

# Diagnostic Digital Pathology at Nottingham University Hospitals: Moving from Implementation to Business as usual

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Clinical Lead NUH Digital Pathology Implementation

Consultant Haematopathologist

## Conflict of Interest

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Personal - no conflicts of interest

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Indica Labs are suppliers of Digital Pathology systems to Nottingham University Hospitals NHS Trust

# Nottingham University Hospitals (NUH)

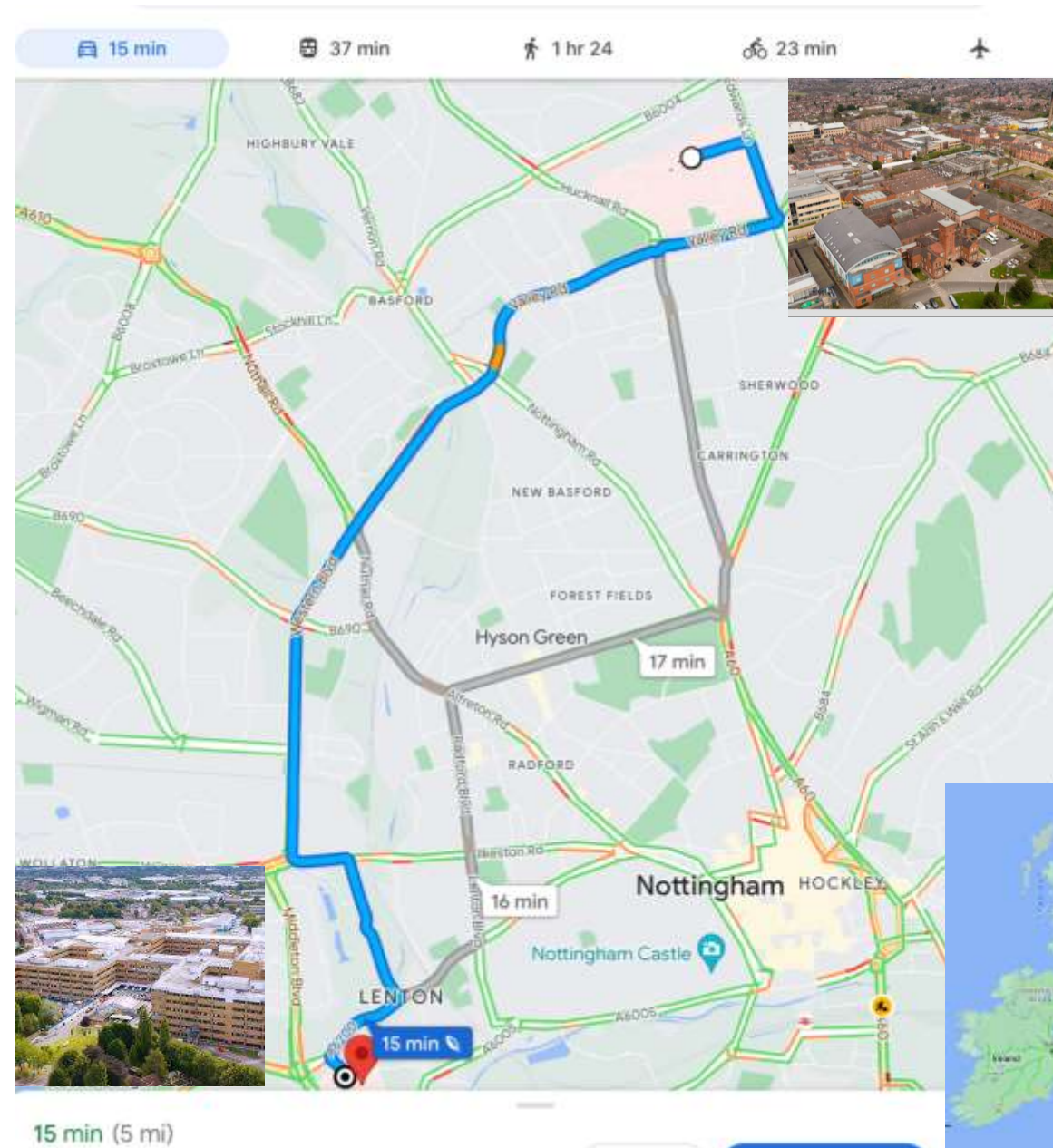
- Large acute teaching hospital NHS trust
- 2 campuses
  - Queens Medical Centre (QMC)
  - City Hospital





# Nottingham University Hospitals (NUH)

QMC



CITY  
campus

# NUH Cellular Pathology

- **Laboratory on QMC campus**
  - 72,000 cases
  - 355,000 slides
- **Consultant teams at both QMC & City**
  - 33 consultants in 8 subspecialty teams
  - Regional referral centre
    - Haematopathology, Renal, Neuropathology, Sarcoma, Perinatal pathology

# Background

## PathLAKE plus

- 21 Trusts in 6 work packages
- Lead Prof David Snead at UCWH

## Innovate UK funding

- NUH grant £2.3 million (WP1)
- NUH bid led by Prof Emad Rakha
- Summer 2020
- Goal >80% digital reporting by Dec 2023

# High level objectives



## Improve efficiency of reporting

Increase reporting capacity by increasing overall productivity

- TARGET >12% increase in productivity
- 80% cases reported using digital platform



## Improve effectiveness of reporting

Increase accuracy and Reduce variation

- Quantitative & Qualitative Standardisation

Reduce error

By Dec 2023





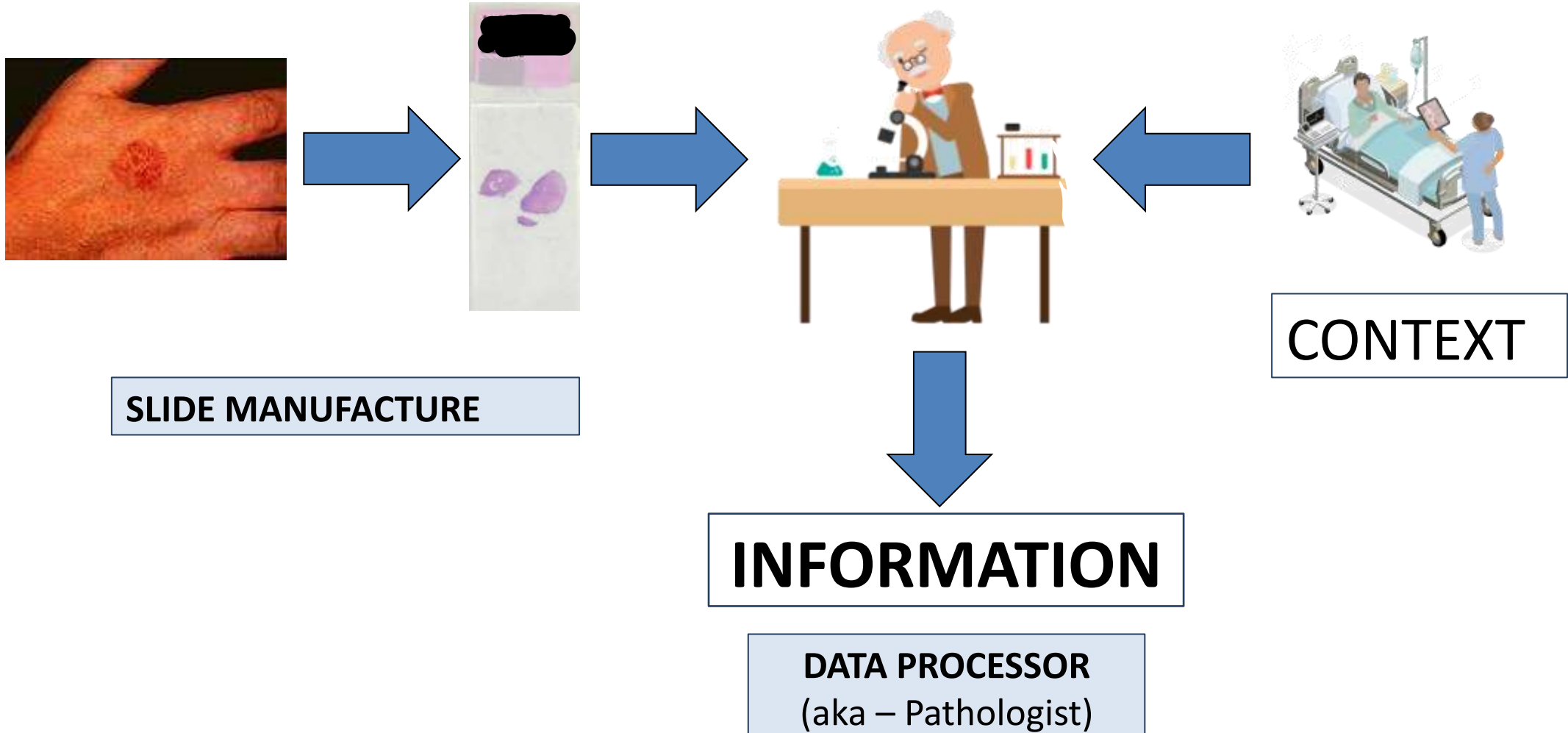
*It's not just a Digital  
Microscope....*

*it's about transforming  
the way Cellular  
Pathology is delivered  
as a service*

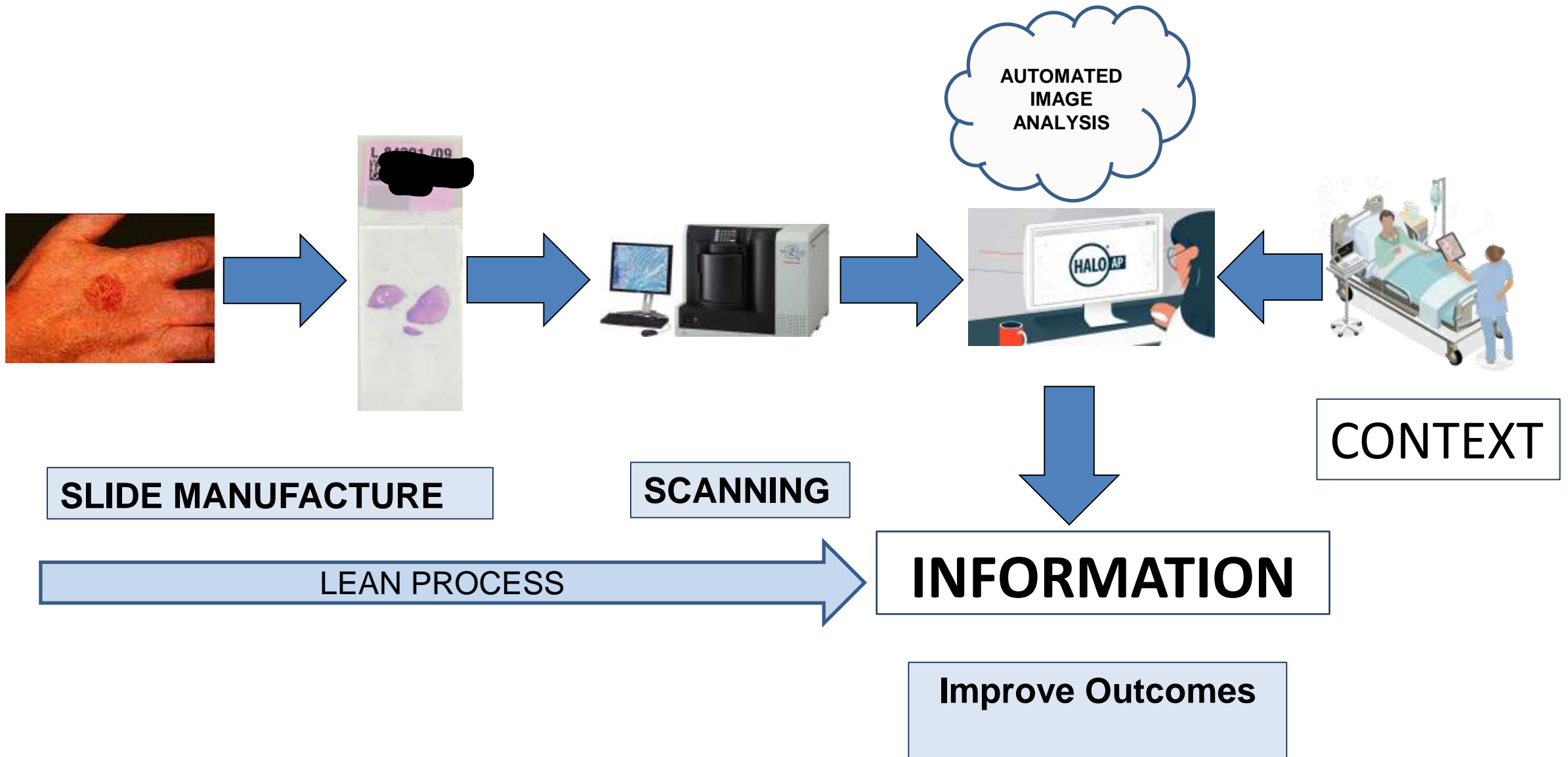




# HISTOPATHOLOGY



# DIGITAL HISTOPATHOLOGY



**70% of change programs  
fail to achieve their  
goals**

McKinsey

# Managing Transformational Change


## Change management

- Leadership
- managing the people side of change

## Project management

- Management
- Framework to plan, execute, & deliver projects





Dangerous biases can creep into every strategic choice. Here's how to find them—before they lead you astray. *by Daniel Kahneman, Dan Lovallo, and Olivier Sibony*

## Before You Make That Big Decision...

THANKS TO a slew of popular new books, many executives today realize how biases can distort reasoning in business. Confirmation bias, for instance, leads people to ignore evidence that contradicts their preconceived notions. Anchoring causes them to weigh one piece of information too heavily in making decisions. Loss aversion makes them too cautious. In our experience, however, awareness of the effects of biases has done little to improve the quality of business decisions at either the individual or the organizational level.

Though there may now be far more talk of biases among managers, talk alone will not eliminate them. But it is possible to take steps to counteract them. A recent McKinsey study of more than 1,000 major business investments showed that when organizations worked at reducing the effect of bias in their decision-making processes, they achieved returns up to seven percentage points higher. (For more on this study, see "The Case for Behavioral Strategy," McKinsey Quarterly, March 2016.) Reducing bias makes a difference. In this article, we will describe

JUNE 2015 HARVARD BUSINESS REVIEW 31



[www.hbr.org](http://www.hbr.org)

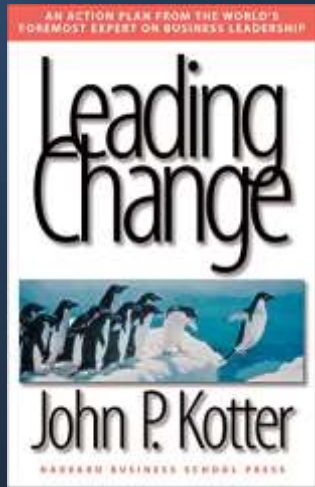
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## Leading Change

### Why Transformation Efforts Fail

by John P. Kotter

# Kotter Change Model



Kotter, J. P. (1996). Leading Change. Harvard Business Press.

1. **Establishing a Sense of Urgency – The "WHY"**
2. **Forming a Powerful Coalition**
  - Build a team of people to lead change.
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  - Embedding the changes into the organization's systems, processes, & values, making it permanent

# Project Phases

Leadership &  
governance

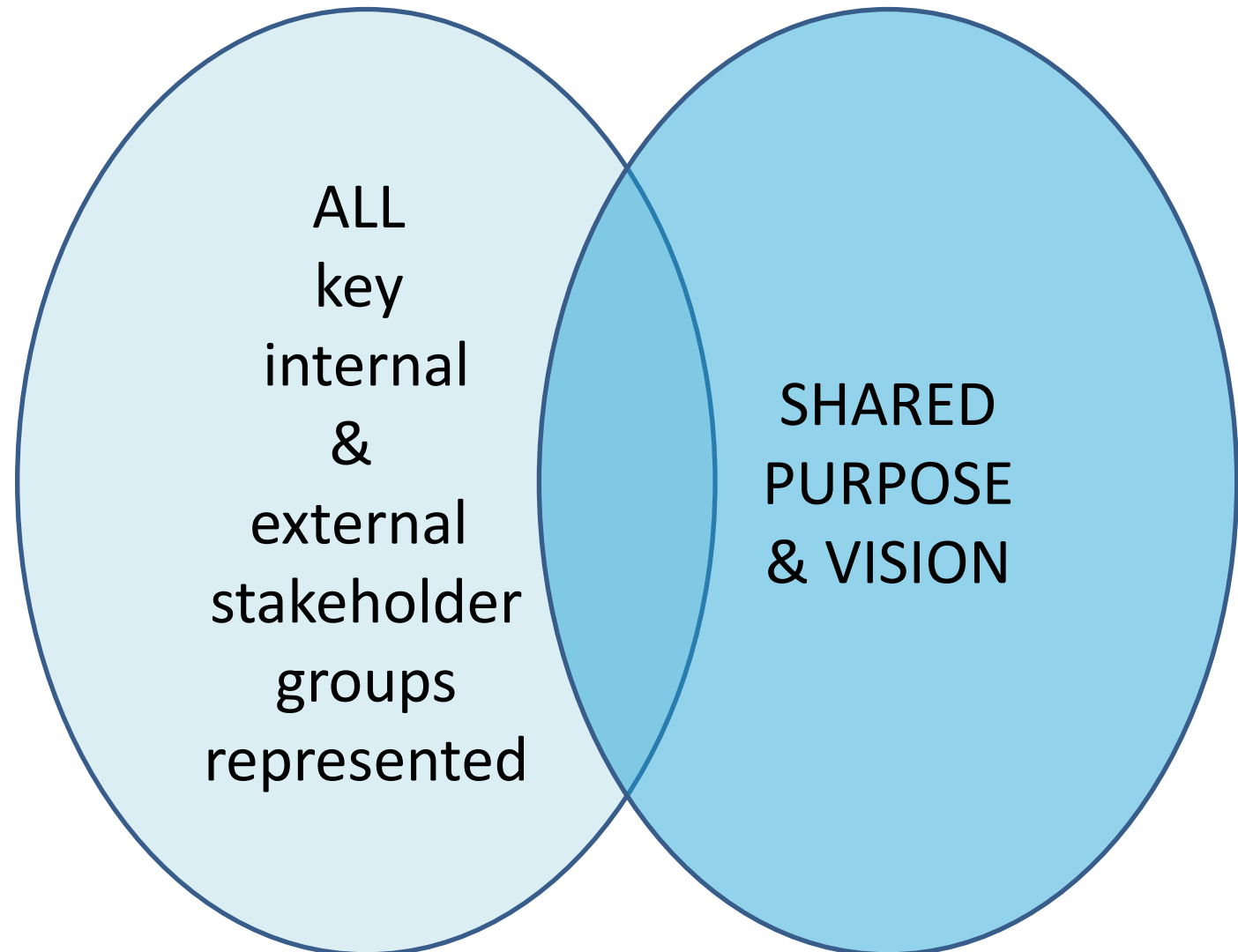
Procurement

System  
Implementation

Clinical  
Deployment

# NUH Digital Pathology Implementation Group

- Cellular pathology manager
  - Clinical lead
  - Project manager
  - Clinical workstream chair
  - Cellular pathology section leads
  - Lead Biomedical scientists
  - A&C manager
  - Pathology IT manager
- Finance manager
  - Procurement manager
  - Trust Digital services representatives
  - HR manager
  - NUH Estates
- Indica Lab representatives







# Indica Labs HALO AP

## Implementation plan overview

(NUH)



June 2021

to

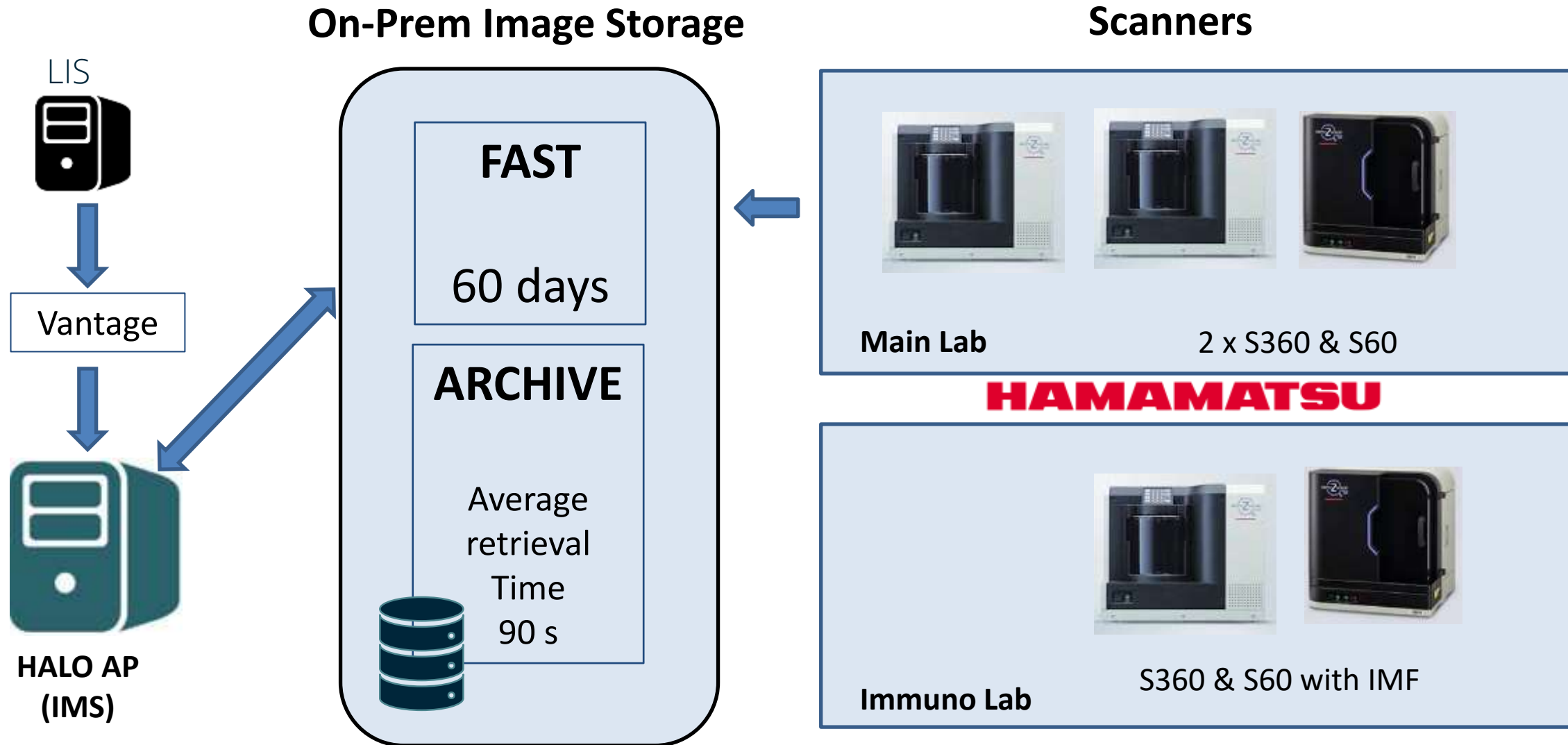
July

to

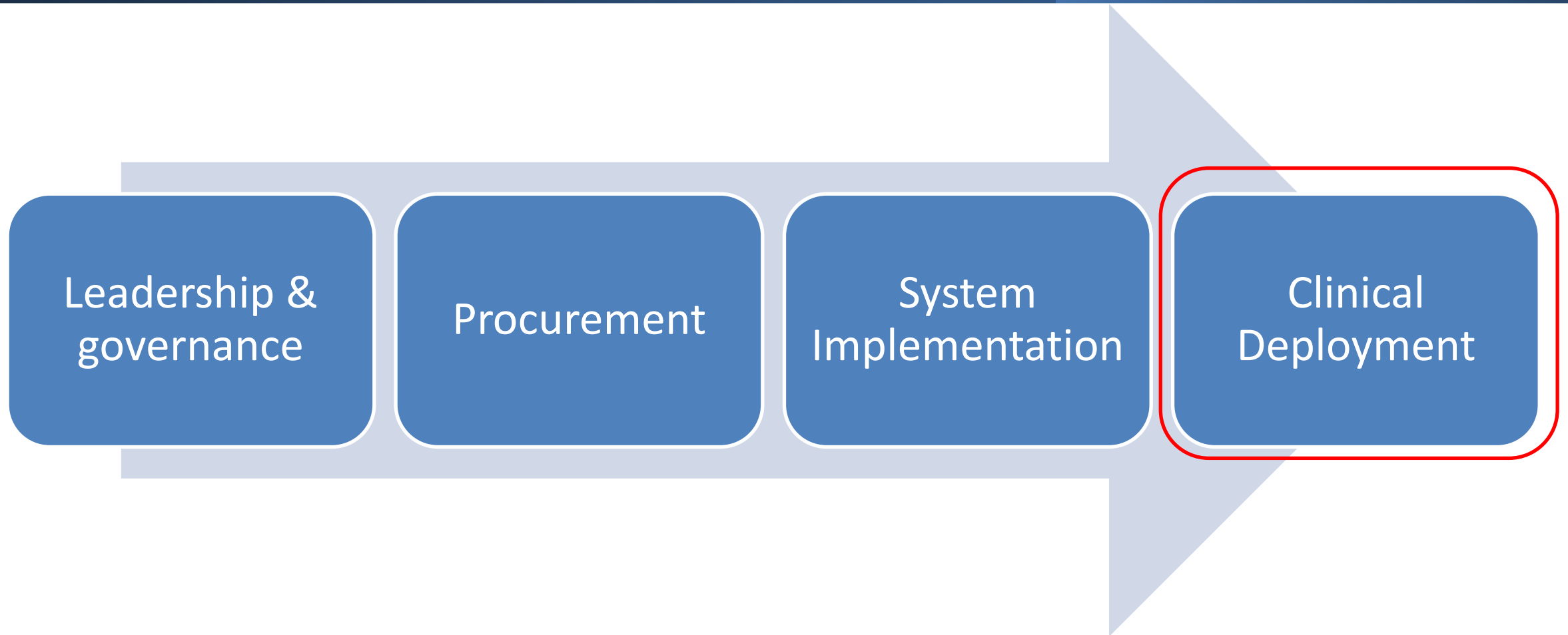
Nov

Dec 2021  
onwards

# NUH system overview

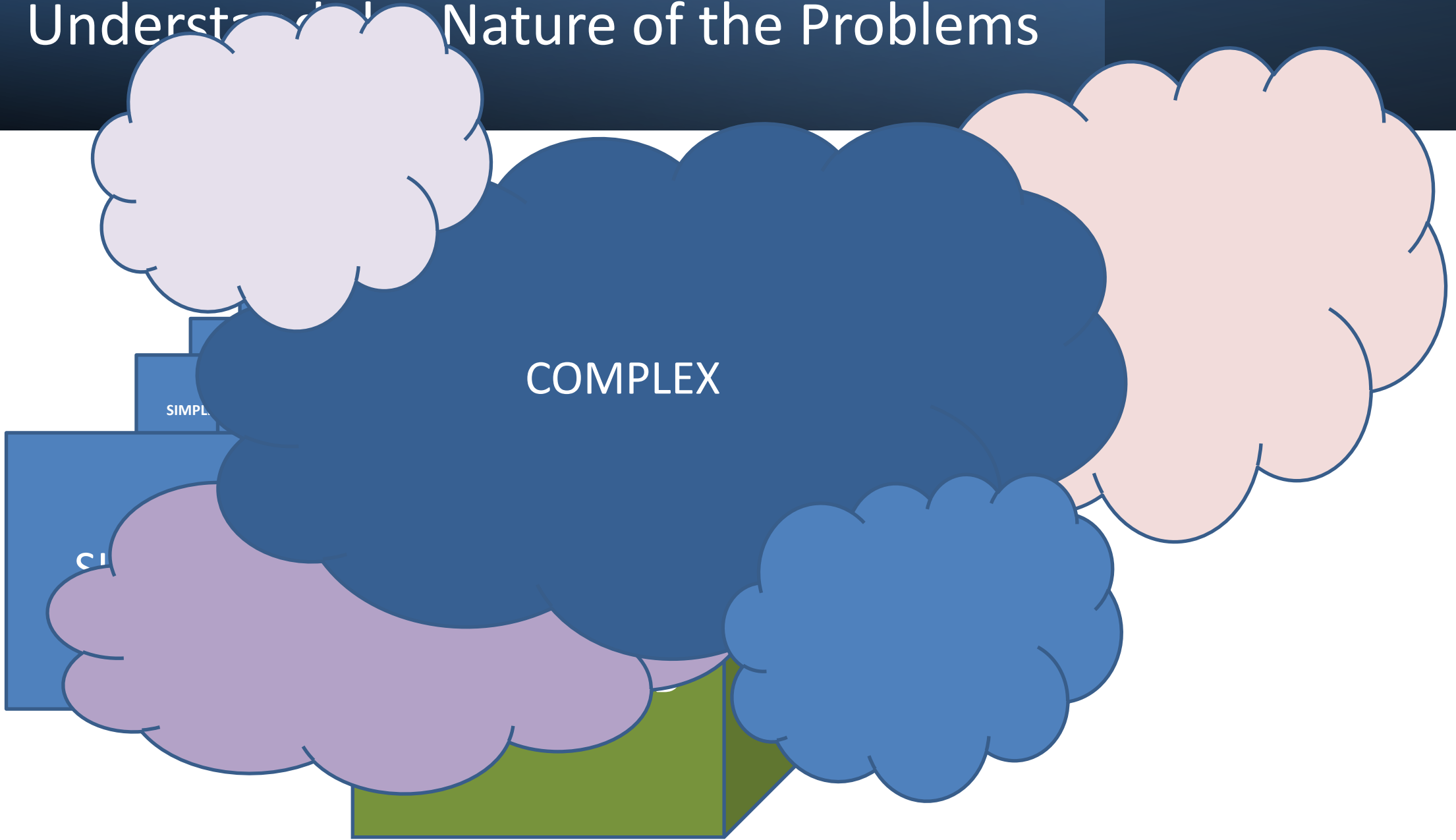


# Project Phases



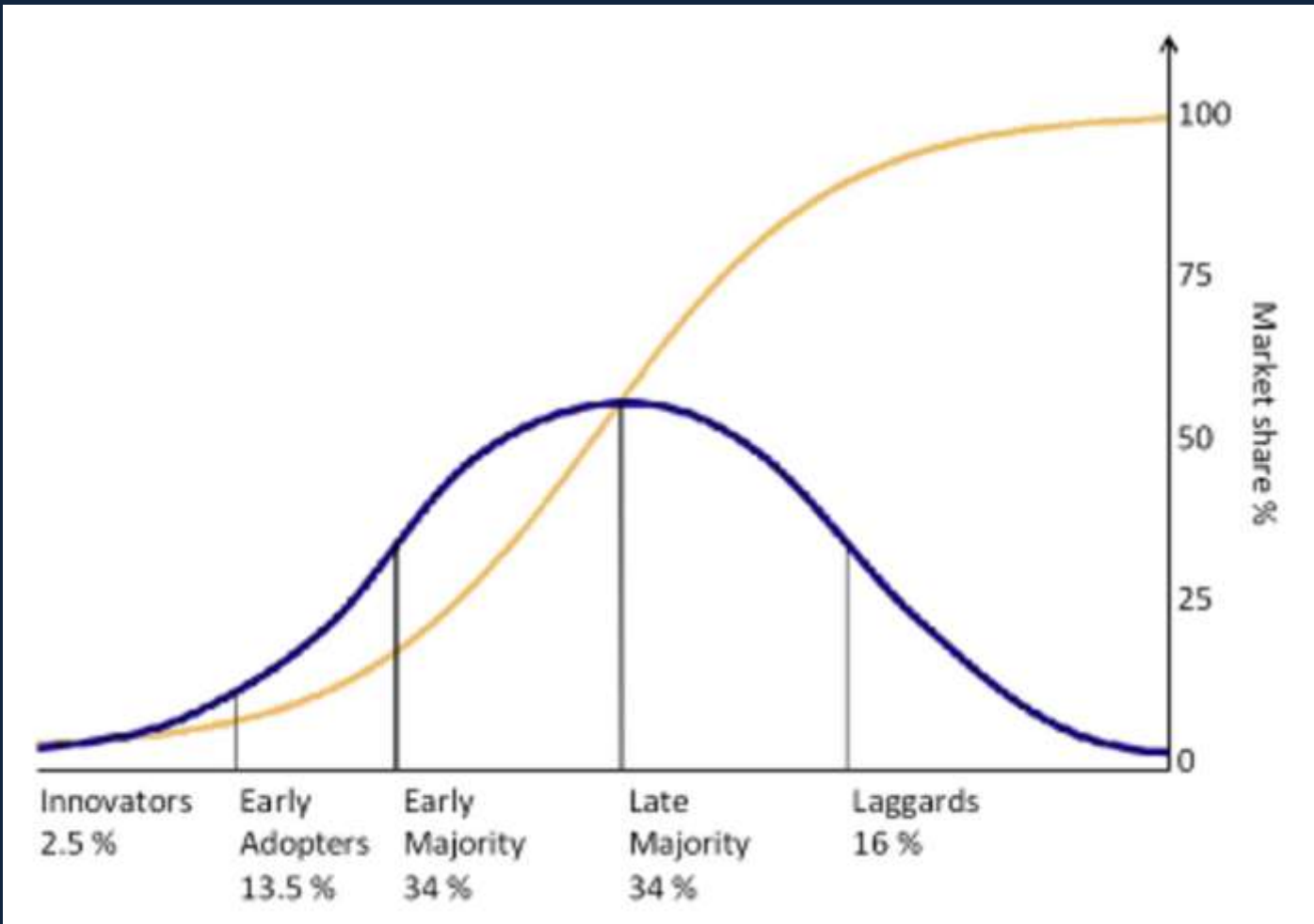


# Understanding the Nature of the Problems



# COMPLEX

- **UNPREDICTABLE**
  - Multiple Interdependencies
  - Unclear Cause & Effect relationships
    - Often non-linear
- ***“Unknown Unknowns”***
- **Experiment when it's safe to "fail"**
  - *Discover & Harness “Emergent” properties*
  - ***Probe, Sense, Respond***
  - *Example: Transforming the way cellular pathology is delivered using digital pathology*



Diffusion of  
innovation

# Accelerating Diffusion of Innovation: Maloney's 16% Rule<sup>©</sup>

Psychology of  
Influence<sup>^</sup>

Scarcity

Social Proof

**Maloney's 16% Rule:**

Once you have reached 16% adoption of any innovation, you must change your messaging and media strategy from one based on scarcity, to one based on social proof, in order to accelerate through the chasm to the tipping point.

Key Opinion  
Leaders

The Tipping  
Point+

T  
H  
E  
  
C  
H  
A  
S  
M

2.5%

13.5%

34%

34%

16%

Adoption  
Profile\*

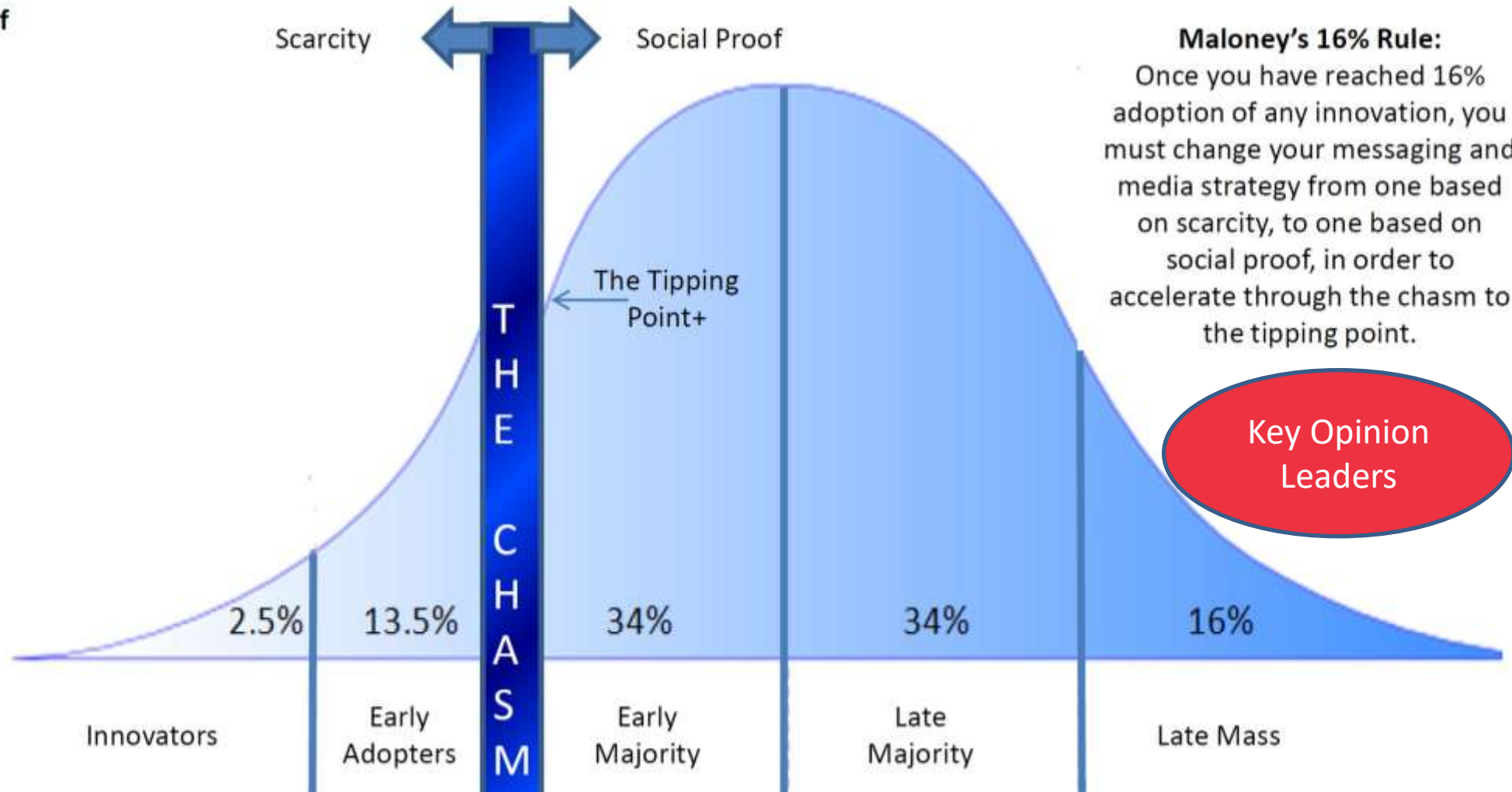
Innovators

Early  
Adopters

Early  
Majority

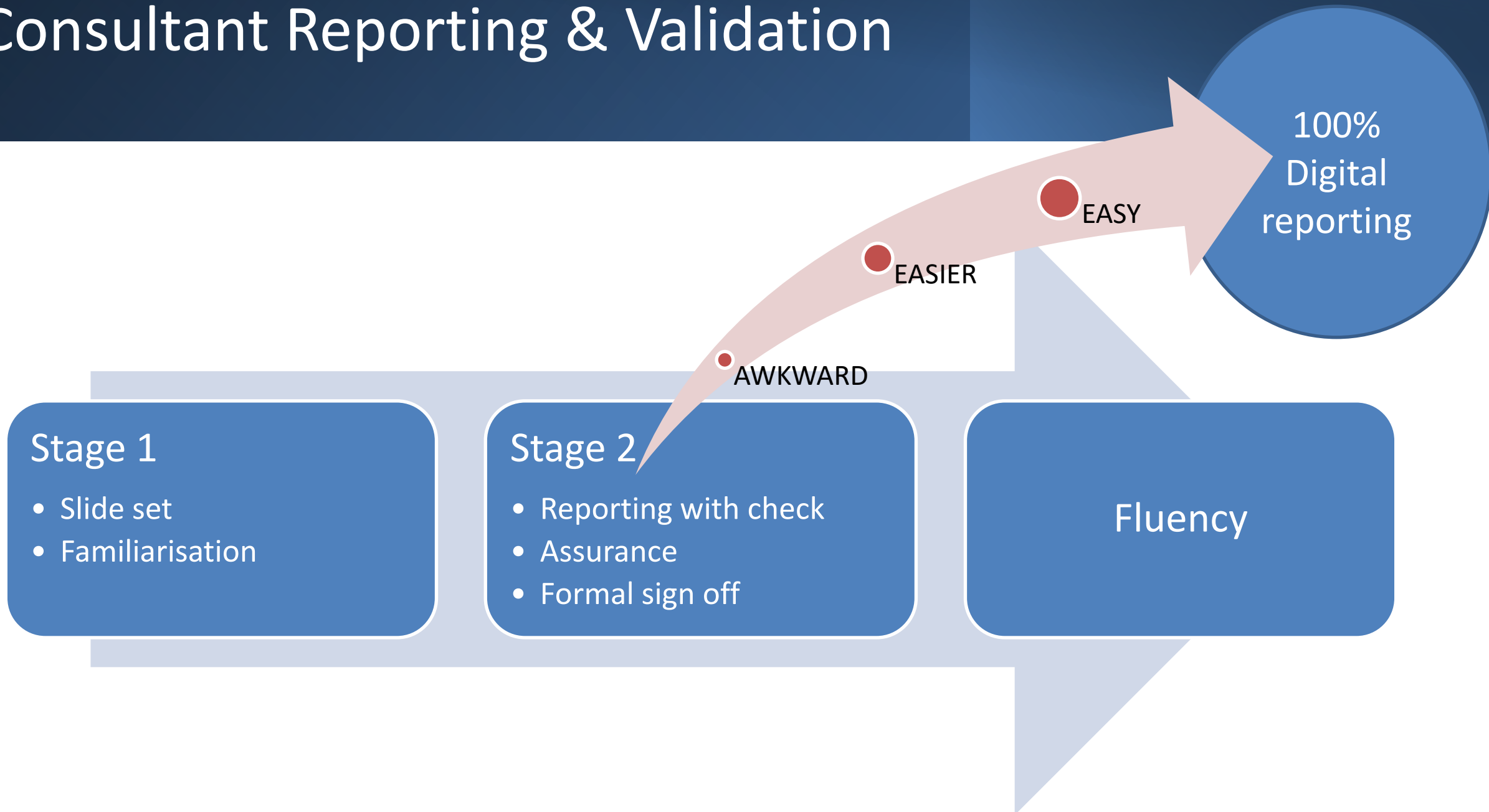
Late  
Majority

Late Mass





# Consultant Reporting & Validation

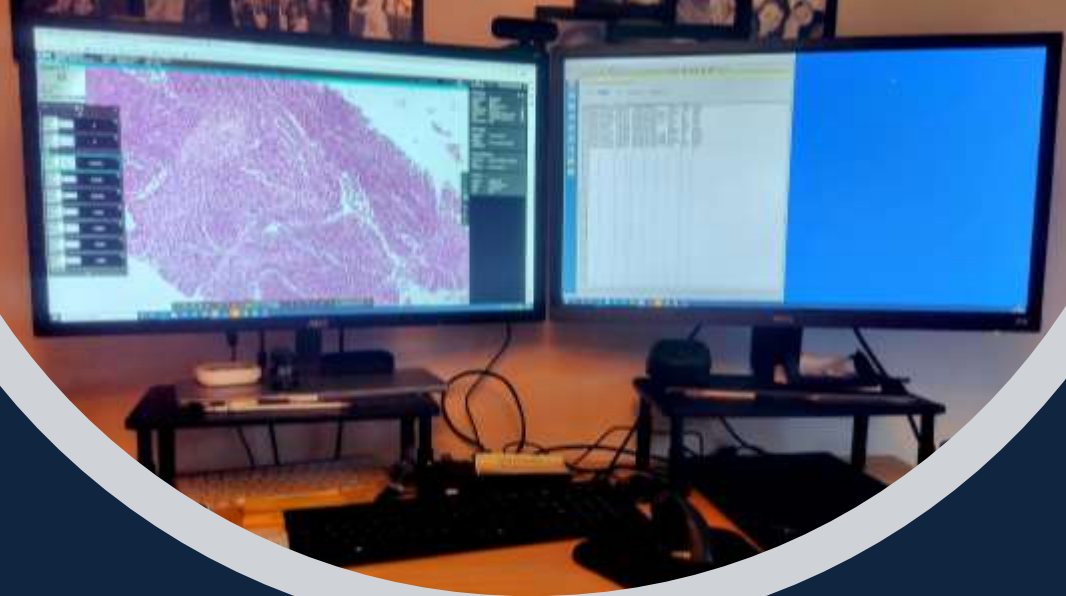


# Digital workflow (Glass-lite)

- **Specialty teams workflow driven by HALO AP**
  - "Pull" worklists on HALO AP
  - Glass slides & report cards remain in lab
  - Haempath, GI, Skin teams – glass-lite
  - Renal, respiratory & urology teams in planning

# Moving to a virtual working environment

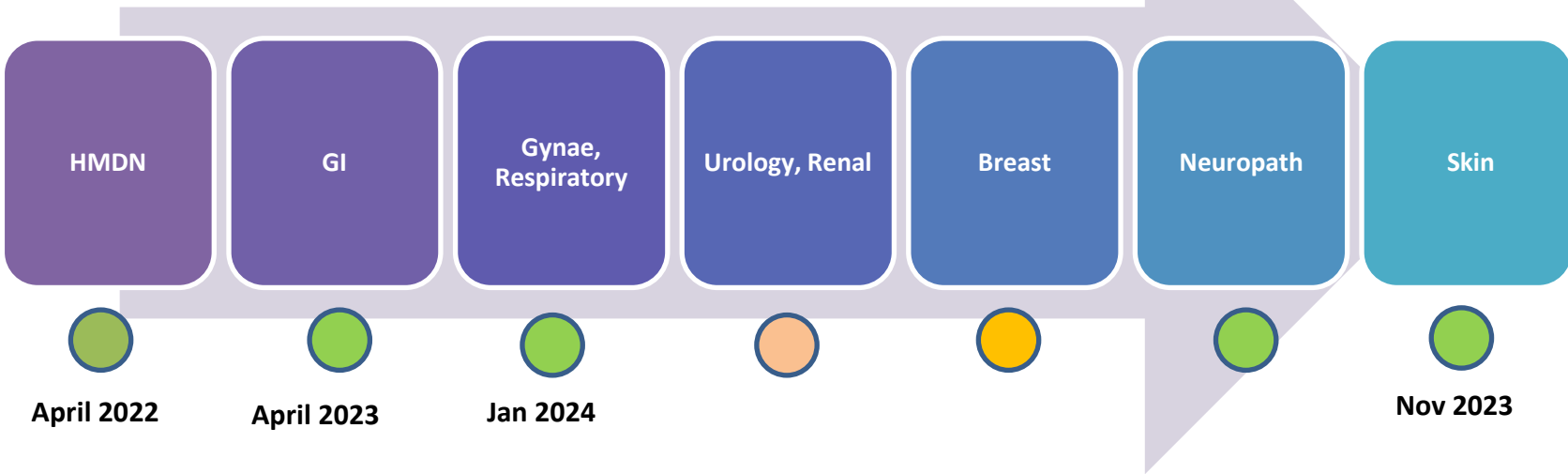
Grantham, England



Nagpur, India



# Consultant validation progress



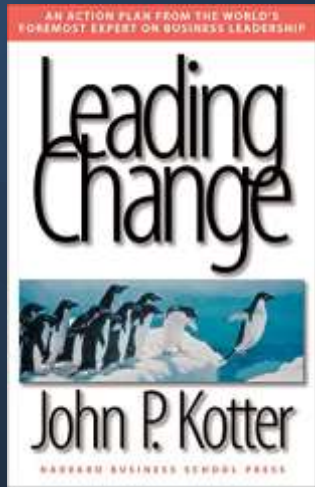
NUH consultant validation summary		
	Stage 1 Validation	Stage 2 Validation
Started	35	35
%	100%	100%
Completed	35	32
%	100%	91%
32 consultants in 2022 + 3 new starters		

# Milestones

Milestones	
Contract signed with Indica labs	May 2021
Hamamatsu scanners installed	Aug 2021
HALO AP sandbox installed	Sept 2021
HALO AP production server installed	Oct 2021
Storage servers installed	Nov 2021
System Validation completed	Dec 2021
Reporting Go-Live	Jan 2022
HMDN team 100% digital reporting (glass lite workflow)	April 2022
Digital Pathology UKAS accreditation to ISO151898	Jan 2023
50% consultants complete digital reporting validation	Feb 2023
Renal biopsy immunofluorescence validated on HALO AP	Feb 2023
Glass lite workflow GI pathology	April 2023
>80% consultants complete digital reporting validation	May 2023
Glass lite workflow Skin pathology	Nov 2023
94 % consultants complete digital reporting validation	Nov 2023



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# Benefits



## Greater Flexibility

- Faster review of cases
- Much easier 2nd opinions
- Home working
- Improved TAT



## Productivity

- Falls during validation
- Rises with experience

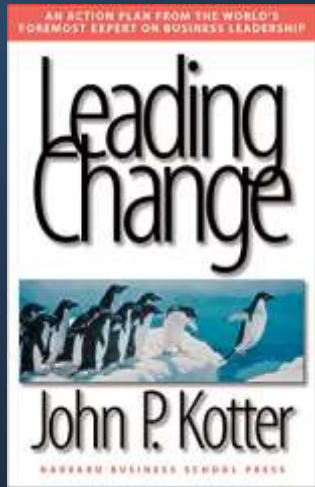


## Team Morale

- Sense of shared achievement
- Closer relationship between lab and consultants

NB – difficult to separate effects of digital from other transformation work

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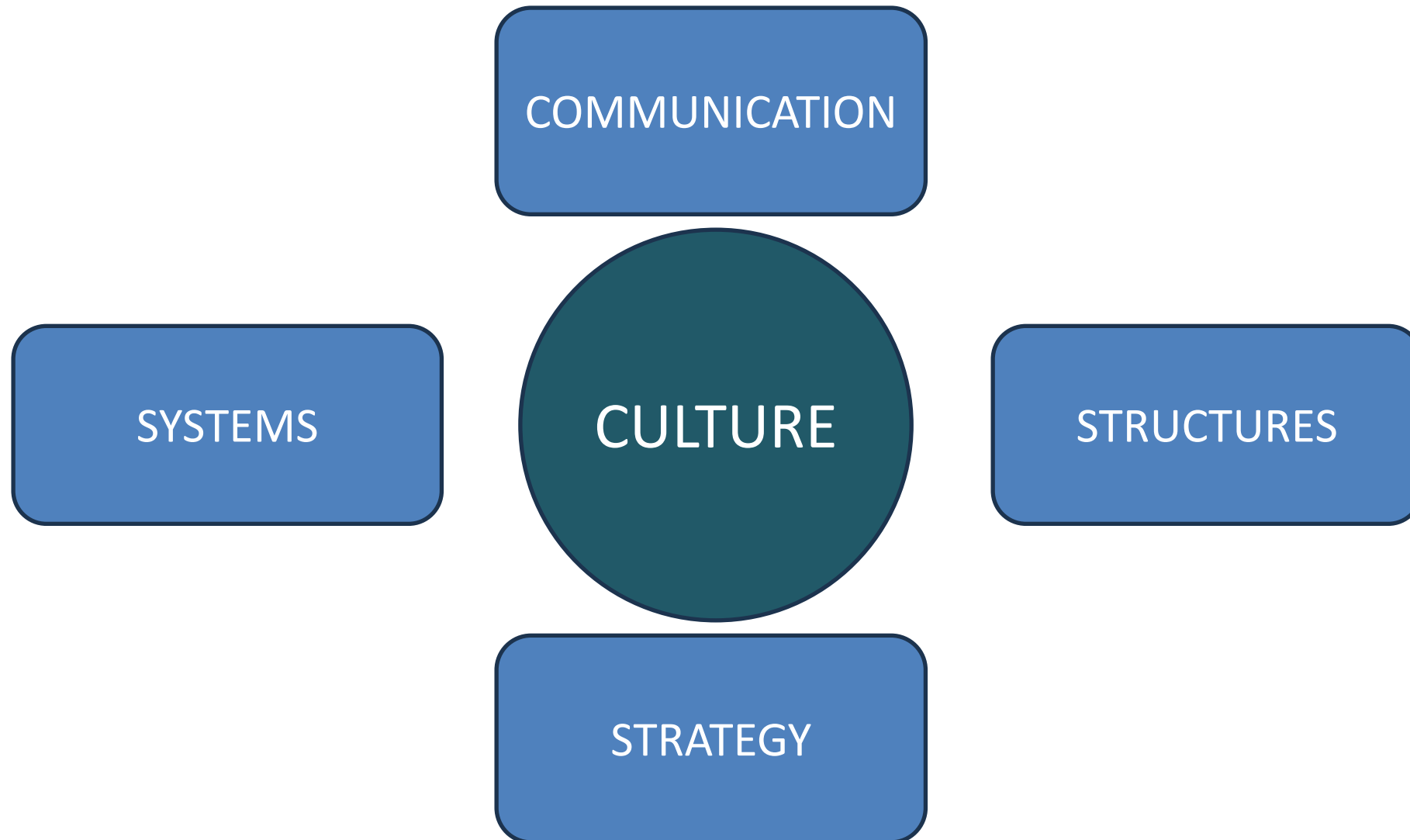
# Institutionalize changes in the culture

- **Anchoring New Approaches in the Culture**
  - Embedding the changes into the systems, processes, & values

**Making it permanent**

**Maintaining momentum**

# Institutionalize changes in the culture





# End of implementation planning



## **SYSTEMS**

SOPs  
Training  
Business continuity plans



## **STRUCTURES**

Digital Pathology Management  
Group  
Computational Pathology group



## **STRATEGY**

Future vision  
Direction of travel  
Short, medium and long term goals

# NUH

## Image analysis/AI strategy

### Short term – 3-6 months

- Integrate Grant funded IBEX Galen prostate & breast
- Set up Computational pathology group

### Medium term – 6-12 months

- Develop business case for HALO AP core analytics
- Collaborate with indica to develop and validate assays

### Long term - > 12 months

- Continually develop business cases for novel assays

# Transitioning the Team

- **"Off-boarding"**
  - Key team members will not be around to manage BAU
  - Knowledge and skills need to be shared
  - New relationships need to be built internally & externally

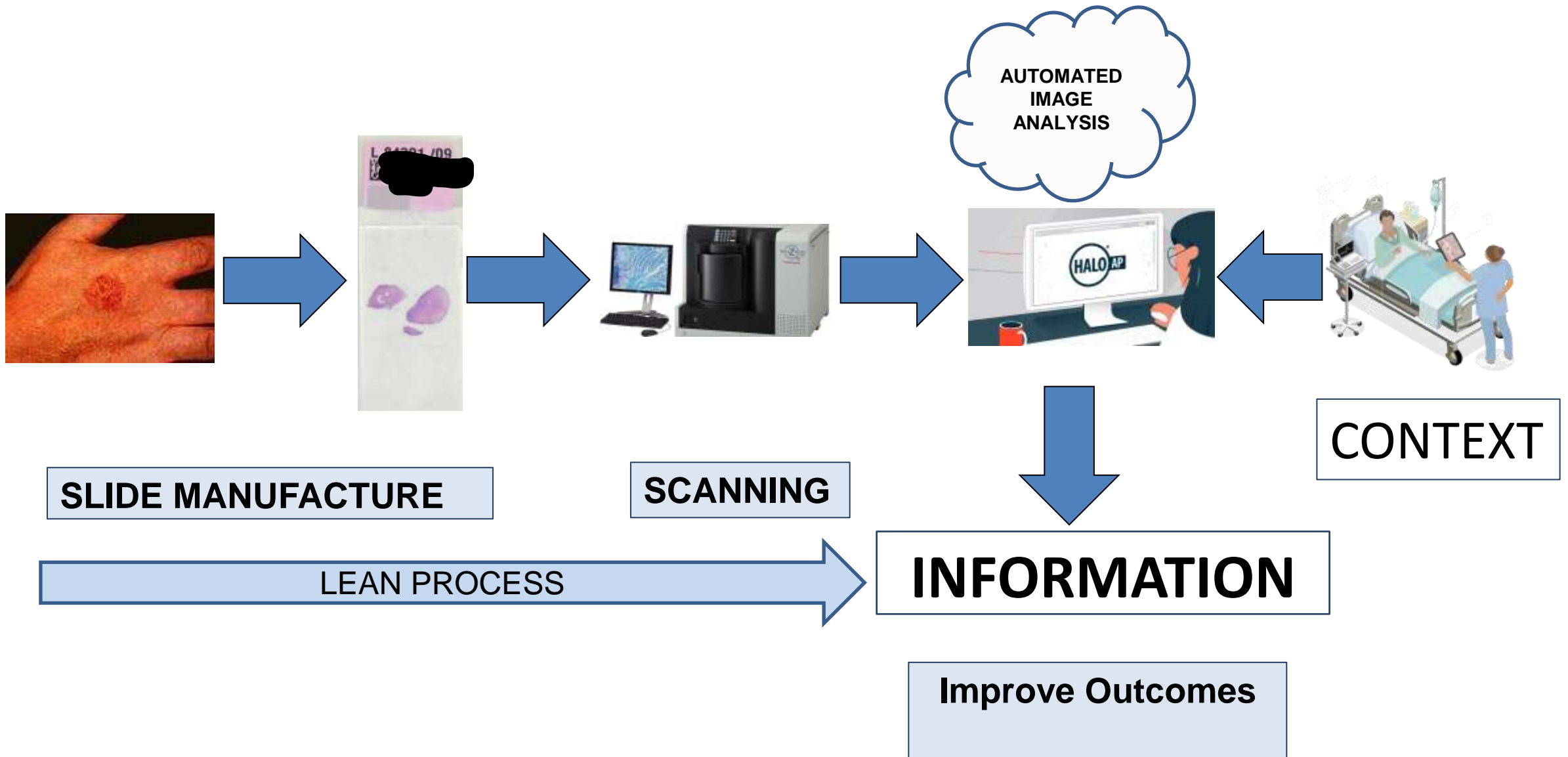
## PARTNERSHIP WITH SHERWOOD FOREST HOSPITAL'S TRUST



## Strategic Pathology Partnership

- Joint LIMS
- Single Deployment of HALO AP
- Vision - seamless Cellular Pathology Service

# DIGITAL HISTOPATHOLOGY





# Systemic Problems (NHS-wide)



## LIMS capability

NHS infrastructure old

Integration with IMS & AI problematic



## Pathologist Training

Transition from glass to digital

RCPATH exam still on glass.

Still need glass slides for training



## Future Funding

Soft money ending

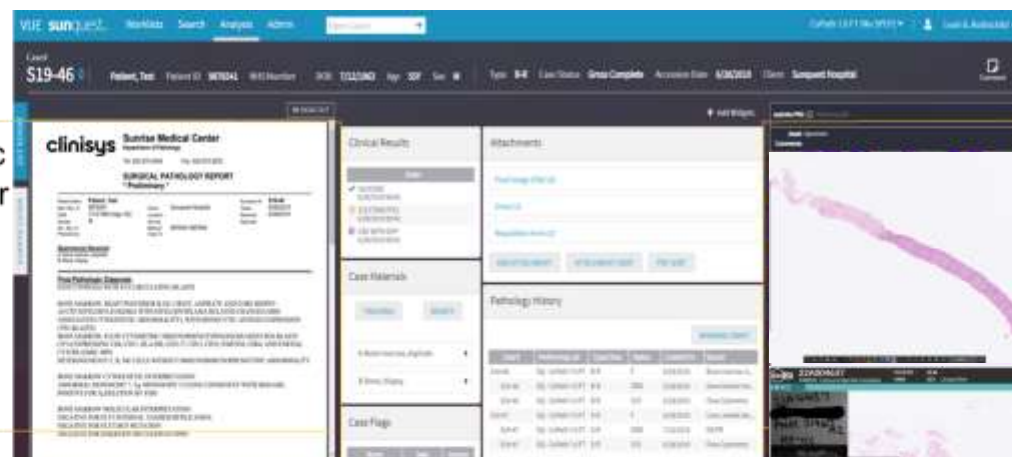
Trust business cases

Difficult NHS-wide financial situation

# Fully Integrated Digital Reporting

## VUE

Left hand panel is the dynamic report preview, refreshing after new changes are made e.g. report edited, synoptic data entered



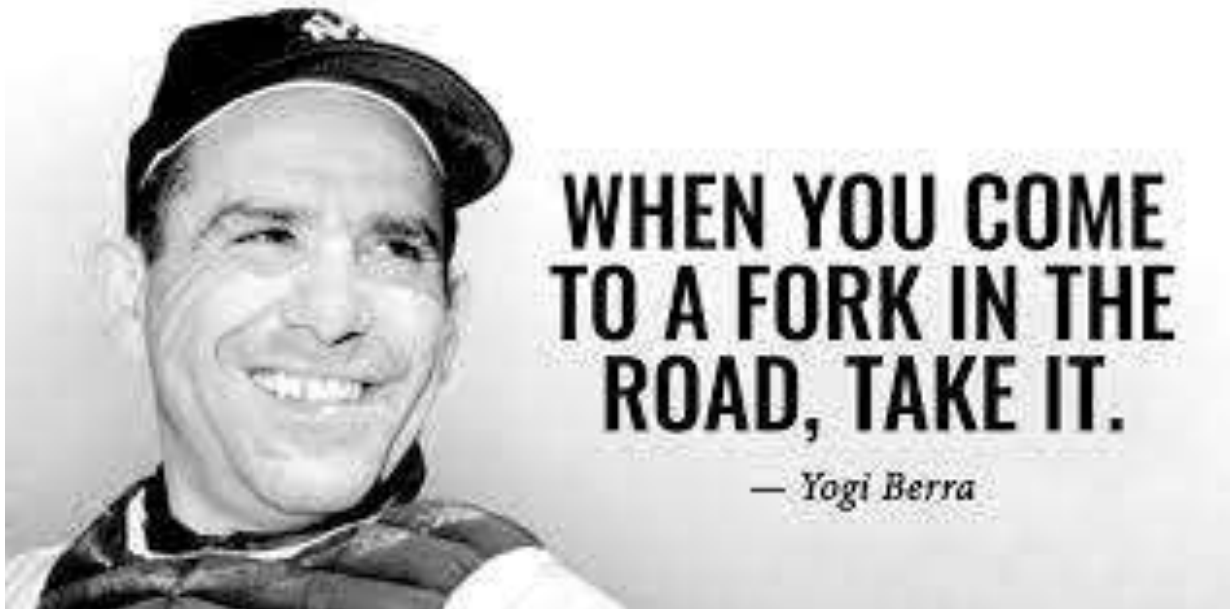
Right hand panel is the response pane presenting widget content. This window can launch on a second monitor.

**HALO AP**

Central panel contains personalised widgets to enter / view data, or launch content in the interactive window.



“It’s difficult to make predictions....  
especially about the future “



A conceptual image featuring a glowing, translucent crystal ball held by two hands. The crystal ball is the central focus, emitting a bright, ethereal light. Inside the crystal ball, the letters "AI" are prominently displayed in a bold, black, sans-serif font. The hands holding the crystal ball are positioned on either side, with fingers slightly curled around its base. The background is dark and atmospheric, with a subtle blue glow emanating from the crystal ball, creating a sense of mystery and futurism.

AI



# Thanks to

- NUH Cellular Pathology Team
- Wider NUH Trust Digital Pathology Implementation Team
- Katie McKinley & Indica Labs Team
- Rob Turner and Hamamatsu Team
- PathLAKE plus Team
- Innovate UK

Any  
Questions

