

INTRODUCTION

Can you imagine your first days here at this university?

I vividly remember 35 years ago when I cycled in early September through Groningen, starting to learn the virtues of the verkeerscirculatieplan, having just experienced the first Bommen Berend Kermis and smelling (or not yet?) that distinct scent of the Suikerbieten campagne - which I am sure you know, that is: is that scent still upon you?

I can recall the feeling the a bit sweaty hands - but excited, even if uncomfortably excited!

I can assure you - that anxiety is here again today!

Obviously because of the honour to be speaking here in front of you at the occasion of the opening of the academic year.

But I do have the feeling all the time! [upbeat]

Because technology has the potential to create a better world.

But then - that does NOT happen automatically - and that drives me:

Technology will only help progress society,

- if we can make sure the technology keeps advancing

- if society supports and goes for the changes and chooses the frameworks in which it operates

- and by the degree to which we transform ourselves and our institutions

And that creates many, many questions

So, then - what better place to be then at a **university**....so many questions, where the answers matter enormously.

What I will do next is:

- describe the enormous opportunities and what creates that
- then talk about the 3 main drivers that determine the benefits
- and the questions that leads to

WE ARE THE VERY BEGINNING OF TECHNOLOGY

I define the technology in the benefits it creates ie for the core is that *it changes the world from large-common-denominator solutions to one to one combinations at scale. Or the ability to **do exactly the right thing**, for the right person, at the right location, at the right moment, at the right context, in the right sequence, in the right... etc.*
From being on average right to be always right.

Now why is that possible? What are the drivers behind this?

- = computing power
- + mobility: ability to connect everywhere
- + radical technology

Or differently stated: because everyone and everything is always connected to a supercomputer. Or in Gronings: because you have the datacentre from Eemshaven in your pocket.

And two things will only further accelerate that in the coming years:

- if now 3bn people are online, we expect that to double in the next 5 years.
- Machine Learning, which is: *Think of machine learning as another way to program a computer to **learn** to be clever rather than programming it to **be** clever.*

WHY DOES THAT MATTER?

These developments have the potential to make enormous difference - create enormous benefits. I will give you two examples of how

1- self driving cars

- fewer accidents because it drives better than humans
- enormous productivity gains
- but just imagine what could happen if we all share our mobility plans
- redefining cars to public transport (yellow car, train, OV bike)

Now why does that matter.... [pause]

- did you know that at the busiest moment of the day, 95% of cars stand idle

2- ophthalmologist research with machine learning

Diabetic retinopathy — an eye condition that affects people with diabetes and that creates the risk of blindness — is the fastest growing cause of blindness, with nearly 415 million diabetic patients at risk worldwide. The disease can be treated if detected early, but if not, it can lead to irreversible blindness - but many people live in areas where they cannot get an annual screening.

A Machine learning experiment proved to be of help here:

- a dataset of 128,000 images and used them to train a deep neural network to detect diabetic retinopathy.
 - then that algorithm was applied to another set of images, that had been examined by a panel of board-certified ophthalmologists
 - the algorithm got similar results as the ophthalmologists
- That means, that diagnosis can now take place everywhere - and assist doctors to evaluate more patients and do that faster,

These are just two examples with massive impact: - improving mobility (with a factor of 20?)
- or making state of the art health available to everyone.

But there are endless other examples such as agricultural machines doubling food production by doing the right thing on every cm² versus giving the whole field

OR

Smart fridges together with machine learning reducing unnecessarily throwing away ingredients too soon (right now apparently we throw away 45% of our supermarket purchases).

This is why I feel so excited.

So.... WHAT WILL DETERMINE THE OPPORTUNITY ?

As said before, the extent to which we succeed in capturing these enormous opportunities (which by the way I also feel included dealing and mitigating with the risks and adverse things / disadvantages) lies in 3 things:

- the **progress of technology**,
- the **societal acceptance**
- the ability for everyone to **adjust** and adapt.

It is in these 3 areas that I see the questions coming-up

TECHNOLOGY

- obviously the main driver...the further improvement of technology itself - which depends on many questions to be resolved.

The key things are: step-changing energy sustainability, creating connectivity anywhere and micro-tisation: making technology smaller (and that helps the other two)

SOCIETAL ACCEPTANCE

We believe that technology can only create the benefits if people understand and use it - aka whether there is maatschappelijk draagvlak; frameworks.

Those frameworks will determine the benefits,

- first because of the **room** the technological development will have
- but secondly also will determine the acceptance by everyone.

Let me give you just a few examples of the questions underlying the need for new frameworks:

- doing exactly the right thing depends on the availability of data, of data people are willing to share. The question is: to what extent must that be regulated?
- content can be distributed in new ways: how to balance freedom of speech versus content made for [incitement] - the awful pictures that we have seen of Syria broadcasted by the BBC are intended to inform, but that same content can also be intended for different purposes. How to set rules for that?

Three remarks on these frameworks:

1- This clearly has to do with policies and laws: our regulations were created in different times and need to be adjusted.

But it is not only about that, it is also about choosing consciously how we want our society to look like. For instance, should we be happy that our children are glued to their 7' screens and sometimes more easily reached through whatsapp? (sorry: that apparently needed to be said) But seriously: how can we make sure that the new technologies actually build our society - what kind of afspraken do we need to make for we behave towards each other up in a family or student house (I hope: no phones during a meal!) up until discussing the the ethical discussions around health technologies.

2- Furthermore, I want to note that this is not a plea to just create the room for technological development, on the contrary - our belief is that technology can only create the benefits if people understand and support it.

To give an example of what I mean: at Google we have great services that can help you everyday life - but will only do so if you are ok with that (and have let us know).

It is exactly for that reason that we have our privacy dashboard - who of you have used that?

Through that dashboard you can determine exactly

So the question is very much: how do we balance the opportunity for technology versus societal acceptance.

3- We think that it is absolutely crucial that these questions are debated in full.

That debate should not only focus on the risks they provide but in full evaluation of all the pros and cons and then in public fora decide a course of action for a desired society.

My opinion is that the key perspective here is that the technology is inclusive: doing good, involving everyone and empower people.

I believe that that the university should play a key role in creating the right frameworks: providing insights and show the tradeoffs, and thus facilitating a well informed debate.

ADAPTATION

That brings me to the third factor that will determine how will we succeed in capturing the benefits of technology and that is adaptability, our competence to adjust.

Technology creates this 1-2-1 combinations at scale, the relations are more specific and more numerous - and also something new can find it's way faster then before.

The impact of that is that there is more change, and the pace of change is faster.

Now even if change is van alle tijden (or: the only constant is change), the fact that the pace of change is faster, means we need to adjust more often and therefore our competence to adapt (aanpassingsvermogen) will be a crucial factor

And that is true at organisational/institutional level but also our individuals.

Now that raises two kinds of questions: do our current ways of doing things are still valid? And how can we promote this competence everywhere?

Let me give an example: when I started working an innovation would be brought to the market in the following way: idea, desk research, market research, concept development and testing - and then: bit launch (leading to either success or failure) - this could easily take a few years... But clearly that no longer works.. because markets change so fast so you now see that very early ideas are immediately brought to market, co-created etc. Or in Dutch: doen is het nieuwe denken. How do companies need to change to make that happen?

Or for instance the impact on and economic policy. What I see happening is that the economy becomes more specialised (bijzonderder): because the lower cost of information, demand can be more specific and hence supply.

That becomes apparent in the fact that SMEs/SMBs take a larger share of GDP.

And that raises many questions on economic policy:

- does the more fragmented economic structure make the system more robust for shocks as the costs of mistakes are less?
- to what extent / or what type economic policies still influence macro development in this landscape?
- are vertical / sector-based policies still viable versus generic, facilitating measures?
- what will jobs look like and what is then the best way to promote employment?

Apart from changes to our current ways of working, the other question is around strengthening our competence to adapt. What rigidities have we now in place that actually slow adjustment? What can education do to increase the power to adapt?

For instance, I do not always see a culture in the Netherlands that embraces change: eerst zien,

dan geloven - and when goes wrong the knee-jerk reaction is not to find who to blame (whereas clearly, when dealing with the future, not everything will go right....

What can we do to change the culture where we embrace change, and where making mistakes is accepted? Or as we say: if not enough fails, then we have not tried hard enough.

Again, I think the university can play a key role in researching what can increase our ability to adapt and come up with insights that help to do so.

WHAT DOES THIS ALL MEAN FOR STUDENTS?

And that brings me also to what it means for your careers, in particular for all of you who are students here.

I believe that the above things will have an impact on everything: every sector, every discipline, every country - the opportunity to come to much better solutions because of doing exactly the right thing.

And yes, maybe the career lines are less clear, but I believe the opportunities are much broader - because it is less clear.

And I believe a few things will be true: this is a world where everything can start everywhere....and then be used by the whole world. Which will be less and less governed by standards, but where the specialty (bijzonderheid) will be key.

So what can YOU do to best prepare for that? I would recommend: learn to be curious, learn how to research and learn to learn.

And that can best be done, by using your time here to study with all your heart and find your passion.

(which by the way is also my advice for the non-study time... that should be done with similar intensity! - but that is probably less necessary to say).

And then onwards: stay curious always, go for it - try things, think big, and continue to always learn.

CLOSE

I am genuinely excited and optimistic of the time that we live in where we can really make a difference to the key challenges our time: climate (and everything that comes with that), health, ageing, mobility etc etc

But as said: it does not come automatically. I believe in NL we are very well positioned for this world, but it will depend to a large extent

- on the quality of the debate--if we don't have reasoned debate, we may risk regulating this future out of existence (ie let not the risks prevail)
- through that the choices we can have as individuals
- and then the determination to make the changes and go for it.

For all of that - I see vital role for academia, for this university: so many questions, where the answers matter a lot.

I hope that at this point you share my 'uncomfortable excitement' for 'what's next' ... and even more so that you all can't wait as I do to 'get on with it' either as a bachelor or master student, doing research or providing education...

What a great time to be here and study - and I wish you a very productive academic year - there is a clear need for your work.