



# DIAGNOSTICS REIMAGINED

## Convergence of imaging and molecular diagnostics driven by Big Data and AI – who will be the catalyst for data integration?

This “Market Pulse Check” provides investors with our key conclusions, based on a compass event on diagnostics we held in June 2018. At the event, we hosted a number of promising companies and high-profile speakers from the innovative diagnostics field. Although this is a critical part of the healthcare sector, it is no secret that in recent years it has been far from the most attractive part of the wider healthcare market for investment. The main reasons cited for this were the invisible reimbursement metric, and complex user modalities.

Despite a whole host of remarkable technical innovations, the innovative diagnostics industry remains in a difficult place. Expensive commercial scale-up models have all too often met with only modest success. There is fierce competition from a growing number of innovators in diagnostics. Adding to the challenges are the limited nature of hospital and community care budgets, and the lack of an integrated user platform.

In addition, the business model in imaging diagnostics – selling high-end technology and providing maintenance services – is no longer a major differentiator in the market, largely driven by a saturation of the technologies provided and their impact on improved medical diagnostics. For example, MRI equipment with magnetic fields of about 7 tesla might produce better images than machines whose fields are less strong, but they only improve marginally the capabilities of radiologists in providing a diagnosis. Rather, AI is the key to bringing imaging diagnostics up to the next level.

All the players in the imaging diagnostics field are now making a push into AI in order to stay competitive. The situation is comparable with the computer industry in the mid-1980s, where flagship hardware company IBM lost its leading position to software providers such as Microsoft and

Oracle. In imaging diagnostics, established players will want to avoid something similar happening in their sector.

Access to Big Data is necessary for effective AI, but it still represents a bottleneck within the diagnostics industry in the absence of a common large-scale data platform. Established players have started to set up platforms based on their own equipment and technology, but we are still a long way from a common standard being implemented.

In the molecular diagnostics field, integration is also a key topic. If large sets of patient data from different diagnostic modalities and multi-omics can be consolidated, they could provide “panels” to clinical decision makers. These range from tumour boards in hospitals to practitioners who triage patients in A&E departments, and even clinical investigators stratifying patients before enrolling them in clinical trials.

Several innovative technologies in molecular diagnostics are now attempting to take advantage of Big Data and AI, such as next-gen sequencing and digital pathology.

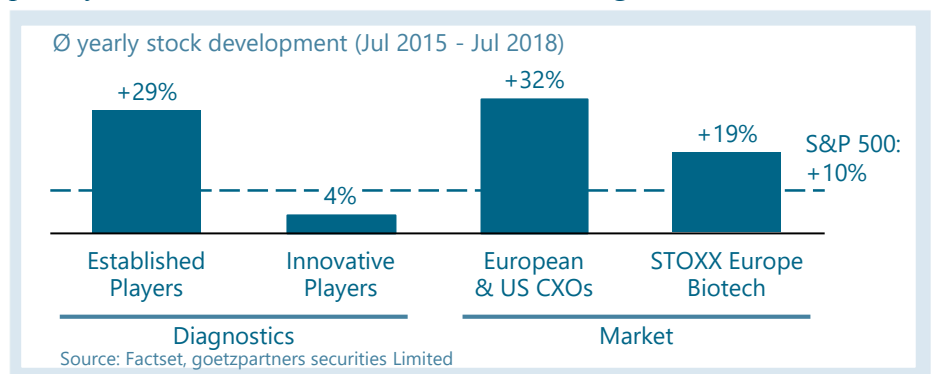
*There is fierce competition from a growing number of innovators in diagnostics. Limited hospital and community care budgets and the lack of an integrated user platform add to the challenges.*



**Martin Bruninger** Managing Director  
**Ulrich Kinzel** Managing Director  
**Günther Schermer** Partner

## DIAGNOSTIC SECTOR PERFORMANCE

*Recently, innovative diagnostics has been far from the most attractive part of the healthcare market – established diagnostics has done well*



A major challenge, however, is posed by the absence of a common data format or consolidated dataset. The future of all such technologies will rely on these becoming available, as well as on the emergence of “curators” that combine and integrate the data to allow a consolidated interpretation of a patient’s data to support the decisions of practitioners.

But who will push the implementation of a common data standard or platform? Should it be the responsibility of the regulators? Will white knights outside the diagnostics industry (google, Amazon, ...) be able to drive this initiative forward? In other words, do we need vendor neutral system integrators? The other thinkable scenario might be that the three main machine vendors (Siemens, Philips and GE) divide the market and form an oligopoly of integrators.

In any case, imaging and molecular diagnostics are at the start of a significant journey of transformation.

## “THE DIAGNOSIS”



## MARKET VOICES at the compass event

### Molecular Diagnostics creates value from Big Data

At our compass event panellists shared insights on the consolidation of molecular imaging diagnostics and artificial intelligence. We discussed the implications of functional and molecular imaging, and also non-invasive in vivo characterisation of disease, for reducing costs and improving population health. The panel considered the dawn of radiogenomics, and how it might be used for information optimisation by facilitating the progression from image generation to diagnosis. While AI-aided solutions in imaging are currently limited to specific cases, the field is transforming, and progress is likely to be rapid.

**Telix Pharmaceuticals** outlined its approach for molecular-targeted radiation, and discussed the importance of the digitalisation of molecular imaging to improve decision support. The combination of diagnostics and therapy is going to be critical in future approaches to cancer therapy. Another company, **Blueprint Genetics**, reviewed the importance of data analysis in healthcare today, where data collection exceeds current processing capabilities.

**Bestway**, a Chinese hospital operator with an emphasis on women’s health and oncology, discussed various diagnostic modalities and their importance for the early diagnosis of breast cancer in China, and what early diagnosis means for treatment decision-making. **Curetis**, whose cutting-edge technology offers an accelerated diagnostic process for hospital acquired infections, pointed out that current microbiology practice is slow and ineffective. It relies on out-dated concepts, and represents a limiting factor in the fight against the growing burden of antimicrobial resistance. **Definiens**, meanwhile, discussed the power of tissue phenomics in optimising treatment decisions by combining tissue data with multi-omics data.

### Imaging Diagnostics fosters a new wave of innovation from data integration

**Siemens Healthineers** shared their views on the importance of imaging for screening, diagnosis and therapy to ensure the best patient outcome at the lowest possible risk. The availability of rapid and reliable imaging information facilitates the decision-making process for optimal treatment, reducing both unnecessary intervention and indirect costs. The panel further discussed the growing importance of deep learning technology in localising and characterising lesions through imaging rather than physical biopsies. The result is enhanced diagnostic precision across the board, and especially for less experienced prostate readers.

**Neusoft Medical Systems**, a global provider of medical equipment and services, outlined the increasing importance of cloud-based approaches for location-independent, on-demand access to patient information. It promotes a more integrated and accurate approach to diagnosis, while improving process efficiency and flexibility. **Medneo**, a radiology service provider, presented a different approach to process integration by explaining how imaging service providers can improve diagnostic efficiency by maximising capacity utilisation.

**Mauna Kea Technologies**, which develops digital in vivo endomicroscopy solutions, discussed how technical advancements in imaging modalities can improve a physician’s decision making. Better patient outcomes can be achieved if more accurate, less invasive diagnostic methods are used. The panel also pointed out that rapid improvements in imaging technology benefit the field of diagnostics, but also facilitate treatment. One example is its combination with robotic surgery, a field that is anticipated to see accelerated growth in years to come.

## CATALYSTS FOR DATA INTEGRATION?

