

# Yuri Sebregts responses to executive interview questions of Götz Wehberg

## Your Role

- **Götz:** Can you explain your role as CTO to us in this context, ie what is your role in respect to Digitalisation? What excites you most?

**Yuri:** As CTO I lead the technology organization of the Shell Group<sup>1</sup>. This is an organization of 3800 amazing people based in our technology and digital hubs in Houston, Amsterdam, London and Bangalore and in satellite offices in Rio, Boston, Hamburg and Shanghai. I have the privilege to work with the team every day on three main areas. Firstly, we perform the research and development for Shell as well as the associated high-end technical IT. Secondly, we perform advanced technical troubleshooting for our assets and projects and conduct concept phase project scoping. Finally, we run Shell's external Catalysts and Technologies business. Nowadays, many technology solutions require full integration of digital and physical technologies, and that is why in Shell we have chosen to make our digital Centre of Expertise (CoE) organization part of the technology organization. This CoE is a group of some 350 experts in advanced analytics, AI and machine learning, IoT, robotics, computational science, blockchain, chatbots, digital realities and additive manufacturing. Naturally, the CoE team works closely with thousands of people in our IT organization and with teams in Shell's Projects & Technology organization and the Shell Upstream, Integrated Gas, Downstream and New Energies businesses to digitalise our customer offers and our operations.

## Transparency

- **Götz:** In how far data enabled transparency of business operations is a critical enabler for you to stay on top of your business?

**Yuri:** Strong process and data management has been the backbone of outstanding customer service and efficient internal operations for decades. New analytics tools powered by exponentially faster data access and compute capabilities bring this into a new era.

- **Götz:** Can you give us examples, how Shell is using new digital technologies to increase insights at overall network (e.g. cross business value chains, on an intersite, and intrasite level)?

**Yuri:** One example is that we have now started to use advanced data analytics to tailor customer loyalty offers to an individual customer's preferences. We have seen that this is making their experience in doing business with Shell even more rewarding.

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<sup>1</sup> The companies in which Royal Dutch Shell plc directly and indirectly owns investments are separate entities. In this executive interview the expression "Shell" is sometimes used for convenience where references are made to those entities individually or collectively. Likewise, the words "we", "us" and "our" are also used to refer to Shell companies in general or those who work for them. These expressions are also used where no useful purpose is served by identifying specific companies.

Another example is how we can now integrate project engineering design for large capital projects such as chemical manufacturing plants or deepwater wells with procurement, inspection and verification using remote visualization and blockchain technology.

- **Götz:** How do you see the role of a CTO vs CDO/CIO in this context?

The leader of our digital CoE organisation who is de-facto our Chief Digital Officer reports to the CTO in Shell, as do the other technology development groups. We work very closely together with the IT organisation led by the CIO. They provide the data and platform architecture, cloud compute, market standard systems that nowadays often come with certain AI capabilities embedded. They also make sure only authorised people have access. We develop the use cases together with the Shell businesses, build proprietary and competitive applications that market standard systems do not provide, and take care of integration of the digital component with other aspects of the technology. These include, amongst many others, geology and geophysics for our seismic interpretation and reservoir models, and process engineering for the advanced process control strategies for our proprietary chemical processes.

### Data driven operations

- **Götz:** From your standpoint, in how far new digital technologies are changing operations, e.g. in upstream, downstream, chemicals and trading?

**Yuri:** In our operations we are on a new S-curve driving operating efficiencies to the next level. Advanced algorithms can find more optimal operating points improving yield, energy efficiency, lead time and stock levels and many other operating parameters, and also monitor and predict equipment performance better than humans do. And mobile devices can bring data and insights to the people in the field that were previously only available in central engineering offices. Even more transformative however are new ways of engaging with our customers, thereby enabling new business models.

- **Götz:** Can you give us some examples where you think Shell is quite advanced (e.g. analytics in predictive maintenance, IoT for manufacturing, supply chain resilience, autonomy / self-organization, ...) in this context?

**Yuri:** Two examples where we are doing really well is in machine learning to auto-build predictive maintenance algorithms, and in advanced analytics to optimise our hydrocarbon field developments. For instance, we have more than 10,000 complex predictive maintenance algorithms operational that are monitoring a much larger number of key equipment than remote operating centers can do based on traditional engineering limits.

- **Götz:** In which areas would like to see more pace for Shell?

**Yuri:** A challenge for any existing business that was not originally built “digitally” is the migration from its legacy IT and data landscape to the new data access structures that unlock agility in development and rapid scaling and deployment. We are making great progress, but prudent management of capacity and affordability means that this is usually the factor that sets the pace.

## Digital business models

- **Götz:** What is your approach to develop new digital business models at Shell?

**Yuri:** At Shell, we have found that what works well is to try things out at a small scale with real customers and learn from the customer experience with a focus on iterative improvement before scaling up. For digitalisation of our internal core operations it starts with selectively choosing a few key performance metrics that have the greatest impact, and focus resource on scaling up in those areas to prevent fragmentation of effort.

- **Götz:** Can you explain to us examples what Shell is doing and are what are the key considerations to create competitive advantage in in this respect?

**Yuri:** We make sure we deeply understand the technologies at play, which helps us identify the best technology partners to work with. This is an important area of our business growth opportunity, so we make sure not to “blindly” outsource the development of it. Next to this we focus our best in-house resources on differentiating capability to integrate our domain knowledge in energy and chemicals with digital technologies. It is at this unique interface of physical sciences and engineering with digital technology where we can best create competitive advantage.

- **Götz:** New digital trends and technologies are often linked to start-ups who seem sometimes to be able to act with lightning speed. For example, Shell has the Gamechanger programme to stay connected to this world. How do you really leverage the energy and entrepreneurship of “start-ups” at Shell?

**Yuri:** Our Gamechanger team works with very early stage start-ups, where a start-up has a really innovative idea, but it is not proven yet, and it is not quite sure how to develop it into a practical and commercial proposition. Shell, through the Gamechanger program, can offer some seed funding, and more importantly mentoring and coaching during those early steps in building a new company. Once a startup is more mature, the idea is proven and it has a capable management team in place, Shell Ventures could invest in the startup. This team can often help them grow, and make the connections with other parts of Shell for implementation of the new idea in our operations.

- **Götz:** New digital technologies are challenging traditional business models heavily. How do you see the role of a CTO in developing these? Can you give us an example?

**Yuri:** The CTO does not have the sole mandate of being innovative in the company. All Shell business leaders are innovative and look for new ideas to improve their operations and grow their business. Neither does the CTO have the unique capability to be creative. Our technology organisation that I have the privilege to lead is full of creative people. It supports business leaders in all parts of Shell with realising the innovative business models through technology solutions, as well as offering new ideas and suggestions. What is more unique about the CTO role is having the time and Shell funds to develop ideas for the medium and longer term that would not make the prioritisation cut in the businesses due to the lead time to deployment, or lack of familiarity. For example, we can work on new energy storage solutions that will be critical to deal with the intermittency challenge of renewable energy sources. But that are years away from being deployment-ready. Often such solutions have digital components. When they are ready they will drive transformational new business models and growth opportunities.

## Enablers/barriers

- **Götz:** What are focus areas for Shell in deploying digitalisation and how would you see the overall way of implementation with respect to key enablers and barriers?

**Yuri:** We focus on getting our architecture right and protecting our proprietary data as a key source of competitive advantage. We also focus on developing advanced in-house capability of sufficient scale in combination with strong partnerships. And lastly, we focus on making sure the use cases and business models are “owned” by the Shell businesses so that they are integral to their strategies.

- **Götz:** How does Shell manage the transition of its workforce towards digitalisation?

**Yuri:** We hold our most advanced digital capability in the digital CoE organisation to work on the breakthrough and most valuable opportunities. This part of Shell also helps to upskill the rest of the organisation through participation in hackathons where they practice the application of new tools to real business opportunities, through online training modules, building extended community of practice, and making standard platforms and replicable code available. Thousands of people working in Shell use digital tools routinely and this community continues to grow fast.

- **Götz:** From your perspective, what is Shell doing differently to its competitors as to building prerequisites or developing these enablers?

**Yuri:** I believe the true competitive advantage does not lie in the choices of what to do, but in building the capability to actually do it. I see most competitors announce similar initiatives around predictive maintenance, subsurface interpretation tools, business process automation etc. We were early in embarking on this journey and that makes us one of the leaders in the industry in terms of in-house capability and actual deployments. We need to keep developing and implementing rapidly though, as this is a fast-moving field of technology, and a lead position is easily lost if focus and urgency is lost. We don't intend to let that happen.

- **Götz:** Thank you so much, Yuri, for this excellent insights and interesting executive interview.