

BAYER'S LAB OF THE FUTURE APPROACH



SEBASTIAN CHRIST, Digital Lab Consultant, Bayer

Sebastian Christ joined Bayer company in 2010 to learn the profession of a chemical lab technician in a 3 years apprenticeship. After completion he specialized on organic chemistry and worked on different cardiovascular projects. Already during his medicinal chemistry activities, Sebastian Christ has been involved in approaches to improve IT-Lab workflows. In June 2018 he changed to IT Business Partner department to focus on the design and development of the "Lab of the Future" together with colleagues from Chemistry and IT. Since then IoT, new technologies and methods + FAIR data have become important topics to keep track of.

Why is there such a big push towards digital labs in 2019?

The big push to digital labs is clearly because the pharma companies see clear potential in digitalised laboratories. It's about collecting more data, with Structured Data being the key word, because you can make great use of this data with for example, AI. Somehow you need to lay the foundation for it and that comes out of the laboratories where you are executing all the experiments. You need data from the lab devices and you need well-structured data out of your ELN system, which is documented by the lab technicians. When you have all this data at hand, you can apply a smart algorithm / machine learning to then help the Lab Heads with better predictions; for example a very good target compound or lead structure for rare disease. Right now, every scientist must make decisions based on his own experiments without any digital

support. What the companies really want to achieve is that you have digital support to reduce the time you need to spend, or you need to invest to find a new target compound. If we can achieve that, it does not only help the companies, but also, a lot of patients.

What will be the main opportunities in this area?

This is a difficult question, because first of all, we have to say that laboratories are really diverse: analytical laboratories, chemical and non-chemical laboratories. You can create an opportunity for every laboratory, but you have to really all look at it separately, in terms of what you have. Or what do you need to do to really get potential out of those laboratories and laboratory workflows. Once you have evaluated that, then you have created an opportunity. You are able to provide structured data, which means not

only chemical data, like the temperature profile of the experiment, or the outcome of an experiment, but also that you combine this data with data coming from the biology labs, so that you have this reference for the data. When you have all of this at hand, then you have a huge opportunity to apply AI to the whole data.

What recurring challenges do you see in this space currently?

Big challenges are, of course, the current laboratory landscapes, as well as the new technologies, which are coming to new modernised laboratories. You will have specialized areas in your company, which will work with the new modern technology. There, it might be easier to connect this to your IT systems and where you already get all the structured data, without doing a lot of stuff to really make the data structured. However, you will still have a lot of laboratories, that with old lab devices and also have old equipment simply because it works. There is no reason to really modernise those laboratories. It's therefore a big challenge to combine the old world with the new world and align both worlds to one system, that works for the whole company.

Are you partnering with any other companies as well?

Partially we are developing systems in house, but we also cooperate with partners, for example, with Labforward. They support us, for example, in IoT technology, which we use to connect lab devices, especially the old lab devices. Bayer is not a software developer itself; for special reasons, we have in house developed software. But we are also looking for partners to really achieve a good infrastructure and architecture.

You recently spoke at our PharmaTec

series. What were the three top takeaways from your presentation?

The top three takeaways of my presentation would be that you definitely must manage the expectations of AI carefully. That you also need to go in small steps, but you have to think really big when it comes to lab digitalisation. My third takeaway would be really to never rest. Always think big, because when you're designing the lab of the future, there is no end point, there will always be a lab of the future. So don't rest, always look what else could be possible.

When we talk about smart labs, and digital labs, are we talking about exactly the same kind of laboratory: a laboratory that is ready for the future?

I would say there is a difference. So when we say smart labs, that really means that you have a connection to all your devices, so that they can communicate with each other. But when we're talking about the digital lab, it's so much more than just the smart lab, because it's not only making use of your lab device data, but it's all also about how data can be connected with other platforms that have nothing to do with the laboratory itself or to allow other people in the company to make use of the data too.

What do you see as the main areas of growth in digital labs in the future?

The main areas would be definitely within research laboratories, because I think there's a lot of unused potential. However you must also ask what support can be delivered to the colleagues who work in a GxP regulated environment. Right now, it is hard to answer that question, but I think there is a lot of potential in regards to GxP laboratories. This will stay an important laboratory field for the future.