

Why we never get automation right first time

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Why is automation difficult?

Automation is hard when it is about designing and building a service that:

- brings together a bunch of different people/entities/systems to collectively deliver an outcome,
- coordinated through a set of data driven algorithms

Fit for purpose

Engineering practice covers:

- Data
- Design
- Development
- Deployment

Governance responsible for

- Accountability
- Ethics
- Competence

What goes wrong when automating services

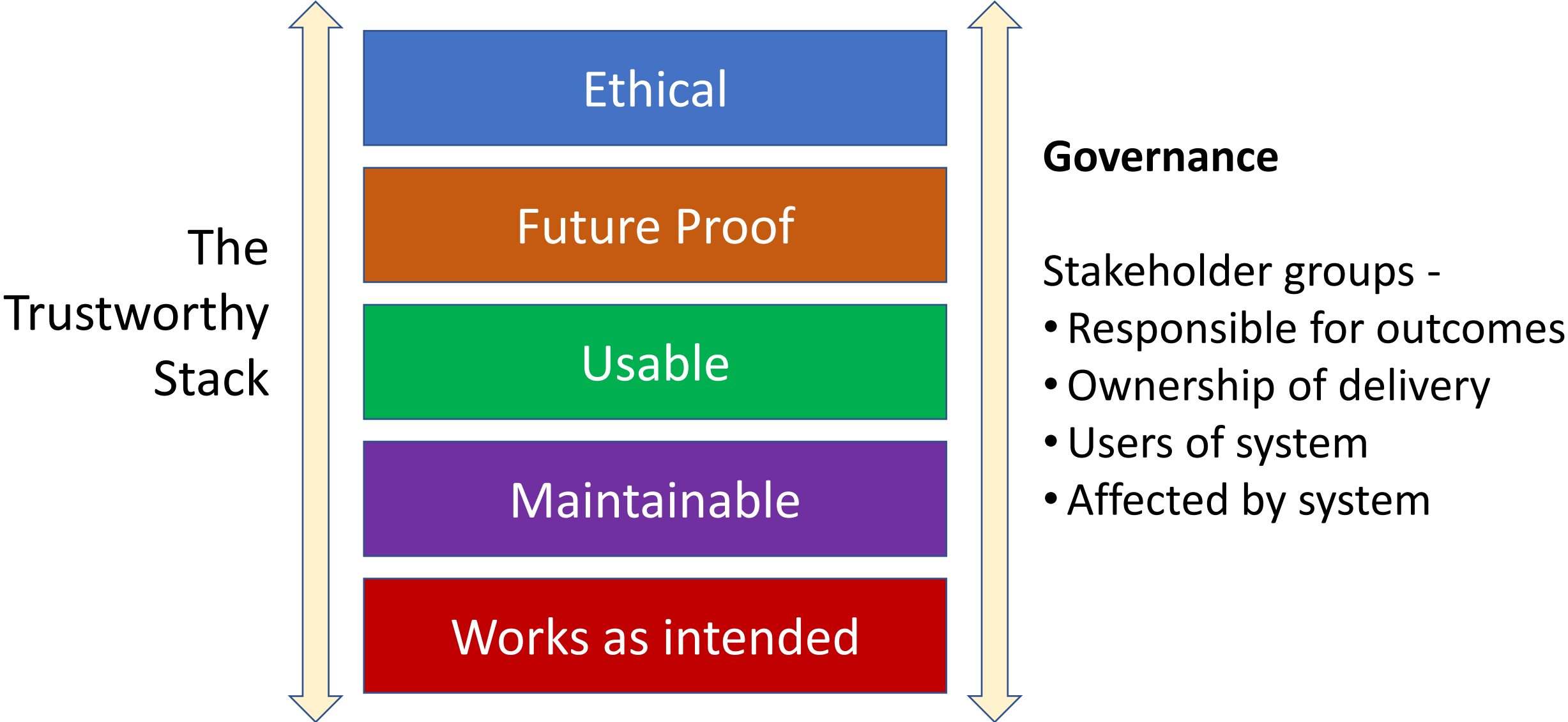
Governance

- Misunderstanding of what is being automated
- Focus on outputs not outcomes
- Not all those who will be affected by a service are consulted
- Unintended consequences are not anticipated or understood

Engineering

- Different systems interfere with each other when integrated within a service
- Reuse of systems in new contexts they were never built for
- Complexity is badly handled, e.g. when services are part of a system of systems

What it takes for automation to work

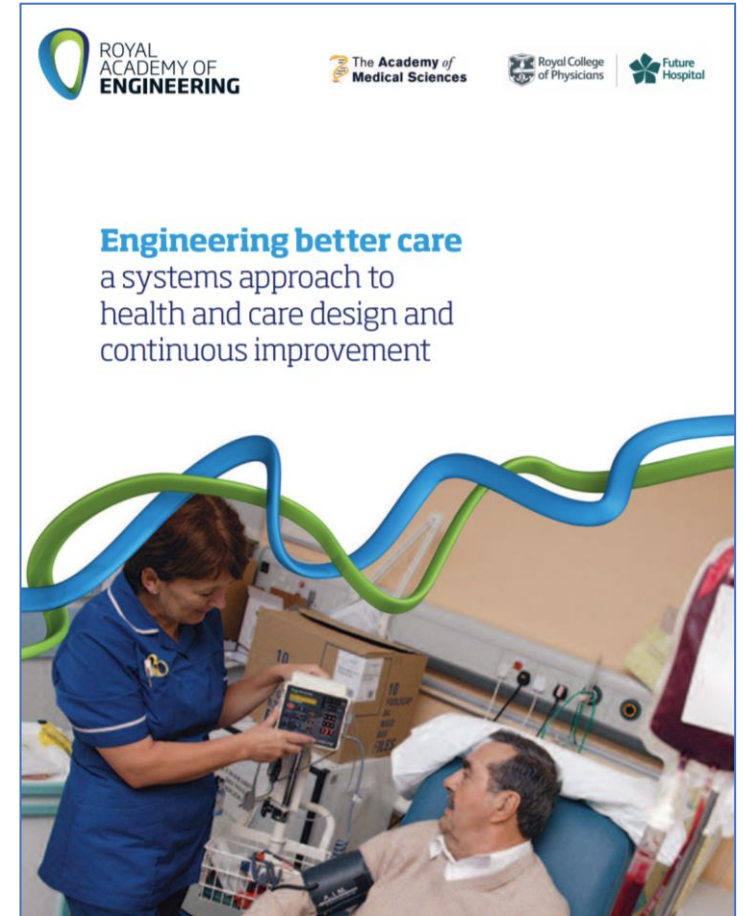


Can it be done?

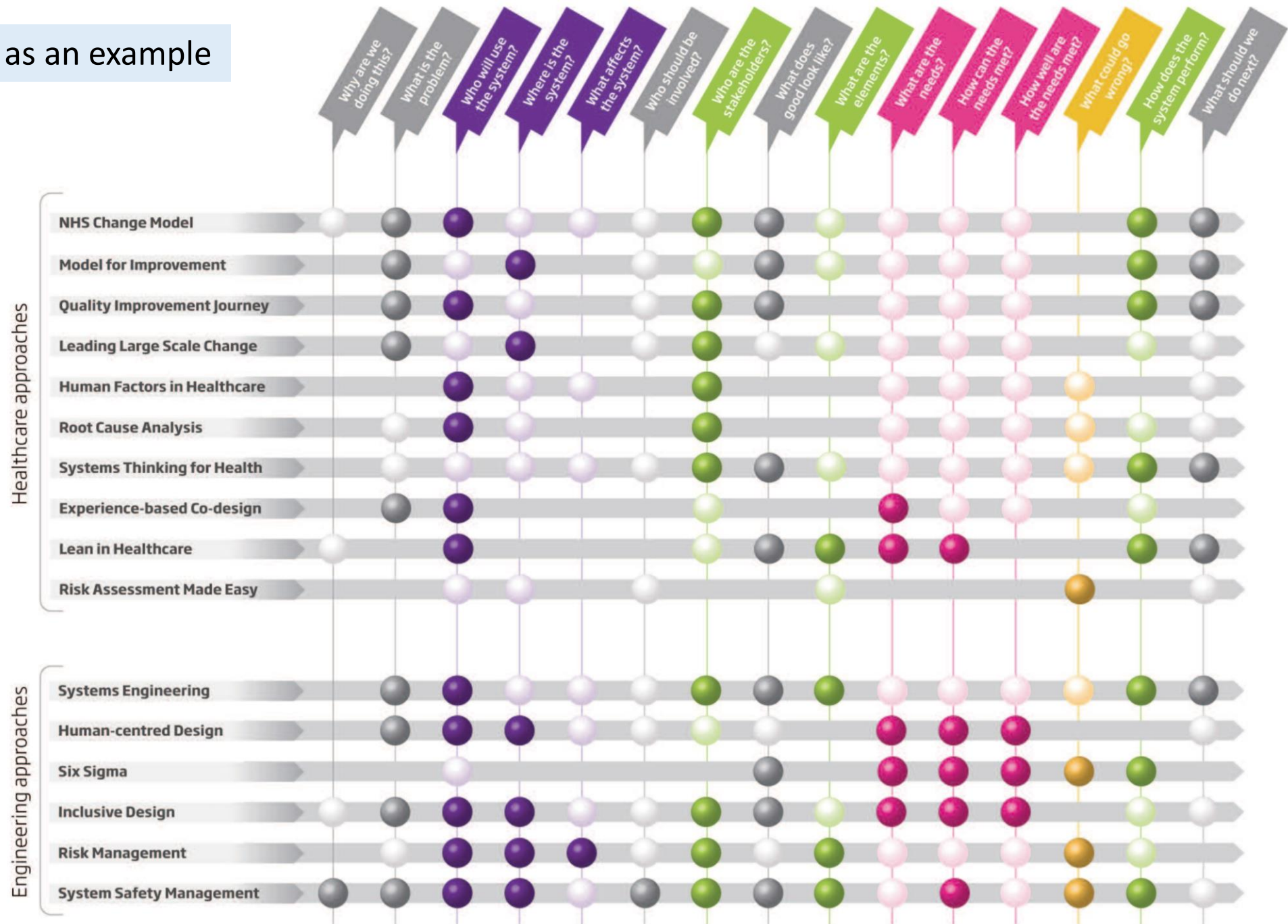
2017 report on Engineering better care from

- Royal Academy of Engineering,
- The Academy of Medical Sciences,
- Royal College of Physicians,
- Future Hospital

<https://www.raeng.org.uk/publications/reports/engineering-better-care>



Complexity of healthcare as an example



Solid coloured blob:
Clear guidance and tools

Light coloured blob:
Description only
without clear guidance
and tools

Systems are centred on people

An effective systems approach is centred on people, their needs, their capabilities and ultimately their role in understanding, designing, delivering and maintaining success.

Iteration before implementation

The behaviour of complex systems is not easily understood and improvement is most often the result of successive iterations targeted at maximising the chance of success prior to implementation

Design is an exploratory process

Improvement results from a creative process that seeks not only to explore the real need, but also to evaluate a range of possible solutions in order to select the best option

Risk management is a proactive process

The identification of possible opportunities for and threats to a system before they arise is more likely to lead to the delivery of robust and adaptable systems

Thinking changes practice, process helps

Individual perspectives give rise to changes in thinking that can immediately permeate current practice; a new process is an opportunity to deploy new thinking

Statutory national computing curriculum for 14 year olds in schools

Pupils are taught:

- How to design, use and evaluate computational abstractions that model the state and behaviour of real-world problems
- Key algorithms that reflect computational thinking;
- Use of logical reasoning to compare the utility of alternative algorithms
- Projects combining multiple applications to achieve challenging goals, including collecting and analysing data and meeting the needs of known users
- To create, reuse, revise and repurpose digital artefacts for a given audience, with attention to trustworthiness, design and usability
- How to understand a range of ways to use technology safely, respectfully, responsibly and securely