can trust it, there will be problems for the commercial utilisation of the technology.

Behind the need for speed is an international race and commercial pressure from industry and the startup sector. The regulations are moving too slowly in this perspective.

1. Fundamentally, AI is about trust
2. Individual integrity is set against the public interest
3. Multidisciplinary research is required



Stefan Larsson

Role: Associate Professor at LTH, Lund University.

Background: Responsible for the Digital Society Program at liberal think tank, Fores. Member of the Swedish Competition Authority's scientific council. Affiliated with the AI Sustainability Center.

Currently: Inputting more scientific perspectives on artificial intelligence than just engineering ones.

"At the same time, there is a risk of creating fast and bad policies. Good regulation is a democratically rooted balancing of interests that is often perceived to be slow. At the same time, it is risky to stress certain issues," says Stefan Larsson.

"Speed is one of the difficulties, being smart and knowledgeable about how to regulate whilst technological innovations are moving fast."

Will compromises be required?

"Especially in the health area, the focus is on how to balance social interests that come with good intentions, but which are not simple to implement without compromise. We want sharp diagnostic tools and good precision, which often require large amounts of data. The intention is good but, at the same time, patients' control of their own information is also a good intention, but it's not always compatible when aggregating large amounts of data."

"So how should we achieve this balance? What should it look like? If it is of such great general public interest that society benefits from it, well then we have to think about what to do with the protection of integrity"

You mean selling out some individual's integrity to benefit research?

"Yes, because you see that the general interest is big enough."

"Simultaneously, commercial interests are also important. How can we stimulate innovations? Ownership and use of data can be a commercial interest that may not necessarily be in the public interest. It can be a special interest, a company that wants to make a profit. You have to have that motivation in order to invest. But if the public interest is used as a key to access a lot of data, and it then results

in a profit-driven special interest, you are back on square one when it comes to the balancing act."

In the same way, it must be in the public interest for businesses to develop to create jobs and products for human health?

"Yes. Absolutely."

So how do you find the right balance?

"It is very much a legislative issue linked to politics. I can't draw exact lines when it comes to healthcare. It is a challenge and a democratic process. It is not so easy to balance diverse interests in a short period of time. That is why these policy issues are tricky and time consuming."

Then there is also enormous pressure, especially from the business community, to come up with regulations that do not slow development and which, on the contrary, accelerate it?

"Yes exactly. But then there are other factors that also make it difficult to bring about change in the public sector. For example, how procurements are made. Traditional organisation is perhaps not the most advantageous for today's ideas about how data can be shared between different authorities."

"It is not so easy to make the legal judgements either. There are often gray zones and difficult interpretations that must be made in the light of how new technologies are understood. Often, the simple, safe decisions are the ones that get prioritised. This can lead to risk-averse legal assessments."

Is there a risk of over-hedging?

"There is definitely such a risk. In smaller municipalities, there may be only two or three lawyers who make all the legal evaluations across all areas. You can't be an expert on all risks."

80 %

are unaware automated decision-making exists in the public sector

Source: The National SOM Survey 2018

"The results could inhibit innovation and lead to inaction. However, it is still logical to not just drive on and risk making mistakes."

Even if we regulate the handling of our own data, will we be impacted by technology from other parts of the world?

"Yes. A question that is sometimes missed in this context is how AI works together with our particular social structure. AI can be a race to get the sharpest tools. But good and reliable AI is not just a very sharp knife. Instead, it is something that needs to be considered together with values, ethics and other social structures. This is clearly an area that needs to be researched further."

"There is a growing understanding that technology development can't neglect societal values, structures and inherent distortions. If we ignore this, we risk developing discriminatory AI systems, in line with the fact that society is not equal."

1 Stefan Larsson, AI researcher

Is there commercial value in developing "good" AI?

"Indeed. There are glaring examples of when things have gone wrong, in surprising ways. Good or reliable AI is probably not strictly an engineering issue, even though programming and system software design are essential elements. That is why we are advocating the multidisciplinary need. You must have several skills around the table so as to include, for example, the ethical and cultural aspects. Issues of bias, responsibility and transparency are core issues in the development of AI, and not something that can be applied afterwards as a quick fix."

"Nor can you assume that all users are benevolent. You have to have a reasonable estimate of possible ways your product could be abused, and what negative incentives it can create."

How interested are researchers in getting to the bottom of these issues?

"An emerging interest has grown over the last few years. We show this in our report. It is quite a new insight that this is a major challenge, and that the significance of AI development requires a multidisciplinary approach. Now, the humanities and social issues are entering into the picture, in line with new technologies impacting markets, people and organisations. This type of research will mature, and universities and colleges have a responsibility to facilitate good collaboration across disciplinary boundaries."

And from industry?

"There is also a nascent interest, at least when they see what commercial downsides and risks there are. Companies such as Microsoft, Telia and Bonnier are part

of the AI Sustainability Center and several substantially data-driven companies on a global level have launched ethical principles to build trust."

"There are examples of when things have gone wrong when gender bias or ethnicity bias has been reproduced. You probably want to understand the root cause of this, and find a good level of transparency and accountability so you can both detect and counteract bad applications."

How do you build the public's trust?

"The European Commission's expert group believes that this is based on three categories: don't break the law; ensure the technology is robust and doesn't make mistakes; and, of course, do things ethically. It's especially important to understand how autonomous products arrive at a certain conclusion or action. Especially when they are used in healthcare. And especially if things go wrong."

Machines make some choices that can be life changing for humans?

"In general, you can say that the greater the consequences, the more important it is to ensure good, impartial AI processes with clear accountability and traceability of error sources. We often talk about certain types of algorithms such as "black boxes". You should however see the transparency issue as a broader category that includes the complexity of various possible data sources and institutional arrangements and that, for some applications, data is brokered in an environment of different stakeholders, and that conflicting interests such as intellectual property and business confidentiality can play a role."

60 %

don't agree with the statement
that decisions made by computers
lead to more reliable decisions than
officials making decisions in the
public sector

Source: The National SOM Survey 2018

"Not everything can be completely transparent and explainable, purely conceptually. It is a utopia to expect to be able to explain everything exactly as it is. But you have to find ways to do it well enough to pick out what is important for a certain result. "

What happens if we fail to build trust?

"One downside would be that we don't fulfil some of the potential AI and self-learning technologies offer. For example, generating efficiencies or offering relevant suggestions tailored to suit me as an individual, such as precision medicine or general customised services. If we are to achieve the potential and bring about value through these powerful methods, we should also focus on issues of trust. How do they work? What do they result in? How do they interact with individuals, organisations and society? You also have to have a good take on the issue of accountability, as a part of this."



Photo: Volvo Cars

AS BIG AS CARS DRIVING THEMSELVES

Industry in total transformation
Attracts capital
Appeals to entrepreneurs

Andreas Strasser, Volvo Cars Tech Fund: “Volvo wants to contribute to better healthcare”

The interest in keeping track of your health data has grown exponentially in recent years. It can also be done in your car. This trend is attracting venture capital from the automotive industry to a new area.

TEXT: KERSTIN SJÖDÉN

Technology development in life science has become interesting for completely different industries. There is a connection between healthtech and mobility. Andreas Strasser is Investment Director at the Volvo Cars Technology Fund, one of the stakeholders in the automotive industry looking at new investment areas.

Why is Volvo Cars interested in healthtech?

"Healthtech is hot in the automotive industry, as well as in society at large. We live in a society with an aging population and people want long, healthy lives. We are more interested in health than ever before and many use different types of digital tools to measure and monitor their health and wellbeing."

"At Volvo, we want to help our customers with this. For example, by giving them a health status when they are driving. This could be about measuring stress levels or keeping track of when the driver loses attention. If a driver gets an early notification from the car when he or she seems to be tired or distracted, accidents can be avoided."

"Today, the technology exists to measure heart rate. With this technology we could warn that, for example, a heart attack is taking place. We could inform the driver, alert

the medical service and slow down and park the car in a safe place. We also want to help the elderly to continue to drive with the help of self-driving cars."

What is the Volvo Cars Technology Fund?

"Volvo Cars Technology Fund has been around for a year and a half, and will ensure that Volvo Cars has access to the most innovative technologies and ideas available. Not only those used today, but also those that are changing how we travel in the future, with the potential of transforming the automotive industry."

"As such, we are investing in companies that help Volvo gain access to new strategic opportunities and, in the long run, improve cars for customers. The technology fund aims to be profitable and we try to find companies that can make money independent of the relationship with Volvo."

What are the most interesting trends in the automotive industry right now?

"Electrification. Self-driving cars. AI. Various forms of digital mobility services and new ways of using the car, such as car sharing services. We try to be open to all kinds of tools that make cars more attractive."

1. The automotive industry sees opportunities in life science
2. People want to keep track of their health data
3. Healthtech can save lives on the road



Andreas Strasser

Role: Investment Manager for EMEA (Europe, Middle East and Africa) at Volvo Cars Technology Fund. Based in Berlin.

Background: Head of Research and Automotive Strategy at Volvo Car Group. Lived in Gothenburg 2012-2018.

Currently: One of the keynote speakers at the Park Annual life science event in Gothenburg on September 26. Sees investment opportunities as industries converge.

What type of companies have you invested in so far?

"We have so far invested in seven companies and three are in the pipeline. It is a wide range of companies, such as: Luminar which develops advanced sensor technology for self-driving vehicles; Züm which is a car sharing service for children; electric vehicle charging company Freewire; and VR company Varjo. I've also just completed an investment in an exciting healthtech company."

Can you tell us more about that investment?

"It's a company that, in the event of an accident, analyses what has happened in connection with the accident and what likely injuries there are to the passengers. When a person is admitted to hospital after a car accident today, it is not at all certain that you know what injuries have been sustained. Using data regarding, for example, the car's acceleration and which part of the body that has been exposed to trauma, we can contribute to better patient care."

How do you go about looking at new companies?

"I try not to be too specific. Instead, be open to anything that may be interesting. I have worked for Volvo a long time and can quickly make an assessment of whether the company is relevant to us or not. I want to give the start-up companies at least 20 minutes to try to convince me that they have the best solution for us. Of course, there have been a few strange meetings, but it's important to be open and to listen to the innovators."

What's the hardest part about your job?

"It is basically impossible to know which startups will succeed. I get a number of fantastic ideas presented to me every day. Almost all of them seem exciting and most of them have potential from a business perspective. But at the same time, the statistics show that most will fail. Navigating through it all is difficult."

100

million SEK in venture capital
to the accelerator companies in
Sahlgrenska Science Park 2018

SIX TRENDS

1

Sector convergence is transforming the entire business landscape.

2

The accelerating need for disruptive innovation requires cross-sector knowledge sharing.

3

There is an increased interest for de-risking high-tech innovation.

4

Industry is looking for multiple uses of innovation, using complementary co-creation with less need for exclusivity.

4

New collaborative models are being evolved, often influenced by open innovation.

6

The sharing economy is spreading into new sectors.

Source: Sector convergence – a significant growth opportunity! Expertise, capabilities and capital
Lindholmen Science Park and Sahlgrenska Science Park, 2019

Tobias Nilsson, Region Västra Götaland: “We need to transition here and now”

There is no time to lose. Healthcare must be transformed. This needs to happen right now. Tobias Nilsson, Region Västra Götaland's chief strategist for the transition, sees an organisation moving too slowly.

TEXT: KENNY GENBORG

An organisation with 50 000 employees and a constant need to fight fires and manage emergency medical crises is not easy to transform.

There are always other things to take care of, rather than innovation development and business initiatives.

But still, it has to be done. And has to be done fast.

Not primarily for the sake of money, but to deal with an otherwise inevitable shortage of people to do the job, according to Tobias Nilsson.

At the same time, Tobias Nilsson is grappling with the difficult communicative issue; how to create commitment for a transformation? Without at the same time signalling panic.

At the end of 2018, Västra Götaland's regional development director, Ann-Sofi Lodin, wrote a debate article to emphasise the seriousness of the situation.

“We know that in the future we cannot continue to work as we do today. If we do, both employees and patients will lose out. Therefore, we fundamentally need to change how healthcare is provided and in what ways,” she wrote, listing the well-known arguments:

An aging population with greater healthcare requirements. Significantly increasing costs for increasingly advanced healthcare.

An economic development that will not relatively offer more money for more healthcare.

And then the lack of skills. The most important aspect, according to Tobias Nilsson.

So, there's no choice?

“Essentially, that's the case. We are not attractive enough as an employer to retain the staff we have and we don't succeed in attracting enough generally. We have vacancies and they will continue to grow as we get an increased amount of older people with greater healthcare needs. Also, having such good results in healthcare means that more people survive severe illnesses, but need continued care.”

“It's not an economic panic. We have good finances, but the cost increases we've seen lately are very worrying.”

Is it a socio-economic challenge?

“Yes, but even more a skills supply issue. There will be no one left to do the job.”

1. The speed of transformation of healthcare is too slow
2. The shortage of labour is the main driving force
3. New tools are not enough, unless ways of working are changed



Tobias Nilsson

Role: Chief Strategist at Region Västra Götaland.

Background: Investigator in strategic development and follow-up of specialist and hospital care in Stockholm. Political advisor to former Minister of Social Affairs, Göran Haggglund. PhD in Economics at Stockholm University.

Currently: Reports to the Healthcare Director and leads the strategic work on the transformation of healthcare in Västra Götaland.

The people that are left will work on the municipal side and in business."

How far into the future are we looking here?

"Not so far. We need to transform here and now. We need to create greater security and relationships in the local healthcare system now. Not in ten years."

Is the transformation moving fast enough?

"So-so, I would say."

What's slowing it down?

"It is difficult to change ways of working. There are many people that need to be influenced. Most healthcare will continue to be managed as it is today. We're not expecting 50 000 employees to have their ways of working change all at once."

Is there a communication issue with this?

"Yes, and it's a difficult one. A lot of things work, but not well enough. We need to make it known that action is needed, but there is no panic. We're not going under. We have good healthcare, and a solid financial position."

Part of the communication challenge for Tobias Nilsson and the rest of regional management is that the transformation of healthcare and new digital services will fundamentally change people's daily lives. This applies to healthcare workers, to our daily lifestyles and wellbeing, and to patients with different conditions.

Have people realised how big that change is?

"Both yes and no. Anyone who has experienced health care, for themselves or together with their relatives, is aware that healthcare today doesn't work as well as it should. That being said, we should bear in mind that healthcare in general delivers fantastic results. For the most part, it's world class."

"But that feeling of not using the potential that exists, in the form of technical solutions and digitalisation, is probably widespread."

However, people are not yet aware of what it will mean in concrete terms, according to Tobias Nilsson.

Will the change be so great that people will be doubtful about what is happening?

"In some respects, yes, I think so. All of us working inside healthcare will face greater challenges as it becomes increasingly diversified."

"Some people will embrace these services and see the potential of using solutions such as AI that provide better and more individualised healthcare. At the same time, pressure on the healthcare system will be eased with our limited resources being used to treat those who are unable to take advantage of the new solutions."

"We have to deal with people who have high demands and expectations on the new solutions, as well as a large group that aren't at all there yet. There must be a completely different approach for those people."

Healthcare can become less equal?

"If we do nothing. However, if we manage things properly, both groups will receive quality healthcare but in different ways. One group will use the potential of digitalisation so that we can allocate more resources to the other group. In this case, the health outcome does not have to be so different."

"But if we continue to treat everyone with the same tools, we will encounter problems."

What will happen in the near future?

"There will be greater focus on the person-centred health centers. They will tie it all together when patients are fin-

45 %

of Swedes believe healthcare is the most important societal problem.

Source: The National SOM Survey 2018

ished with hospital care and are moving on to continued care at home. This mainly concerns the elderly and those with multiple illnesses. This needs to happen now, with a greater speed of transformation."

How receptive are older people to this way of dealing with them?

"They want reassurance and a fixed healthcare contact. They long for it. However, digital maturity levels are different, especially on an individual level. The group of people that experienced IT quite late, or not at all, during their working life is not at all comfortable with this."

At the same time, there seems to be some things that are quite easy to fix, but which are not being fixed?

"Having a fixed healthcare contact for those who really need it, should be fairly easy to solve. Make sure every general practitioner keeps track of their listed patients. It's a low hanging fruit."

"Another is to use the operating area data we have and compile it in a better way so that it can support quality-based development, as well helping us to figure out why we have problems in certain areas."

Why don't you do it now?

"We are not good enough at it. It is easy for myths to live

on as to why things are a certain way. Instead, check the data. For example, the perception that emergency room visits are constantly increasing. That's something everyone says, but it's not true. The number of visits has in principle remained the same in recent years."

We often talk about information flows not working and that the fax is still being used in healthcare in 2019. Why is this?

"Well, because it is still needed. Because there are no other tools that work well enough. It is a bad tool, but you cannot receive the information in a better way. Hence the reason for continuing to fax."

"We have high hopes for Millenium – the new information management system that will be rolled out in 2021 – so that all users can see what they need to see."

There may already be digital tools for information flows, which are not fully used?

"There are tools already in place. Just start using them and change ways of working. One example is IBD, inflammatory bowel disease, where you can do a sampling from home."

"It has been introduced in Borås with great results. Patients are satisfied. Healthcare providers are satisfied. It is being introduced at Sahlgrenska University Hospital, but is not fully deployed. Although we know it is good."

The tools are being used, but patients visits are being booked anyway?

"That's what we are concerned about. You have to also transform ways of working. Otherwise you just add more steps. This is not possible when resources are finite. That's what the transformation is all about: not adding stuff."

So, how do you get that message across?

"We can do some things from a central perspective. But it is above all a management issue for the first and second line managers to manage and distribute the work. The staff want it."

But things are still going slow?

"We have another example involving mobile healthcare and hospital-based teams that visit the homes of patients with unstable conditions. The teams that work in this way are very satisfied, and so are the patients. Our finance colleagues are super-happy as we save lots of resources and the patients feel better."

"Those who have had objections to this are the ones who have not yet started. The same applies with the municipalities."

This is a line management issue, but it must also be an issue for senior management?

"It is firmly anchored at the top level. We have a unified regional council, all the regional management directors are behind it. It is on the agenda at every regional council meeting. It is fully anchored both politically and with the civil servants."

"Everyone agrees on the direction we're going, but it is, as I said, a large organisation with many politicians and officials. We are not always good at making decisions that support this enough."

What about the work being done regarding innovation?

"We face more challenges on this topic. I have worked in Stockholm and seen the speed that has been there for many areas. Even if the speed has been faster, it has

been hard to take the learnings from the new innovations. It has been difficult to evaluate them and to make sure they are integrated into an organisation where they have become an integral feature."

"The combination between Stockholm and Västra Götaland would have been superb. Imaging their drive combined with our structure and ability to nurture what we do."

What examples of innovations can Västra Götaland boast?

"The biggest thing we have is a mobile person-centred healthcare. We get a lot of attention for this both nationally and internationally."

You don't mention the business community at all in this context?

"Half the healthcare providers on the primary care side are private. They are of course part of this. On the municipal side, there are quite a lot of private providers of elderly care and home care."

But I'm thinking of the fact that there is an innovative force in business?

"Of course. Mobile person-centred healthcare is what we have succeeded with best. But the other example, IBD, is driven by pharmaceutical companies and IT providers. They have developed the service, driven it forward and participated in the implementation together with the region."

How does that interaction work?

"Splendid in that example."

And in general?

"It's mixed. There are examples of it not working so well, where we don't manage to interact well enough. This is sometimes down to coming in at the wrong level and trying to sell an idea to the central politicians or administration without being able to link it to the operating area."

How should you go about doing it?

"Regardless of where your entry point is, you must quickly secure the other levels. With IBD, we quickly managed to tie everything together in a good way. This enabled us to get the support and backing from the area where it was introduced. On a central level, we have been involved in the work from the beginning, to create the best conditions and environment for the idea to become an integrated part of our activities."

Does the business community lack insight into how to actually approach the healthcare sector?

"Yes. And unfortunately this goes both ways. With the politics involved, it's not easy to know how and where to interact. On a central level within the region, we are really busy with the stuff we need to do. And the operating areas sometimes only think about how they can get the individual product or service to work, and they are satisfied with that."

Every now and again, I hear criticism from the business community that it is difficult to access Region Västra Götaland compared to other regions. Is this true?

"Yes, unfortunately. We have a structure where inquiries are dealt with in silos. It is easier and more comfortable. Sometimes we are unnecessarily niggardly, and we're not brave enough to test something new."

Is this your opinion, or is it an insight into the entire management?

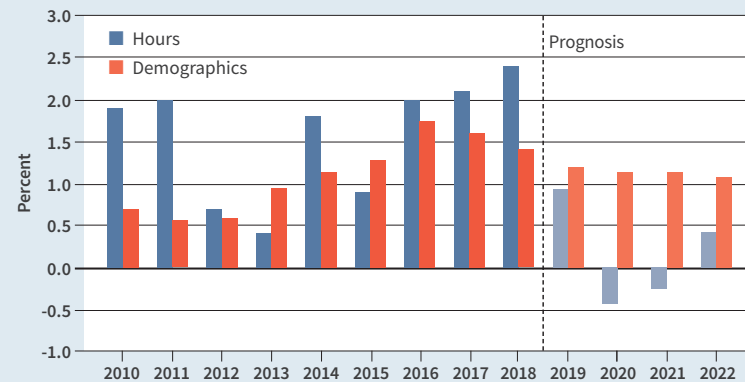
"There is a broader insight. We do not use the potential that actually exists in the collaboration to make things happen and to bring about change. This applies both within our own operating area and together with our private healthcare providers."

Collaboration is something that we in West Sweden usually boast that we are very good at. Is this correct?

"It is correct as long as we are discussing things at a blue-sky level, but when it comes to the proof of the pudding and getting things implemented everywhere, we're not quite as good."

"All of us working inside healthcare will face greater challenges as it becomes increasingly diversified."

Development of the number of hours worked and the demographic pressure



Source: Statistics Sweden and the Swedish Association of Local Authorities and Regions (SALAR).

The most important factor for the growth of tax revenue is the increase in the number of hours worked. These have risen sharply over a long period of years; even faster than the demand due to changes in population numbers and age composition. In the coming years, the number of hours worked is expected to develop slightly, while the pressure from the demographics continues to increase.

Emma Spak, SALAR: “The driving force must come from below”

The transformation of healthcare cannot be forced from the top, according to Emma Spak, who is the new head of healthcare at the Swedish Association of Local Authorities and Regions (SALAR).

- There is no ready-made IKEA “person-centred healthcare” package”.

TEXT: KENNY GENBORG

The key issues facing healthcare in the municipalities and regions lie in the hands of SALAR's healthcare section. Digitalisation, the supply of skills, patient safety... all end up on Gothenburg doctor, Emma Spak's desk.

In September 2019, she will leave her assignment as coordinator for the SALAR ‘Person-centred healthcare’ project and her part-time job as a physician at Eriksberg's healthcare center, to take on a full-time position as department head at SALAR.

Emma Spak is often visible in discussions on the transformation of healthcare. She has previously worked on a national level for a trade union. She has a clear idea of what it takes to achieve lasting change.

The needs are centered on resource utilisation, financing and skill shortages, but the driving force for change must come from below. Change needs to come from employees and patients who are motivated by better healthcare. Not by financial arguments or directives from senior management.

"We are working to promote this in different ways, including leadership development, new ways of working and contacts between the municipality and county councils" says Emma Spak.

So it depends on the leadership?

"This type of change is nothing simple to implement. There is no ready-made IKEA package called "Person-centred healthcare" that you can buy and assemble. This is about leading through complexity, which is quite a lot more difficult."

"You need to ensure that you share the vision throughout the organisation. Then you need to try different things and make a practical change."

People should create change themselves?

"Pressure for change from below and a clear focus mandate from the top are both needed. Then the operating areas will have the opportunity to bring about real change, with a clear mandate to collaborate instead of working in isolation in their own organisational boxes."

1. The pressure for change comes from below
2. Financial arguments are not motivating
3. Concrete examples are needed as inspiration



Emma Spak

Role: Head of Healthcare, Swedish Association of Local Authorities and Regions (SALAR).

Background: Coordinator of the SALAR ‘Person-centred healthcare’ project. Doctor at Närhälsan in Gothenburg. Chairwoman of the The Swedish Junior Doctors’ Association.

Currently: Actively debating what drives change in healthcare. New large area of responsibility within SALAR.

Is the pressure from above significant?

"Yes it is. At the same time, it can be difficult to hold on to it when it is tough financially. In any case, you need to make sure you don't just end up preserving what already exists. It is important to allow transformational work that we are not 100% sure will work."

This needs to be done in a context where there are many urgent issues to deal with?

"That's the difficult part. A very long-term perspective is required. The report is aiming for a ten-year plan. Many regions are focusing their plans on 2030. It is a long span of time, and the vision that is created must be relevant in everyday life."

"The central work is focused on trying to keep this issue on people's minds by inspiring and spreading examples. It is also about very concrete things such as follow-up and what you should measure to see that you are heading in the right direction."

How should it be measured?

"A project that shows good medical results may be more expensive because it requires an investment. If it is only done in one area and not shared by several, the cost does not go down. We need to build models to be able to evaluate the returns on investments."

At the same time as reports are underway and national strategies are formulated, impatience is growing, both within the operating areas and with entrepreneurs with new ideas. Emma Spak agrees that it is work ongoing at different speeds.

Overall it is very long term, in everyday life very fast?

"This is a part of leading in complexity. Everyone needs to be involved in building the long-term vision so they can relate to it in their everyday life. When dealing with the

acute problems, we can do this with a firm belief of where we are headed in the long term."

Give me a concrete example?

"If we talk about waiting times at the emergency room, and do not look at it in relation to a long-term vision, it is likely that someone is trying to solve the problem by providing more emergency care or, alternatively, shutting out those who are seeking healthcare by demanding referrals. If you instead consider the long-term vision that healthcare must be more preventative, long-term and proactive, the solution to the emergency room's problems may lie in analysing which patients are there in the first place."

"Ask the question, are many of our chronically ill patients seeking help? Can we take care of them in a different way? By thinking like this, we will get into more innovative ways of working. How can we monitor and optimise patients who have COPD, diabetes or heart failure at home so that we can enhance their treatment? So they never have to seek emergency care. Are there other things we can do with other groups to reduce their needs?"

There are many ongoing projects that are successful?

"There is a difficulty working in project form and then implementing the projects. There is a fantastic example from Västerbotten where they have worked with distance prevention technology for so long that the basic methods and gadgets are already in place. The technology for working with video contact is already well integrated."

"Staff at the haematology unit in Umeå thought it was unreasonable for bone marrow transplant patients to travel 250-300 km by taxi, sleep in a hotel, take samples the following day and meet the doctor for 20 minutes. And then take a taxi home again. Two days away from home and/or work, plus maybe the day after since you're too tired and can't do much."

+100 %

The number of 80-year olds has doubled by 2040

Source: SALAR's financial report May 2019

"The employees requested to start a project where the samples were taken locally and the patient visit was made via a link. They were told to talk to another clinic that was already working in that way, and that this type of method change is never done as a project any more. Just go for it! It took two to three weeks to go from idea to full implementation."

If that way of working was already so established, why can't it be extended to the entire organisation?

"Because the success factor is that there is firstly a desire and a driving force, both from employees and from patients who will use it. That there is something positive to aim for as an end result."

In a best-case scenario, when you release it to the public you encounter those who are uncomprehending. In the worst case scenario, you have to face clear resistance. In this case, the employees said that they saw a need and opportunity to improve the quality of care.

If you listen to the regional management in Västra Götaland, a lack of competence is the main motivation for a transformation?

"It is quite clear this is the case if you look at SALAR's financial report. The number of people aged above 80 will increase by 48 percent in the next ten years, while

1 200

Researchers in medical and health sciences at the University of Gothenburg (2018)

Source: Statistics Sweden

the working-age group will increase five percent. Since last year, the forecast has increased for the 80+ category and decreased for those of working age. The gap has widened."

"From a healthcare perspective, people more often talk about focusing more on the elderly patient and the ageing group. But first and foremost it is about the financial bandwidth. In ten years, we will have hit the ceiling for staff. If we continue at our current speed, we will need to use 60 percent of the new available workforce. If the increase in the public sector continues, we will need to consume all available new workforce to grow to that extent."

It's a very grim reality, but that is not the argument you bring up?

"That isn't what drives the individuals in the organisation. As a doctor, I am followed up on how well I follow guidelines and goals on an overarching level. But I could never go to a patient and say that we have to bring down your long-term sugar because I have to report to the whole group here how well we care for diabetics. This will never motivate the patient. A patient who perhaps likes to hunt

and fish is motivated by being able to keep his/her sight to be able to aim well, or to maintain sensitivity in the trigger finger."

"The same is true for the healthcare providers. They will not be motivated by regional management coming down and saying that we need to get the finances in order. Here, you need to understand that the transformation, even if there is an extreme sense of urgency that the system won't hold, must be driven by us increasing quality, reducing the gaps and using our resources in the best way."

The message of saving money doesn't work?

"If the feeling is that the transformation is about not having enough money, it sounds like we are scaling down our mission or lowering our quality. Suspicion will spread. If we instead talk about increasing equality, and maintaining or improving quality, motivation increases."

Then solid examples are needed?

"Take a technical thing like teledermoscopy. You can take pictures of skin changes and send them to a specialist. Follow-ups show side effects that you didn't expect."

"First, you would think that dermatologists should be able to assess more patients and diagnose skin cancer earlier so that patients have an increased chance of survival. In hindsight, you also see that the number of unnecessary operations is reduced. This is beneficial for the patient. At the same time, the pathologists' workload becomes lighter. Then, primary care doctors become better at assessing skin changes with the help of the quick feedback. Digital referrals gradually decrease over time as well. In the next stage, you find yourself in a situa-

tion where there exists large amounts of material and the evaluation can be done by high quality AI, thus reducing the burden on dermatologists even more."

What would have happened if finances were prioritised?

"If the aim had been to scale down and save money, you would never have experienced this driving force from everyone involved, which stems from how incredibly better healthcare is."

Then everyone else follows suit?

"It is still difficult to implement this. In Västra Götaland it has been going on for a while, but it has been a long process. I have seen other regions that are about to introduce the same thing but have not dared to build on others' already documented experiences. We must dare to not do everything ourselves and instead build on what has already been done."

Innovations and technological developments engender this?

9 358

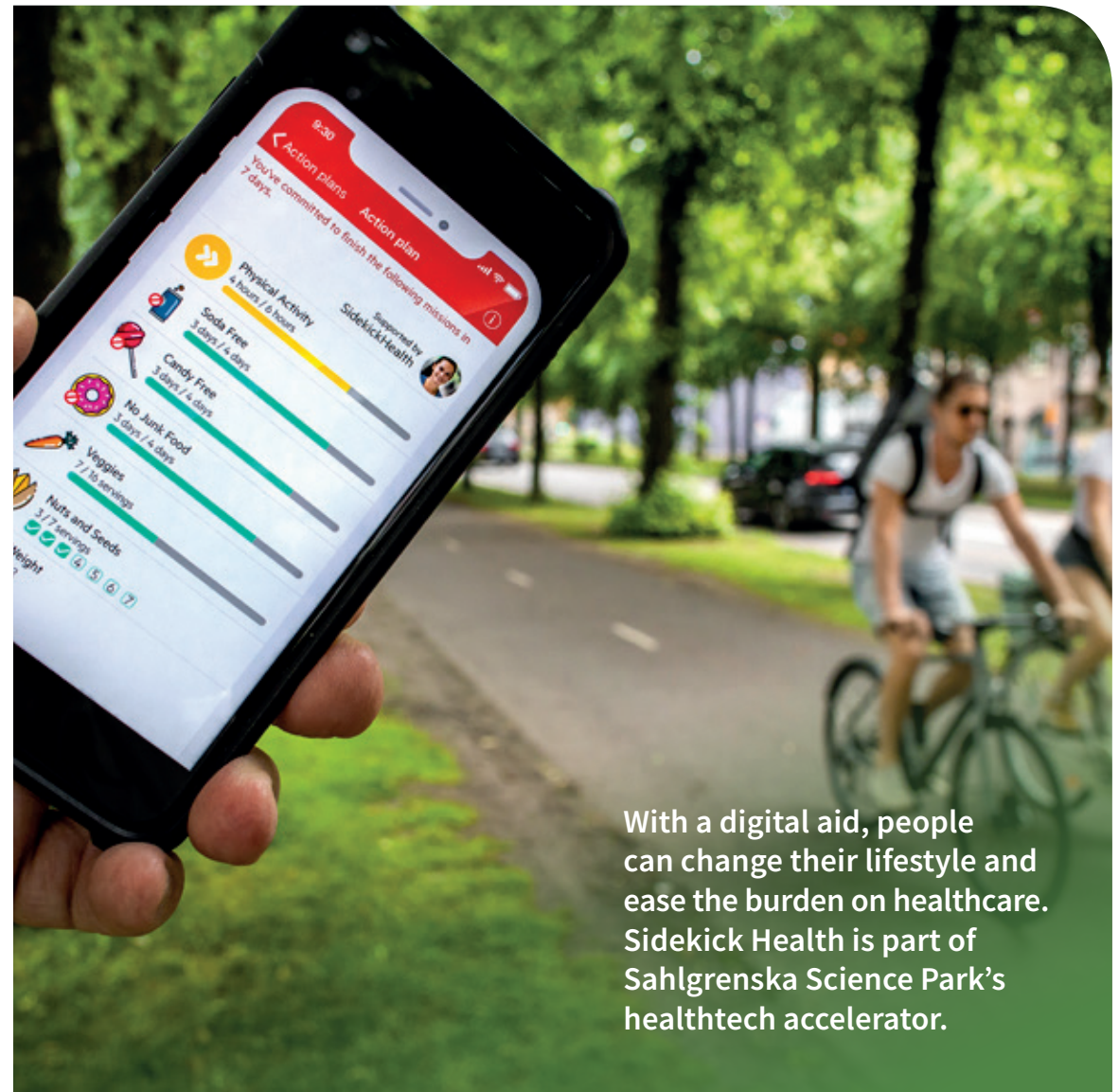
Researchers in medical and health sciences at all Swedish universities (2018)

Source: Statistics Sweden

"Look at how much progress has been made with chronic diseases. In the 1970s, diabetic patients experienced a lot of in hospital care. Gradually, it was made possible to measure blood sugar at home, and now we have continuous monitoring where patients can take a much bigger part in their own treatment, with much superior results. This must be possible with other large patient groups that need a lot of care."

Patients take more responsibility for their own care?

"It means that those of us who work in healthcare should not rely too much on our own conception of how care should be conducted. We become very caring in our way of working. But, here, our role is much more coaching to ensure that the patient can and is empowered to do as much as possible based on current conditions and needs."



With a digital aid, people can change their lifestyle and ease the burden on healthcare. Sidekick Health is part of Sahlgrenska Science Park's healthtech accelerator.

Photo: Sören Håkanlind

Sineva Ribeiro, Swedish Association of Health Professionals: “People who want to prick themselves should be allowed to do so”

"She's a survivor. She has only half a heart." The Swedish Association of Health Professionals' chairwoman, Sineva Ribeiro, takes her adult daughter as an example of how the skill requirements change when healthcare is moved to the home.

TEXT: KERSTIN SJÖDÉN

With more patients suffering from multiple illnesses being cared for at home, more specialists are required, according to the Chairwoman of the The Swedish Association of Health Professionals, Sineva Ribeiro.

"But now the opposite is happening and we're lowering the skill levels," she says.

Do you agree that there is a need for structural changes in healthcare and that the focus should be on person-centred care?

"I think a lot of what is being done in hospitals today could instead be done at home. We live longer, but we have more illnesses. You can live with lung cancer or heart failure a whole life, and this places other demands on healthcare compared to before. At the same time, hospitals are built on a different logic. You end up in a ward on the basis of a diagnosis, but today many people have multiple diagnoses. My adult daughter is one example. She is a survivor, has only half a heart, has had a stroke, brain abscess, has slightly high blood pressure and a low heart rate."

Does healthcare work well for her?

"No. She manages a lot herself, she measures her blood values and usually knows if she needs to raise or lower her medication. She would have liked to send her values digitally, but has to call and wait in line at Sahlgrenska's telephone exchange. Many people eat blood thinning medicine in Sweden, and I don't believe you should have to go to a specialist hospital for this. Healthcare should be moved closer to the people. People who want to prick themselves should be allowed to do so."

"But there are many questions that need to be answered. If healthcare is done at home, what laws and regulations are required? What patient safety law applies to a person who pricks him or herself?"

"More specialists will be required close to these top patients. The patients who often know a lot about their illness themselves. Instead, we're doing the opposite and lowering the skill requirements within many areas.

How?

"For example, we're placing some orthopaedic surgeries at one clinic and lowering the nurse's skills to that of

1. Patients who want to can self-care more
2. Reduced skills requirements will not solve the staff shortage situation
3. Politicians must start implementing the proposals



Sineva Ribeiro

Role: Chairwoman at the Swedish Association of Health Professionals.

Background: Specialist nurse, surgery, at Sahlgrenska University Hospital. Educated at the University of Gothenburg and Chalmers University of Technology (leadership in health care).

Currently: Advocating the employee perspective on the transformation of care, and also the patient perspective through her own family experience.

"Much of the new technology has to be mobile, so you can take it to the patients."

an assistant nurse, or replacing the X-ray nurse with an unqualified junior doctor."

"I don't believe in lowering the requirements to resolve a staff shortage situation. We've tried it before and discarded it. Instead, we should be developing all professions within healthcare and have a high level of skill closest to the patient."

What solutions do you see when it comes to nurse shortages?

"We have an acute shortage of specialists. We've been saying this for ten years. For example, we have submitted a proposal for an academic specialist course which means that the nurse is employed in his or her future workplace during the specialist training, with retained salary and with all the collective agreement benefits. We have developed a framework agreement within SALAR on this."

"When it comes to undergraduate nurses, I'm not sure I would agree that there is a shortage. There are around 140 000 qualified undergraduate nurses. SALAR, which is the major employer, has about 70 000 employees. Why does half the workforce choose not to work for this employer?"

Yes, why is that?

"Nurses must have better working conditions and higher salaries. This doesn't only apply to nurses. It's about a large part of the welfare professions where we have large groups of academically-trained women with unequal salaries. In the past, many nurses have come from the group of assistant nurses who have chosen to continue studying. Today, many assistant nurses say this is not worthwhile. In the other Nordic countries, the same problem doesn't

exist. There you have approximately 17 nurses per 1 000 inhabitants. In Sweden, the number is 11. During a night shift in Norway, you have five or six patients to take care of. In Sweden, that number can be 20. You have to feel that you have the prerequisites to do a good job, and know that you can go home when the shift is over. That's not always the case today."

Do you think there is a common direction for the work on the transformation of healthcare?

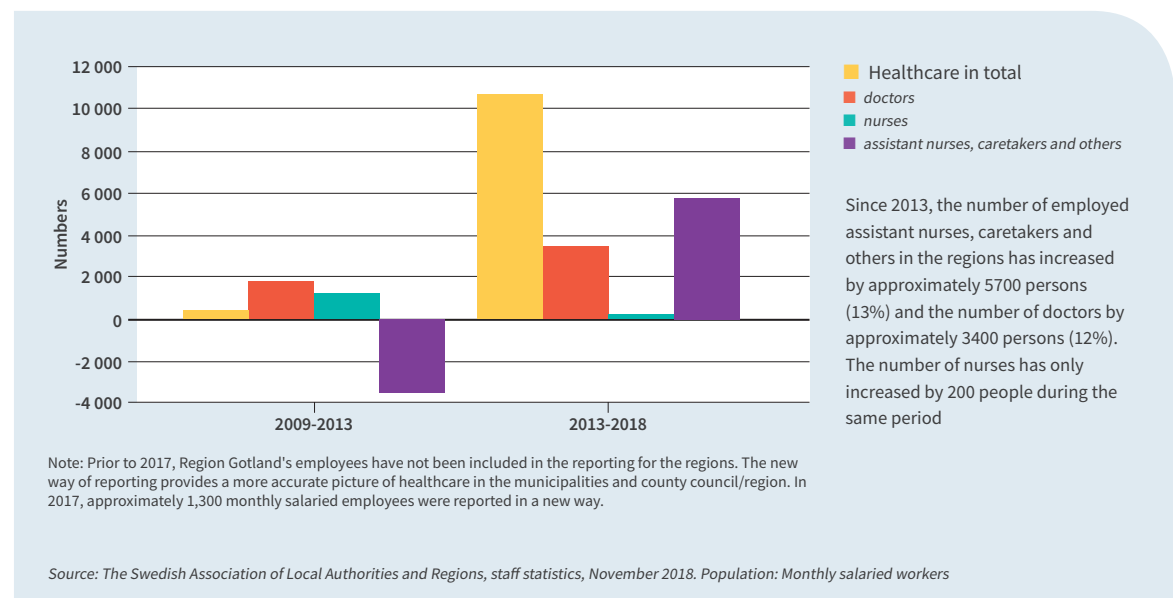
"We sit in as experts in Anna Nergårdh's investigation into the structural change of the healthcare system. We feel that we are listened to. But the question is what comes out of this. It needs someone to put their foot down. Two interim reports in the investigation are completed and I wonder why the politicians have not started to think about how the proposals should be implemented."

How can we move healthcare out from hospitals if the right resources and skills do not exist?

"There is a need for restructuring support to move clinics and competence without lowering them in the hospitals. Today, care facilities are being closed at the hospitals, but there is nowhere else to go for the patients. This creates great insecurity."

What do you think of new technologies in healthcare, such as automation and AI?

"Today, there is very little of this in healthcare. I think the students are hungry for it. We are behind in this respect. In the future, we will be able to correct defects on children already in the foetal stage, and operate on the child in the stomach of the mother. Much of the new technology has to be mobile, so you can take it to the patients."



Li Huaqing, Gynius Plus: “Attracts people from all over the world”

The quest for the right skills is one of the major challenges for both large industrial companies and smaller growth companies. It's not enough to search locally or regionally.

TEXT: KERSTIN SJÖDÉN, IMAGE: ELISABETH ALVENBY

To develop international companies, the innovation environment, the technology and the business concept must be perceived to be attractive by people with specialist knowledge from different parts of the world.

What is Gynius Plus?

"We have developed a mobile colposcope. A kind of microscope that is used for early detection of cell changes in women, thus preventing cervical cancer and ultimately saving lives. Because the colposcope is mobile, it can be used in places where access to healthcare is limited and women's health is underdeveloped."

How does it work?

"Teams of nurses travel to remote villages in countries like Tanzania and Kenya with our mobile colposcope. They can examine hundreds of patients in just a few days. Using a smartphone, images are sent to doctors in hospitals and they provide a diagnosis. Access to electricity can be a major problem in these villages. As such, the colposcope is battery-powered. The records

can be stored locally on the phone to be sent when the nurses are back, for example, at a hotel with an internet connection. An important aspect is security. When patient data is sent, the system must be secure, and we have a solution for that."

"A lack of equipment is a major problem in many countries, even in the cities. When I was in Nairobi, it turned out that the fee for making a colposcopy was high. In part, because of a lack of equipment. Many people simply couldn't afford it. Our colposcope is considerably cheaper than traditional equipment, while the quality is just as good. "

Do the women have enough confidence in the healthcare system to come to the examinations?"

"WHO has worked with screening programs in many countries, such as Kenya, for several years. Here, women know how important it is to go to the examinations. We depend on our partners, such as NGOs, to reach out with our products, and we depend on the women's confidence in these organisations. "

1. Mobile technology saves women's lives in poor countries
2. Cheaper examinations provide same quality results
3. Skilled people are attracted by the benefits of technology



Li Huaqing

Role: CEO at Gynius Plus

Background: Ph.D. in physical chemistry at the University of Gothenburg. Postdoctoral researcher at the University of Milan (European Research Council Project) and at the University of Gothenburg.

Currently: Entrepreneur who has chosen to lead an international growth company out of Gothenburg and the innovation environment around Sahlgrenska Science Park.



"A lot is happening with new digital health solutions in the Gothenburg Region."

450

life science companies
in West Sweden

Is Gothenburg a good place to start from when you want to reach out globally?

"Yes, I think so. Although geography is less important today, I think Gothenburg is strategically well located for us. We don't only have our market in developing countries, we also target smaller clinics. We have approximately 30 customers in Denmark and several in Norway. Gothenburg is located in the middle, which is perfect for us. There is a lot going on in the Gothenburg region in terms of new, digital health solutions. I have a large network with contacts at Chalmers, Sahlgrenska and the University of Gothenburg. The personal network is important."

Many entrepreneurs think that the lack of venture capital is a problem?

"I find it relatively easy to find angel investors. They are open and want to support you as a startup. We will soon embark on an investment round and I perceive the interest

to be high. We already sell our product and have the regulations in place. A major problem for many startups is that the EU regulations are becoming more and more comprehensive. In 2020, a new medtech regulation, MDR, will be introduced. This means that the requirements for documentation when developing new products will be greater. This means more work to get products approved, and for startup companies, it will be another hurdle you have to overcome. Risk capital is often needed here."

You came to Gothenburg from China 13 years ago. Why?

"I received a scholarship from the STINT foundation (The Swedish Foundation for International Cooperation in Research and Higher Education). I chose Chalmers because it is a highly reputable international university. Sweden has meant a lot to me and I am very impressed with the welfare system and the Swedish healthcare system. When I got my Ph.D. I worked for a while as a postdoctoral researcher in Milan, but I felt I wanted to give back to Sweden, which has given me so much."

There must be a big difference between being a researcher and an entrepreneur?

"Yes. I work with many different aspects as CEO. At the same time, my research background is important for the company. I have worked a lot with improving the software and how we can work with AI in the future."

How do you manage to find the right people for your company?

"It's a big challenge. We have people from all over the world in our company and we follow a conscious strategy to recruit young people who have just finished their studies. We can't compete with the big companies in terms of salaries and security, but we offer exciting jobs in a small, innovative company that really makes a difference for women in the world."

6 000

employees in West Sweden's
life science industry

A PROUD
TRADITION OF
INNOVATION
AND GROWING
COMPANIES



Henrik Cederqvist, Cuviva: "The slowness is frustrating"

Henrik Cederqvist wants to change healthcare for the elderly and frail with the help of a flat pack filled with technology. But to succeed, clear rules are required.

TEXT: KERSTIN SJÖDÉN IMAGE: NICKLAS ELMRIN

As one of the healthtech companies in Sahlgrenska Science Park's accelerator program, Cuviva has received attention for its communication solution for the chronically ill, who receive advanced and cost-effective care at home.

But structures, organisations, remuneration systems and working methods are not keeping up with the technology development.

What is Cuviva?

"We have created a solution that allows resources in healthcare to be used more smarter than today. It consists of a flat pack filled with all the technology that elderly people with multiple diseases need to communicate with their health center even if they don't have a smartphone or a bank ID. A nurse installs the hardware and teaches them how everything works. The pack is tailor-made for the group of frail elderly people with chronic illnesses and has been tested during the past year in Borgholm. It has also been tested in Stockholm within the advanced healthcare at home program, as well as in palliative care at Stockholms Sjukhem in Bromma."

How was the testing set up in Borgholm?

"It was made possible based on the organisational model they have built up there. Where they have coordinated efforts from home health care, primary care and ambulance care. This coordinated approach is known as Hemsjukhuset ("Home Hospital"), and everyone gets a fixed contact with a doctor. Twenty people with chronic heart failure used Cuviva's communication solution, for an initial period of four months. They were given a tablet device, measuring instruments, such as blood pressure gauges and thermometers, and they answered questions every day about how they were feeling. If they wanted, they could send messages or have a video call with a nurse. An important aspect is that the relationship with the healthcare system pre-existed and the digital meeting became an extension of that relationship."

What did the results look like?

"During the four months the trial was conducted, the number of hospital admissions dropped to zero, time spent with a doctor was reduced by 80 percent and physical meetings with a nurse were reduced by 60 percent."

1. Healthcare resources can be used smarter
2. Digital meetings are based on personal relationships
3. The speed of the transformation of healthcare must increase



Henrik Cederqvist

Role: CEO and co-founder of Cuviva AB

Background: Entrepreneurial roles in several companies. Worked in the retail industry, including Stadium and Plantagen, with business development, purchasing and digitalisation.

Currently: Driving the transformation of healthcare with innovative digital technology. Focused on patient benefit, speed and structural issues.

"Additional nurse time was allocated in the form of proactive video meetings, and the total time reduction for all groups was 15 percent. The largest savings came from inpatient care, where the 38 emergency care days were reduced to zero. This result has been sustained after a year with patients."

Most people seem to agree that the future healthcare model should be about "person-centred healthcare." Your tool seems as though it could be part of such a model. What's the interest like?

"Everyone we meet has understood that this type of solution will be part of the future of healthcare. Especially for people over 65 with two or more chronic diseases. The challenging part is the financing."

How?

"It's about making investments in one part of the organisation, for example at a healthcare center, which then results in savings in another part of the organisation, for example, inpatient care. However, the remuneration systems are not always designed to promote quality and efficient resource utilisation throughout the system, but rather they are built up based on silos. This slows down the introduction of solutions like ours, where a changed way of working in one part of the organisation increases the quality and reduces the total cost throughout the entire system."

How can this be solved?

"Today, everyone and noone is responsible for elderly, frail patients. That usually means noone. The main responsibility must be clearer and the money should accompany the responsibility. We are asked too often how to build the future healthcare model. It is difficult for us as a company to answer that. We want clear guide-

lines, then we will do our utmost to create an attractive and modern solution."

But it seems to have worked in Borgholm?

"There is a brave health center leader there, Åke Åkesson, who challenges the system. To do that, a certain personality type is required. It shouldn't need to be like that. Regions, politicians and officials have the opportunity to make decisions about changes that are needed today. But things are moving too slowly."

Can't slowness be a positive thing in this context?

"We have to respect the fact that the healthcare system is a complex system. But thinking about all those people who would feel so much better if the healthcare model looked different, the slowness is frustrating. We want to do so much more. Let's start now and accelerate the journey. We are looking for courageous leaders who want to use our solution, who dare and have the ability to get started and work towards this."

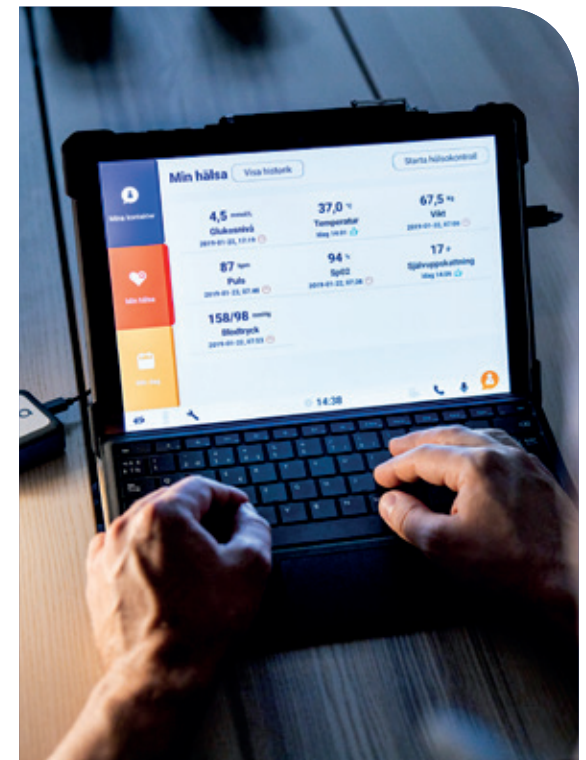
What else is on your wishlist?

"We create a lot of data and want to know how the municipalities and regions, who are responsible for personal data, will best use it for it to generate value. A plan of action is needed on this."

You have no background in healthcare. Is that an advantage or disadvantage?

"Both. As I come in from the outside, I can see things in a different way, in a new light. At the same time, it can be difficult to be accepted and to access certain forums if you are not medically educated. Despite this, we receive a lot of positive attention for our solution, which gives us a lot of energy."

"During the four months the trial went on, the number of hospital admissions was reduced to zero."



3 Henrik Cederqvist, Cuviva



20

Startup places in
Sahlgrenska Science Park's
healthtech accelerator

Cuviva develops technology to digitalise home healthcare.

Mats Sällström, Everdrone: "We must show that the technology is safe"

In mid-July 2019, the Gothenburg-based company, Everdrone, made its first public drone flights between the Sahlgrenska and Mölndal hospitals. It was an important step forward for automated transport within healthcare.

TEXT: KENNY GENBORG

All the major Swedish media, even some foreign media, reported on the successful drone flights in Gothenburg. Dagens Nyheter went with the headline: "Hospital transports blood and lab samples with drones." The article also addressed issues of ethics and risk. The media impact for Everdrone demonstrated both the fascination about the new technology, which many still associate with science fiction, and the expectations on new solutions that can change, improve and streamline healthcare.

Every year, Sahlgrenska hospital's blood vehicle makes 7 440 transports between the Sahlgrenska, Mölndal and Östra hospitals in Gothenburg. These transports consist almost exclusively of high value loads with a relatively low weight, such as blood bags and lab samples. In some cases, the transport is also urgent, which makes it a challenge in rush hour traffic.

Together with Everdrone, Region Västra Götaland is now exploring a new type of transport with the help of autonomous drones. Everdrone is the first Swedish company to receive permission from the Swedish Transport Agency to operate drones in urban environments, out of sight from the operator.

"It feels fantastic to be the first in Sweden to carry out this type of flight," says Mats Sällström, CEO of Everdrone.

What can the technology be used for?

"We see many opportunities with autonomous drones in the future. Not least in healthcare. To make the technology accessible we have to be able to show that it works and is safe. This type of demonstration proves that both the technology and the regulations have matured to the extent that we can now carry out flights on a small scale."

What safety considerations are taken into account?

The ability to land with extremely high precision in places where GPS reception is not reliable is particularly important during these flights. The landing site at Mölndal Hospital is located in a courtyard surrounded by tall buildings.

"In such an environment, you can't rely on traditional GPS positioning. It simply won't be safe," says Maciek Drejak, Everdrone's technical manager.

"Therefore, we have developed a visual navigation system that ensures appropriate distance to surrounding obstacles and directs the drone towards a special landing marker on the ground."

Everdrone develops software and visual navigation systems for autonomous drones. The company, which is part of the healthtech accelerator at Sahlgrenska Science Park, was recently named one of Sweden's 33 most promising startup companies by the magazines Ny Teknik and Affärsvärlden."

1. Breakthrough for drone transports in healthcare
2. The technology and regulations have matured
3. GPS navigation is not enough



Mats Sällström

Role: CEO at Everdrone

Background: Project manager at consulting company HiQ. Previously founder and co-owner of S&Ø Advertising Agency.

Currently: Successfully completed the first test flights with drones between two of the Gothenburg region's major hospitals.

Kristina Lagerstedt, 1928 Diagnostics: "Data-driven innovation will shape the future of healthcare"

Being a duo has been crucial in developing 1928 Diagnostics into one of Sweden's hottest scaleups. If you're not confident, you won't get very far. You have to tune in to what's going on around you, iterate, whilst also daring to realise your ideas, and believe in yourself.

"We both motivate and challenge each other. And we have a lot of fun together," says Kristina Lagerstedt about the relationship with her business companion, Susanne Staaf.

TEXT: KERSTIN SJÖDÉN

It is no small challenge that 1928 Diagnostics has taken on – contributing to a solution to the problems related to antibiotic resistant bacteria. For the past five years, the company has worked hard with a cloud-based solution to support the diagnosis of antibiotic-resistant bacterial infections.

How can your product help reduce the problem of resistance?

"Our tool is used to control the spread of hospital-acquired infections. The bacteria can be resistant to several different antibiotics and also be capable of spreading within a hospital, between hospitals and outside in the community. This is what makes them so dangerous – they are one of the greatest threats to humanity today."

How does your product work?

"If a hospital suspects an outbreak of resistant bacteria, they collect samples which are then sent to the microbiological lab for analysis. The bacteria's entire DNA

code is converted into a data file that is uploaded to our software and the hospital gets a response within minutes. They get answers to two questions: whether an outbreak is ongoing and which antibiotics can be used to treat the bacteria."

Can your tool be used on individual patients?

"Our first product analyses bacteria on a group level and helps control an infection outbreak by creating bacteria family trees and comparing genetic 'bacterial fingerprints'. We also work with diagnostic tools in the form of decision support solutions which will be able to be used for individual patients. However, for it to break through on a broad front there is a need for a technology transformation which sees DNA sequencing technology being used on a daily basis, and we are not quite there yet. The labs have to be redesigned for it to be cost effective to use DNA sequencing. When the labs are ready, we will have a diagnostic product ready."

1. Success is built on teamwork
2. Data-driven innovation is a key factor
3. Dare to think big from the start



Kristina Lagerstedt

Role: Entrepreneur, CEO and co-founder of 1928 Diagnostics.

Background: PhD Medicine, Surgery; Cancer Scientist, MSc Chemistry

Currently: 1928 Diagnostics is scaling up commercially in Europe and North America. Kristina is a member of the World Economic Forum's Digital Leaders of Europe network.

“We currently have nine bacteria in our platform. Within the next few months, we will double that number. This means we will cover 95 percent of the bacteria that cause hospital-acquired infections.”

You are researchers who have become entrepreneurs. How has that journey been?

“Fun! Everything has gone quite smoothly really. For us, it has been really important that there are two of us. It has been fantastic to build a company together with Susanne. We got to know each other at AstraZeneca. We have been in the same phase of life throughout this journey. We motivate and challenge each other and have lots of fun together. Susanne makes sure that everything works here back at base, while I travel more and work a lot with financing and strategic partnerships.”

How did you learn to run a company?

We have seen ourselves as a global company from day one, and dare to think big. If you're not confident, you won't get as far.

If you have the ambition to build a global company, it is important to really dare to be international and not just stay in the Nordic countries. For me, entrepreneurship is a lot about listening to people, talking to people and having a feeling for what is going on. But the most important thing to realize is that the company is the people who work there. Without them, we are nothing.

I've learnt on the job. We have amazing owners, a large network and a chairman who is a serial entrepreneur. He knows how to create a base for a company to easily scale up. So, it is important to do a thorough job to start with and have a long-term plan for how to grow.

You are growing and now working with recruitment. How?

“Many people contact us and want to work here. That is very cool. We have received over a hundred applications

for a new position in Amsterdam. Of course, it is a challenge to find the right people, and making sure the team works together is absolutely crucial. In the US, I have been networking with some people for several years and hope now that some of them want to start working with us.”

What is your next step?

“We have a number of potential new customers in the US market, in Europe and in Sweden. Now, we need more salespeople to get out into the market properly. I am currently working on raising capital. To get to the markets we are aiming for, we need more people, and for that, we need more cash.”

Is it difficult to raise capital?

“We haven't had such a hard time with that but finding the right people can be difficult. We are fortunate to have such fantastic owners.”

How can we attract more women to become entrepreneurs?

“This is an issue I'm devoting a lot of time to, for example, through Digital Leaders of Europe, a network within the World Economic Forum. We met in Berlin recently and discussed how to encourage female leaders and entrepreneurs. I think you have to start already in preschool; work with role models and get girls to boost each other!”



Susanne Staaf and Kristina Lagerstedt

Erik Gatenholm, Cellink: "We managed to change the entire industry"

The fast-growing bioprinting company, Cellink, is part of the international cluster environment at Sahlgrenska Science Park. The company is present in 50 countries and operates in one of the most imaginative technology areas right now.

TEXT: KENNY GENBORG

Cellink's innovative products enable human cells to grow and develop as if they were in a natural environment. With material usually called bioink, new tissue structures are created layer by layer in a 3D printer. The goal is to print human organs that can be used for transplants.

"What we managed to do at Cellink was to change the entire industry. From something that was relatively rigid and classic "biotech," to something that is now innovative, exciting and attractive," says Cellink's CEO and founder, Erik Gatenholm.

How good is the life science industry at doing new things in a way no one expected?

"Not so good. The biotech industry is about safety and robust products that offer patient benefits. What is often forgotten is that there are two parts of the life science world. One side is what comes to the patient, which must focus on safety, security and usefulness. The second is the research side, where new technology is used to develop new solutions that may lead to patient benefits and products in the future. We currently find ourselves

in the research world where things are as un-sexy as they possibly can be."

"We want to be a breeze of fresh air in the biotech research world and contribute with a whole new way of commercialising products. Products should look great. They should be incredibly easy to use. And there should be lots of joyful technical support around them. The customer should be just as satisfied with a research product as with a laptop or phone."

How are we in the Gothenburg region and West Sweden with our attitudes to thinking new and daring to tear down the old structures?

"I think Gothenburg is becoming an innovative city. It takes time to change things. Partly because of the industries that have been in Gothenburg earlier. Gothenburg has been a port and manufacturing city, and I think we are trying to make it into a development and innovation city."

"This can only happen if you recruit the best people in the industry and get them to move here. Innovation and cities

1. People are attracted to innovation
2. The life science industry needs to think differently
3. Gothenburg is becoming an innovation city



Erik Gatenholm

Role: CEO at Cellink AB

Background: The School of Business, Economics and Law at the University of Gothenburg. Started Cellink in 2015 as the world's first bioprinting company. On the Forbes list of 30 under 30 (2018) with people who are creating tomorrow's products, methods and materials.

Currently: On a mission to change the life science industry and possibilities for healthcare.

are built by people who have attitudes and who think differently."

At Sahlgrenska Science Park, we usually say that the digitalisation of life science and healthcare is as much of a transformation as self-driving cars. Do you agree with that?

"I absolutely agree. I attend events all over the world and the same theme appears everywhere. That digitalisation takes time and that it is a major transformation. I think it is happening step-by-step. For people who work and live in this industry, changes can seem slow but, in reality, we are moving quite fast now."

As always in major development leaps, there is built-in inertia. Have you noticed this?

"I see that researchers can sometimes be shy or slow to adopt new innovations because they are worried about making changes. We want to make changes. Sometimes you have to provoke development. For example, when you come up with a product that costs less but still gives researchers the opportunity to get to know a new research area."

" With material usually called bioink, new tissue structures are created layer by layer in a 3D printer. "

"It's all about making change painless and daring to test new things. That's how you get rid of inertia."

What risks are common to underestimate when thinking differently in innovation and business development?

"Of course, the risk is that no one adopts the innovation or that the rate of adoption is too slow. Another risk is, of course, the costs associated with the development and introduction of innovations."

"The most important thing that has worked for Cellink is that we don't try to develop new cool technology and then try to sell it to our customers. Instead, we listen first to what customers actually want. Then we develop it for them. In this way, we make sure that what we develop has less risk."

" We want to be a breeze of fresh air in the biotech research world and contribute with a whole new way of commercialising products. "



Leif Johansson:

"I have been preparing my whole life for this"

"There has been a 'plan, concentrate, prioritise rule.' As if little Sweden can only do one thing at a time. AstraZeneca's Chairman, Leif Johansson, wants to see less planning, more action and a higher self-esteem.

TEXT: KENNY GENBORG

"The most important thing coming out of this report is that what is good for the automotive industry is also good for life science and companies like AstraZeneca and Ericsson."

Those were the words of Leif Johansson when he introduced the report "Sector convergence – a significant growth opportunity", at a breakfast meeting at AstraZeneca in the summer of 2019.

The report was made in collaboration between Lindholmen Science Park and Sahlgrenska Science Park and is based on in-depth interviews with leading representatives from more than 20 of the Gothenburg region's largest companies. The conclusions pick up the trend of large traditional industries converging. Connected gadgets, mobility solutions, data analysis – and life science.

"It feels like I have been preparing my whole life for this," said Leif Johansson, referring to his experiences as the former long-time CEO of Volvo Group, chairman at Ericsson, and his current role as chairman at AstraZeneca. With his widespread international experience, Leif Johansson is also passionate about the Gothenburg region's development potential in a global perspective.

You don't believe in focusing on one thing at a time?

"My experience after a long professional life is that it is largely unsuccessful, unless you are putting a man on the moon."

Plan less?

"Plan less. Concentrate less. And prioritise less. But be prepared to put effort into what works. Make sure you create a fertile environment for things that will be really good."

What does such an environment look like?

"Here we are dealing with real cluster formations. I was chairman for six years at IVA (Royal Swedish Academy of Engineering Sciences) and it is very well studied what creates good clusters. It is a combination of large and small companies, academia, for example, a major hospital like we have here in Gothenburg, and an active and supportive community."

"The other thing that is typical of clusters is that they very rarely exist alone in just one sector. What creates a creative environment in a sector where many companies are created is also something that is good for other com-

1. Create environments for innovations to grow
2. Clusters work
3. It is a myth that Sweden is too small



Leif Johansson

Role: Long serving and experienced member of the Swedish business community. Chairman of the Board at AstraZeneca.

Background: CEO of the Volvo Group. Chairman of the Board at Ericsson.

Currently: Sees opportunities as mobility, telecom and life science merge.

panies. A good business environment for some sectors is also very beneficial for other sectors."

So, working alone is no longer strong?

"The larger companies are also beginning to open up. In the past, we tried to do everything ourselves. We were very careful about who we shared information with for competition reasons. Now there is an insight in the other direction. We can't do it all ourselves. Not even Astra-Zeneca with a research budget of 7-8 billion USD. We have to open up to academia and to small and medium size companies, and collaborate between companies."

How has this developed?

"Previously, we had a large share of research for innovative medicines internally, maybe 90 percent. If you now combine acquisitions and collaborations with large and small companies, and add to that collaborations with academia, you end up at a 50% share for in-house research."

What drives innovation?

"How does innovation come about? Why does it turn out good in some organisations but not in others? It is about embracing uncertainty. If you want to know exactly what you are developing, it is about product development. With new innovations, innovative thinking and creativity, it is very much a matter of daring to embrace uncertainty."

Does it work in a traditional corporate culture?

"It is important to link basic research with applications and then not think that it is possible to control innovations linearly. Instead, it becomes a question of how to create an environment in which innovative people work together to make things happen. Having a cup of coffee with people you don't know is the most creative thing you can do."

How does Sweden assert itself?

"It is usually said that Sweden is such a small country when something is to be done here. But when has Sweden

not been a small country? And look at what we have accomplished despite, or because of, us being a small country!"

Same with the Gothenburg region?

"When was Gothenburg not a smaller city in international comparisons? Yet, we have some of the world's largest companies here, and particularly Sweden's largest companies. We are big enough. We are fully capable in Gothenburg to achieve cross-boundary clusters and innovations, to focus on fertile ground and to do things together."

"There is a willingness for cross-talk between different sectors. That is precisely what we want to achieve."



Health meets future technology

At Sahlgrenska Science Park, health meets innovations and future technology. The team are front and centre in the digital transformation; connecting skills in business, healthcare, academia and the West Sweden startup scene.

The mandate comes directly from the University of Gothenburg, Chalmers University of Technology, Region Västra Götaland, the city of Gothenburg and the city of Mölndal.

Activities are based on the needs and ideas that are often born in healthcare, university, research and business.

Sahlgrenska Science Park's innovation environment is ideal for innovators and entrepreneurs running startup companies that they can then develop into a scaleup phase with international expansion and potential synergies with the major, established life science companies.

Some of Europe's most exciting healthtech companies are part of Sahlgrenska Science Park's accelerator program and in the HealthTech Nordic collaboration. They are supported with needs-adapted methodical business development and financing networks.

Sahlgrenska Science Park also offers attractive premises and networks at the heart of the West Sweden life science cluster. In close proximity to the major university hospital in Gothenburg and other skill clusters.

Around 90 companies are part of this cluster environment.

Through Sahlgrenska Science Park's collaboration arena, networks and connections are facilitated with large companies, university and research as well as healthcare and other innovation environments.

Large companies benefit from startup companies' innovation power and are opening up to give smaller companies access to the large companies' resources and networks.

In the collaboration project, Inn2Health, six science parks in West Sweden are collaborating to ensure the needs of healthcare and patients are made clear to the business community. The project contributes to closer links between business and healthcare. The focus is on innovations to facilitate the transformation of healthcare and the convergence of life science, IT and mobility.

Strong owners and a committed board are passionate about creating a vibrant life science infrastructure and valuable links to other major Nordic life science regions.

Sahlgrenska Science Park's mission includes highlighting the major transformation of healthcare and life science. It is changing everyday lives, working lives and lifestyles of people all over the world. This means that West Sweden currently has a unique opportunity to take a leading role in this development.



90

companies in Sahlgrenska Science Park's innovation environment

SAHLGRENKA SCIENCE PARK'S INNOVATION ENVIRONMENT

Innovators and entrepreneurs starting and developing companies come together to generate ideas and satisfy needs. Sahlgrenska Science Park contributes with business development support in the accelerator program, a cluster environment in the business park and networks in the growing collaboration arena with useful links to industry, healthcare, university and research.

Reports from Sahlgrenska Science Park

Life Science West (2016)

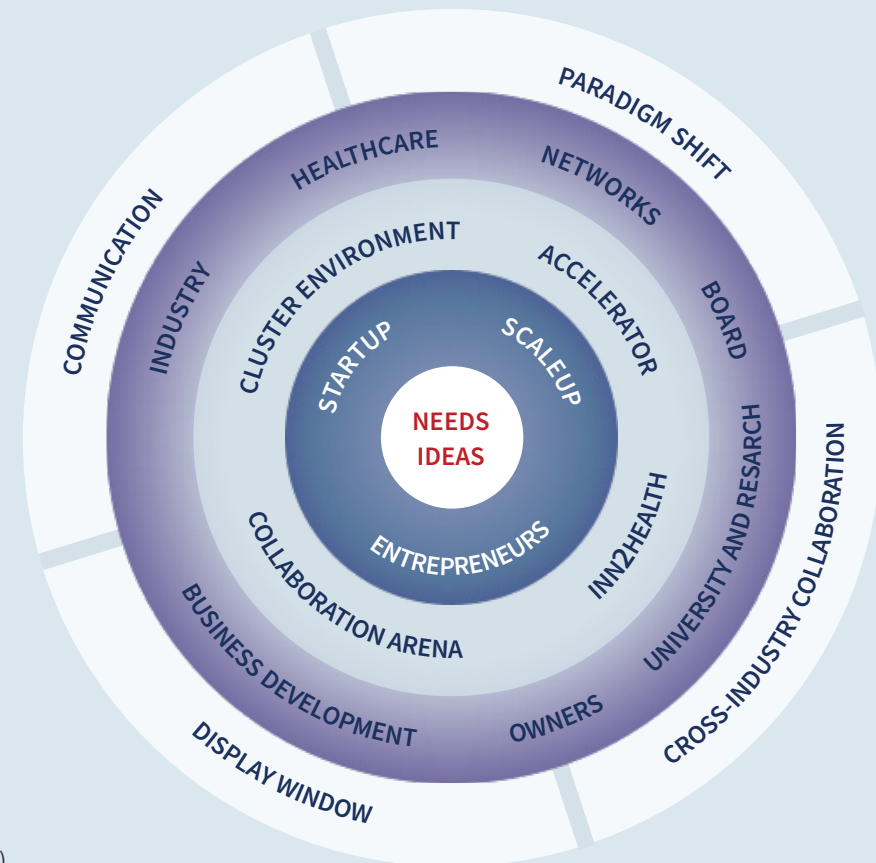
Life Science West (2017)

Artificial intelligence in life science (2018)

The power of coaction (2018)

Sector convergence – a significant growth opportunity (2019)

Download reports and follow the news: www.sahlgrenskasciencepark.se



Strong position in growing
Nordic life science industry

450 life science companies

6 000 people employed within
life science

32% of Sweden's research and
development investments*

#1 at innovation out of
220 EU regions

* private sector



Facts about West Sweden 2019

West Sweden

>6 000 employees

450 life science companies

One of northern Europe's largest university hospitals

>56 000 students

>5 300 university lecturers, PhD students & researchers

>25 000 ICT specialists at >5 300 companies

A strong culture of close collaboration between universities, business and society

World class innovation environments

within ICT, AI, Life science

Increased collaboration between the Life Science, ICT and mobility sectors (ref. report "Sector convergence")

Sahlgrenska Science Park

A neutral innovation arena

98 % occupancy in three buildings with offices and laboratories

Several medical research groups

>3 500 participants in events and networks

Part of HealthTechNordic – one of the world's largest communities for healthtech companies

>100 new companies

>70 companies in business development

>100 MSEK attracted equity to accelerator companies

Arvid Carlsson Award by Sahlgrenska Science Park

14th Park Annual by Sahlgrenska Science Park

Innovations driving the transformation of healthcare

Detects the risk of osteoporosis during a regular visit to the dentist.

BONEPROX

Elderly people with multiple illnesses receive care at home. Better for the individual and better use of society's resources.

CUVIVA

Scans emergency patients' body values in the waiting room without infection-risk, close contact or long waiting times.

DETECTIVIO

Digital tool that helps IBS patients manage gastrointestinal problems. Eases the burden on healthcare.

TUMMYLAB

Photo: Sören Håkanlind

INFORMATION & COMMUNICATION TECHNOLOGY



LIFE SCIENCE



HEALTH TECH

MOBILITY



KNOWLEDGE INSTITUTIONS



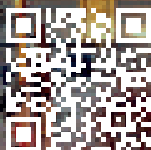
Sahlgrenska Science Park in brief

- Innovation environment with approximately 90 companies
- Direct links to Sahlgrenska University Hospital and Sahlgrenska Academy
- Healthtech accelerator
- Collaboration arena with close links to industry, university and research
- Display window for the West Sweden life science cluster
- Owners: Region Västra Götaland, University of Gothenburg, Chalmers University of Technology, Business Region Gothenburg, City of Mölndal

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