

# The *dual transition*

The path to a digital and sustainable economy



# Executive conversations with...



**BIJOY SAGAR**

EVP and Chief Information  
Technology and Digital  
Transformation Officer

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**Bayer**



# ADDING LIFE TO DIGITAL TECHNOLOGIES

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Bayer AG is a leading German multinational pharmaceutical and biotechnology company. In 2023, the group reported a revenue of €47.64 billion, approximately half of which came from the crop sciences division. The company has set a target of becoming climate neutral at all its sites (Scope 1 & 2) by 2030, and net-zero green-house gas across the entire value chain (including Scope 3) by 2050 or earlier.

*Bijoy Sagar is executive vice president (EVP) and chief information technology and digital transformation officer (CIDO) of Bayer. Bijoy has more than 20 years of experience in the healthcare sector and chemicals industry. Prior to joining Bayer, he served as the chief digital technology officer and CIO of Stryker, a leading medical technology company, where he was also a member of the executive team.*

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### PARADIGM SHIFT

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#### How do you see the digital economy developing in the coming decade?

We will see a maturation process. For example, in the past decade cloud made scaling possible, while in this decade it's more about AI. With the reduced cost of computing and greater availability of data, more businesses will get off the ground, and more cash will be invested and also harvested from the processes.

It is difficult to predict which technologies will be adopted. Blockchain was heavily touted in the past decade, but it did not come to fruition as predicted. In contrast, generative pre-trained transformers (GPT) and generative AI have unexpectedly blown up in a short time.



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**UNLOCKING NEW VALUE**

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**How do you see the business model at Bayer changing with the adoption and scaling of digital technologies? Which untapped sources of value can these bring to your business?**

Our business model has already changed quite a bit. For example, the entire process of large-scale agriculture, encompassing crop planning, protection, planting, yield, etc., is already highly digitalized. Our crop science farming business uses drones to cover 80 million acres, collecting a significant amount of data. We have access to our own satellite data, enabling us to predict within one square meter the moisture level and composition of soil. We use this data in our algorithms to help in the crop-planting process.

Pharma has already gone to market with Calantic, an AI-based radiology solution, which helps physicians simultaneously analyze radiology data and make disease determinations. This helps maximize the benefit to the end-customer and the radiologist.

On the consumer health side, it will be more about behavioral context, targeted advertising, and customized message creation for the customer. In pharma, it will be largely in research and development. We already have a high TPU (tensor processing unit) quantum computing project going on with Google, for example.



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DIFFERENT SOURCES OF VALUE FROM DIGITALIZATION

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**How does Bayer define ROI when it comes to digital initiatives?**

At Bayer, rather than assessing cumulative value to the business, we look at value per project or per investment. This is because we are neither a purely digital business nor do we digitalize the entire value chain. Rather, we look at individual business cases where we know what the value of digitalizing is from short-term, medium-term, and long-term perspectives.

We evaluate whether an innovation could make a slight improvement or a fundamental change to the business. So, the initial business cases are more about where we can actually prove some return on investment.

We need to make sure that we are investing for maximum value. We can't take on too many good-looking 'cottage projects,' because, ultimately, value only comes with scale. We aim to create sufficient value to become self-sustaining.



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However, some technologies have become commoditized. For example, if we decide not to use cloud, we need to have very clear justification for that. It is now table stakes, and everything new is going directly to cloud. On the flip side, cloud also means increased data consumption. Hence, even though the unit cost of compute has come down, the total cost has gone up. This needs to be balanced.

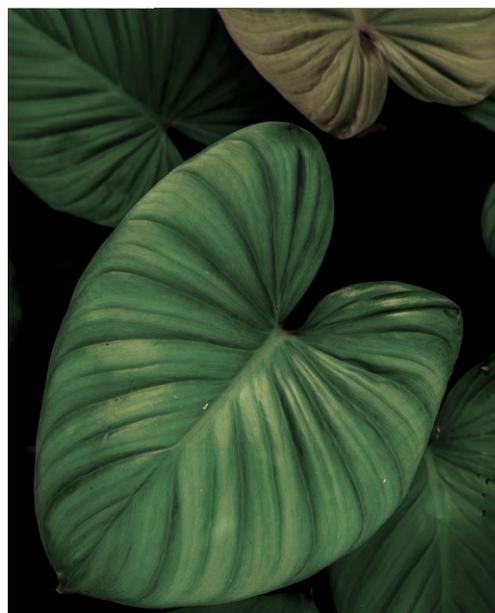
We are a science-based business, and our use of cloud has evolved greatly. Drug discovery and crop science are very innovation-intensive businesses, which means high-cost early-phase development. Owing to cloud technology, much of drug discovery is now going to be *in silico* (i.e., on the computer), instead of *in vivo* (in living organisms) or *in vitro* (in glass laboratory containers). This is a complete game changer, since *in silico* allows experimentation in a much wider range of scenarios than was possible physically in the laboratory or the field. That is where we anticipate that we will generate value.

**In coming years, which are some of the key technologies that you are likely to invest in?**

We are already investing significantly in machine learning (ML) and cloud, and this will be ongoing. High-throughput computing (HTC) will be a priority. Generative AI is going to be a big target for investment as well, particularly

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## Executive Conversations

multimedia/image-based AI.

Digital twinning is another area of focus. Creating digital twins of drug molecules and tracking them has already become an integral part of pharmaceutical development.

Crop science is another avenue for digital twin. Both computer vision and augmented reality (AR) will play a big role in the way we manufacture.

We are doing a lot of 'arm's-length' investments in areas where we feel it is still early days. For example, cell and gene therapies, which are going to be very much high *in silico* business models. We may enter e-commerce in consumer health, which is more about personalized medicine and product choices. 5G has the potential to help facilitate and build a better connection with farmers.

We are also investing in using data in new ways. We have already announced an open-platform marketplace that we are building with Microsoft, where data can be shared in ways where everybody's data is protected, but the value is still created by the behaviors happening there.



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**VALUE CREATION THROUGH GENERATIVE AI**

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**What value can AI create for the healthcare and agriculture sectors?**

The next decade is truly going to be the decade of AI, especially of text-based AI. At Bayer, we are investing heavily in image-based and other forms of AI. However, text-based AI is going to become embedded in everything we do, and I expect this to change the way we structure processes, conduct searches, and create documentation.

There are endless AI use cases with potential, from crop science to pharma, whether it comes to growers; modeling risk for physicians to provide the right recommendations; or targeting the right patient population for diseases and helping them through the process of disease progression and management.

We believe that AI is going to speed up research and development. With Bing adopting generative AI directly into its browser, we will obviously be deploying the technology extensively.

I believe generative AI will be complementary, and not supplementary, in people-based services because human judgment and oversight will still be required. Maybe 20 years from now, generative AI will have evolved sufficiently to require less human intervention, but I do not see it happening in the next decade.



**"Text-based AI is going to become embedded in everything we do."**

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TECHNOLOGY FOR SUSTAINABILITY

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**How are you harnessing technology to drive progress towards your sustainability goals?**

By 2050, we want to have met net zero targets across the value chain in greenhouse gas (GHG) emissions. More urgently, we aim to reduce value-chain GHG emission by 6% by 2024. This means looking at the entire supply chain, including both primary and secondary suppliers. Sustainability goals will work only if everybody in the ecosystem works on them together.

We use computing in three different ways to fully understand the impacts on our gas emissions:

- To continue to monitor and meet sustainability goals
- To help our customers achieve sustainability goals, as well as building sustainability into business models, such as carbon capture and storage
- To analyze our supply chain in near-real-time, enabling whole-ecosystem compliance for a sustainable future

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