DIGITIZATION Your path to Digital Pathology



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How to equip your pathology for the future with digital diagnostics

By the use of digital diagnostics Pathology is becoming more efficient and reproducible. It improves and accelerates patient care, especially regarding the rapidly increasing case numbers, biomarkers and, at the same time, decreasing number of pathologists – resulting in constant or even decreasing personnel capacities.

Regarding this, digitization is a really crucial factor as it results in simplifications and improvements that offer enormous advantages for diagnostics: a logistically more efficient case distribution, reduction of error rate, and improved communication with colleagues through telemedicine.

The possibility of using Artificial Intelligence (AI) is really exciting. Humans and AI have complementary strengths: Humans have contextual knowledge; AI can perform simple tasks without losing concentration. In this way, the pathologist and AI accomplish more than possible for each alone. The AI supports the pathologist, who still remains in the driver's seat.

But digital diagnostics offers even more valuable functions that you can use to improve your success:

- Involve colleagues at other sites in routine diagnostics
- More effective workflows in the laboratory, which reduce errors
- Fast diagnoses via screen in a healthier and more comfortable posture
- Clear organization of daily cases and allocation to individual doctors in the institute
- Multiple availabilities and easy to manage distribution of slides

With the help of digital diagnostics you can also easily optimize other processes in the laboratory. On the following pages, you will learn how.



Martin Weihrauch, M. D, Management Board and Head of Product Development Smart In Media/ Hemato-Oncologist

ADDED VALUE OF DIGITAL DIAGNOSTICS

I am interested in Digital Pathology, but what is the added value for me? I am very fast and efficient with my microscope and glass slides!

> Digital Pathology saves time, reduces costs, and increases quality in pathology in various situations.

Even with a small investment, physicians and medical assistants at off-site locations or frozen section sites can exchange information about a case digitally – thus in real-time – with specialist colleagues.

Microscopes can be converted to digital diagnostics by using microscope digitizers and a corresponding image management system. In this way, pathologists save time, as digital microscopy can be faster than using a standard microscope nowadays.

EASY ENTRY

How do I start small and inexpensive e.g. with the digitization of frozen sections?

> You already have everything on-site at your institute for this scenario: a microscope and a computer with internet access are certainly available at your frozen sectioning station.

For the first steps into digital diagnostics, we equip your microscope with a high-speed camera and your computer with our PathoZoom® Scan & LiveView software. This robust system is immediately ready for use: You can scan on your own microscope.

Physicians and MTAs at the frozen section station can connect to you immediately with this starter package, without having to install any software since everything runs via the browser on your PC/laptop, tablet or smartphone. With any of these devices, you see the same thing at your workstation, at home or on the road that your co-workers see on the microscope in the lab!



What else can I do with PathoZoom[®] Scan & LiveView?

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With this package, you can also digitally scan slides manually on your microscope – at exactly the same resolution as an expensive scanner. You are able to share the digitized slides with colleagues within seconds via PathoZoom[®] SlideCloud, an image storage space reserved especially for you – simply with a link via email or messenger.

You get the whole thing for less than \$ 17,000!

By the way, PathoZoom® Scan & LiveView are installed on hundreds of microscopes worldwide. This improves communication among pathologists enormously, including many colleagues who are diagnosing at this moment!

FULL DIGITIZATION

Ok, get it: With PathoZoom[®] Scan & LiveView I can instantly bring individual microscopes online and digitize individual slides.

STOP!

But I want to go further with digitization and diagnose complete cases without a microscope. I also have colleagues who prefer to work from home; we don't want to drive microscopes and specimen folders around for this.

We have the perfect solution for this....

PATHWAY – STEP BY STEP

Before I modify anything, I want to say that I can't change my whole lab overnight. Besides, I am not ready to invest big money in a system that I am not sure of of!

> This is understandable. Pathologists that successfully digitize are changing their processes step by step with our guidance. We recommend buying or renting the minimum equipment to start.



This allows you to test digital diagnostics at your own pace and avoid high initial investments. In addition, the field of Digital Pathology is currently in the fast lane: Equipment and systems that you buy today may be obsolete tomorrow.

Also, one lab technician and one physician should start working with the system first, not the entire staff right away. In this way, you can digitize the workflow in your institute step by step in a deliberate way and bring your experience to the next stage of the transition.

In summary:

Digitization is most successful done step by step. Depending on your needs, you can linger on one of the steps, go back or move forward.

You already have ...

• a Laboratory Information System (LIS)

You need ...

- a diagnostic platform with a viewer, e.g. PathoZoom[®] Digital Lab
- one/several high-performance scanner(s)
- a printer with which you can directly print your slides or labels with a machine-readable code (DataMatrix code). For this purpose, you can use the easy-to-use software PathoZoom[®] LabelPrinter plus a printer
- a computer and storage space for the slides



THE DIAGNOSTICS PLATFORM

Good! If I don't have to take an immediate economic risk, the next question is: What components do I need to diagnose without a microscope, for example, from home?

> The most important thing for digitization is choosing the correct diagnostics platform. It replaces your microscope at least partially and connects your Laboratory Information System (LIS) and your scanner(s).

> It is crucial that your diagnostics platform is an OPEN system, open to all scanners, open to all LIS, open to Artificial Intelligence and above all: open to your IT department. Ensure that you or your IT retain complete access to the digital slides, the database, and the interfaces.

The interface of your diagnostic platform should be free of charge (not priced!). It must also be able the read the DICOM files - the future open file format.

patho**Zoom**





The diagnostics platform PathoZoom® Digital Lab is the heart of digitization. It connects all critical digitization components of your lab.

Its open architecture ensures the future viability of your complete digital system because PathoZoom® Digital Lab is:

- open for all scanner systems and formats
- open for all LIMS systems
- open for any data storage (local or in the cloud)
- open for the integration & training of all AI modules

THE WORK ENVIRONMENT

What does digital microscopy look like? What result can I expect?

> Ideally, you have two screens: One shows your Laboratory Information System (LIS), and the other shows your PathoZoom® Digital Lab as a digital microscope and diagnostics platform.

PathoZoom[®] Digital Lab does not have to run on the same computer as your LIS.

You can also use a good tablet as a digital microscope since you do not need to install any software for PathoZoom® Digital Lab. This allows you to microscope on any device with a browser and the Internet.

If you open a case in the LIS, the same case opens in PathoZoom® Digital Lab, including the corresponding folder with all associated slides.



THE LIVE TEST

How can all this be faster than my microscope? Hard to believe!

Please try this QR code with your smartphone:

- At the top right, you will see three horizontal lines. If you click on these, you will find the microscope folder. You can microscope with your finger, e.g., zoom into the slide with your thumb and index finger, use the measuring tool, annotate, etc.
- If you would like to test the PathoZoom® Digital Lab on your large computer screen, forward the link to your desktop PC where you can work with the mouse as usual.

How is this working for you?

Our team, physicians and developers, are looking forward to your feedback to info@smartinmedia.com.





Microscope right now in PathoZoom® Digital Lab.

SCANNERS

The choice of an open image management system is obvious. Which scanner can you recommend?



The purchase of one or more scanners comes with high costs. In addition to the classic purchase, there are also rental and leasing models.

If you have an image management system that can handle ALL scanner formats, all scanner brands are available to you. You can combine scanners from different companies in one system.

As of 2022, there are three companies whose scanners we recommended for routine use: Hamamatsu, Leica and 3DHistech. You should test each of these scanners before making a purchase. All are very good in quality but differ in their workflow, handling, and price – and every pathologist has different requirements.

Smart In Media has a lot of experience with scanners and numerous customers with different devices, and will gladly give you an on-site inspection.

Smart In Media.

YOUR SOLUTION PARTNER

But how are the components connected to each other? I don't want to be stranded between the platforms of technology companies.

We are the solution partner for pathologists worldwide – and not an ordinary software company: We take full responsibility for ensuring that all our components work together at your site. In addition: Our PathoZoom® Digital Lab server, installed in your institute, monitors all the slides digitized by the scanner and automatically groups them into cases.

Several physicians work in and for our company. Together we live the philosophy "by physicians for physicians." You will notice this in the simple workflow and many helpful details including useful tools like the PathoZoom® Spacemouse and the PathoZoom® LabelPrinter. In addition, we have interfaces to all common LIS providers, so that cases you open in your LIS also immediately appear in PathoZoom® Digital Lab.



THE WORKFLOW

How does my workflow change?



When comparing the classic to the digital workflow, these steps change:

- The slides are provided with a 2D Barcode for digitization, typically with a DataMatrix Barcode so that PathoZoom® Digital Lab can later assign the slides to the cases automatically. The slides are provided with tissue and stained as usual.
- The slides no longer have to be sorted, they can be scanned in any order.
- There is no longer any need to stack folders with slides to individual pathologists; your lab technicians can quickly assign cases in your Digital Lab.
- While the first cases are still being scanned, the pathologist already begins their reporting.

How does the process look schematically?

You can see the classic laboratory workflow below ...



... compared to the workflow with digital diagnostics:



Scanning takes time. How do I get that back?

The loss of time is not significant if scanning run in parallel with reporting. You actually gain time from these features of Digital Pathology:

- Digital microscopy on-screen is faster and more precise than on the microscope (changing slides, jumping between cases, ...).
- You save time through faster retrieval of structures.
- There is no need to search for/mix up slides and cases, saving you time and annoyances.
- Case acceptance by assistants is accelerated many times over, as they can already mark case-critical regions (e.g., Helicobacter pylori, invasion front, etc.).
- Communication with colleagues is accelerated through shared digital microscopy.
- You can easily involve pathologists at remote sites.
- Retrieval of old cases with long-term archiving is possible instantly.

FURTHER IMPROVEMENTS

What else – in addition to saving time – does digitization improve?

Digital diagnostics offers many other improvements:

- Barcodes increase the security regarding the correct assignment of slides. The pathologist no longer needs to "read" the slides.
- Cases can also quickly be shared with external pathologists (reference pathologists and others) by mouse click.
- You can quickly present cases digitally at the tumor board.
- Macroscopy and microscopy can conveniently be combined.
- Working at the screen is more comfortable than at the microscope due to sitting upright and eliminating focusing back and forth between the request form, slide folder, and microscope.



Artificial Intelligence

What about Artificial Intelligence? Do I need to start thinking about this now?

> Currently (as of 2022), more and more Artificial Intelligence (AI) developments are entering the market. One challenge is that in the future, as a pathologist, you will not need just one Artificial Intelligence package, but many. There will be one for every DX, such as finding metastases in lymph nodes in colon carcinoma, analyzing PD-L1 status, and much more.



You can think of AI in the future same as your antibodies for immunohistochemistry that you use today. There is an advantage here, too, if you can freely choose between different vendors later on.

With each AI, you would need a separate server installation from this special vendor. We have solved this with PathoZoom® Digital Lab and the integrated "AI App Store" just for Artificial Intelligence. With it you can freely and without any installation effort book or switch different AI applications.



HOW TO PROCEED...

Where can I get more information? How can I purchase the system?

Call us for a free expert consultation. The most helpful way to get started with Digital Pathology is to talk directly with our doctors and specialists.

In addition, please find links to scientific studies on our PathoZoom[®] systems for Digital Pathology, customer stories, and in-depth information on the solutions on the next page.

If you are interested, we would like to invite you to visit one of our reference customers, where you can experience digitized workflows live and exchange ideas with colleagues on site.

Call us, send us an email, or visit us:

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What is the specific added value of digital diagnostics? What is the best way to get started? What does the modern workflow in routine diagnostics look like? Answers are provided by Martin Weihrauch, M.D., CEO and Head of Product Development at Smart In Media AG, summarized in this primer.



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