DIGITISATION OF REQUIREMENTS, REGULATIONS, STANDARDS, AND COMPLIANCE CHECKING IN THE BUILT ENVIRONMENT
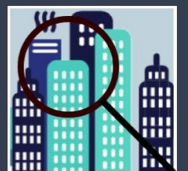
D-COM Note – A Call to Digitise

CONTENTS

FOREWORD

FROM ANN BENTLEY

The construction industry is at the tipping point of an overload of information. How we address this fundamental challenge for our sector and curate existing information and provide a cross industry approach of disseminating the right information to the right people at the right time is crucial.

This latest report from the Digital Compliance (D-COM) Network calls for just this through the much-needed digitisation of the compliance system.

The challenge it poses to the construction industry is that only by embracing as a whole the benefits that digitising requirements, regulations, standards and compliance checking can bring, will we ever address the concerns raised by the Hackitt review around responsibility and the departure from regulations being a systemic problem.

The work that D-COM is doing pulling together industrial and academic capabilities to provide powerful insight and recommendations around digital transformation and cohesion in our industry reflects absolutely the agenda of the Construction Leadership Council.

This report leads on from the consultation on the proposals for reform of building safety regulations and provides a thought-provoking approach to how we can really make a difference.

Ann Bentley

Member of the Construction Leadership Council (CLC) and
Global Board Director, Rider Levett Bucknall

INTRODUCTION

WHO IS D-COM?

The Digital Compliance (D-COM) Network was formed to meet the clear need for research, insight, and leadership in the digitisation of regulatory processes and automated compliance checking.

D-COM is highly rated in its ability to help create the landscape and agenda around digital transformation of regulations and compliance processes.

D-COM's network is formed from a balance of industrial and academic capabilities. It has a multi-institutional and multi-themed approach with transparency, which it considers significant factors in this journey.

WHY THIS REPORT?

D-COM has shown that the concerns raised in the Hackitt review of responsibility, and the departures from regulations are a systemic problem.

The Consultation for Proposals for reform of building safety regulatory system covers a broad spectrum of issues, which are all relevant. However, the consultation suggests simply adding further layers of bureaucracy in an already broken system.

So far there has been no meaningful suggestion of either the digitisation of regulations or the compliance systems.

D-COM understands the value of digitisation and is following the Industrial Strategy 2025, and the demand explained in the Data for the public good report, of the value that digitisation and data can bring.

While D-COM has made formal statements through the process, the publication of this report is to raise the emphasis and the argument for digitisation of the compliance system.

In this report **D-COM is calling to digitise the compliance systems**. D-COM has chosen to drive this, because the consultation itself did not adequately address or articulate its line of questions and recommendations to allow the response to be met from a clear digital and data centric perspective. The right form of questions did not materialise in the consultation document. This is because the relevant stakeholders continue to 'plug the leaks', and they are not grasping the opportunity to transform the regulator compliance system.

> This is an **opportunity to start to overhaul** the system
>
> - the current system is extremely difficult to police
> - it lacks resource and competency
> - there are too many departures from compliance
> - many regulations and statements are ambiguous
> - an untethered and un-auditable decision making processes

ACTIONS & FINDINGS

In D-COMs previous work[1] on the State of the Nation report on digitising regulations, requirements, and standards, it categorised the extent of digitisation into themes of technological capabilities, commercial demand, and political willingness. For the purpose of this response, D-COM continues broadly with these themes.

D-COMs viewpoints are made up of a holistic view of the current system, and what impact and benefit a digital system can bring.

ENCOURAGEMENT

From a perspective of **political willingness**, D-COM is encouraged that the government's **Building a Safer Future Implementation Plan[2]** features;

- create a stronger and more effective regulatory and accountability framework for buildings in scope

- stronger and more effective sanctions and enforcement regime

- clearer standards and guidance

- improving the rigour of the product labelling, testing and marketing process

- residents at the heart of the new regulatory framework

- drive culture change to increase responsibility for building safety

Reform the whole regime that will make a significant difference to;

- those who live in high-rise residential buildings

- those who regulate the buildings

- those who develop the buildings

- those who own existing buildings

- those who provide materials used in construction

For all of the above to be effective need, a clearer set of responsibilities with accountabilities at the right level, and clearer guidance to operate within should be mandated.

Profound **political intent to reform the whole regime**

- residents safety at the heart
- effective regulator
- compliance & accountability
- sanctions and enforcement
- clear guidance
- needed culture change
- product labelling
- product testing

THE CHALLENGE

However, too often, government leaders view digitisation as a trade-off with other priorities and they invest only where they believe the value in mission outcomes, operational efficiency, or responding to public or regulatory pressure for change.

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[1] D-COMs Briefing Note

[2] Building a Safer Future Implementation Plan

The Government's preferred outcomes and intent are being wrapped around an existing regulatory system that is broken and dysfunctional. The proposals in the recent consultations will culminate in a **broken system that is being layered with bureaucracy.** It will introduce more inefficiencies, time lag between processes and stress on resources and cost.

- **Unclear Guidance and Regulations** – the existing regulations and guidance were viewed as complex and unclear, leading to confusion and misinterpretation in their application.

- **Unclear Roles and Responsibilities** – accountability for the safety of a building throughout its lifecycle was unclear.

- **Inadequate resident engagement** – there was no clear route for residents to escalate concerns about their building and ensure that action was taken.

- **Weak compliance, enforcement, and sanctions** – the current system for assessing buildings and ensuring that their design meets standards and what is built meets regulations, was considered weak, and does not assure residents' safety. Weak sanctions failed to drive compliance within the sector.

- **Lack of competence** – the means of assessing and ensuring the competence of those working on high-rise and complex residential buildings was seen to be inadequate.

- **Inadequate product quality** – the existing system of product testing, marketing and quality assurance was seen to be inadequate.

- **Ignorance** – regulations and guidance were not always read by those who needed to, and when they did, the guidance was often misunderstood and misinterpreted.

- **Indifference** – the primary motivation was often to do things as quickly and cheaply as possible rather than to deliver quality homes which are safe for people to live in. When concerns were raised by others involved in building work or by residents, they were often ignored.

- **Lack of clarity on roles and responsibilities** – there was ambiguity over where responsibility lay, exacerbated by a level of fragmentation within the industry, and which precluded robust ownership of accountability.

- **Inadequate regulatory oversight and enforcement tools** – the size or complexity of a project did not seem to inform the way in which it was overseen by the regulator(s). Where enforcement was necessary, it was often not pursued. Where it was pursued, the penalties were so small as to be an ineffective deterrent.

Identified **concerns that highlight fundamental systemic issues**

- Unclear guidance & Regulations
- Unclear roles and responsibilities
- Inadequate resident engagement
- Weak compliance, enforcement & sanctions
- Lack of competence
- Inadequate product quality
- Ignorance – guidance not being read
- Indifference – cost vs human life
- Lack of clarity on roles and responsibilities
- Inadequate regulatory oversight
- Inadequate enforcement tools

A CALL TO DIGITISE

WHAT IS DIGITISING?

Digitisation is the process of converting information into a digital format. In this format, information is organized into discreet units of data that can be separately addressed.

This digitised content is versatile and can be used to communicate efficiently and effectively with stakeholders across a range of channels.

WHY THE NEED FOR DIGITISING?

The purpose and value of digitisation is served by the use of the data to achieve transparency, insights, and protection for the public good.

From a wider perspective of the sector, the Industrial Strategy calls for;

"....technology to deliver better, more certain results during the design, construction and operation of a building or infrastructure asset. These must increase asset availability, life span and maximise performance."

In today's world; documents, requirements, standards, and regulations are essential for creating a safe built environment, and for the citizen to go about their daily business. However, this information is articulated in a style of language that is mostly interpreted, checked, and complied with by humans.

Technology and modality, e.g. new methods of communication with machines like voice commands and face recognition, are allowing connecting to the digital world faster. This is starting to enable some of the interpretation and checking to be done in real time by machines without human intervention.

The technology is here and has been used in other sectors in similar applications. The cost of the technologies and the platforms are also becoming affordable and accessible.

Automation of such processes can be undertaken by machines producing certainty in results, allowing the human to create rules and administer other duties, while maintaining an oversight.

As most machine rules are condition based, this allows gateways to be built, ensuring compliance while maintaining an audit trail with a digital footprint of all stakeholders that would interact with a digital system.

Cyber-security and safety of data would be at the forefront in this approach.

Opportunities through **digitisation**

- compliance certainty
- enhanced accuracy
- greater control
- performance bench marking
- greater quality insights
- accelerated reporting

Fulfilling the intent of

The Golden Thread

Needed Outcomes

When agencies and organisations do try to tackle the digital challenge, they make small bets with piecemeal changes and patchwork investments. This leads to the predictable results of short term improvements that leaders crave.

The needed outcomes:

- quantifiable impact
- achieving the mission
- managing to budget
- mitigating risk
- reduce waste
- tempering bureaucracy
- strengthening public trust
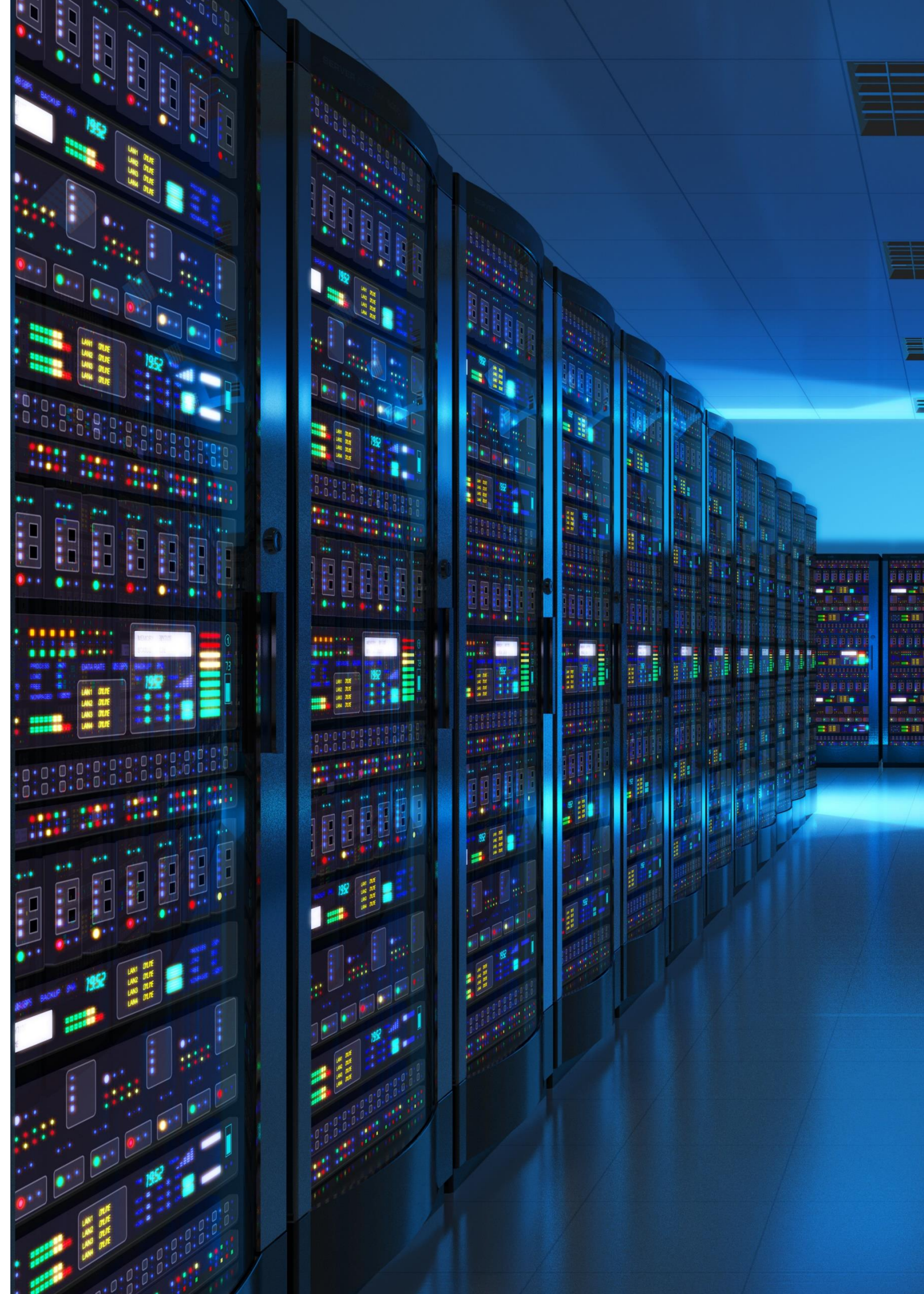
WHAT NEEDS DIGITISING?

The current landscape of requirements, regulations, and standards compliance is very complex and operates mostly on manual processes, marred by bureaucracy. This is compounded by poor user experience, silos, lack of competency, lack of transparency and committee driven decisions that restrict accountability, and with legacy systems in tow.

D-COMs digital compliance model will take the **approach of a platform based system** where various stakeholders can engage with a compliance system that shares relevant data to ensure that consistency and persistency of compliance through the life of the built assets is maintained.
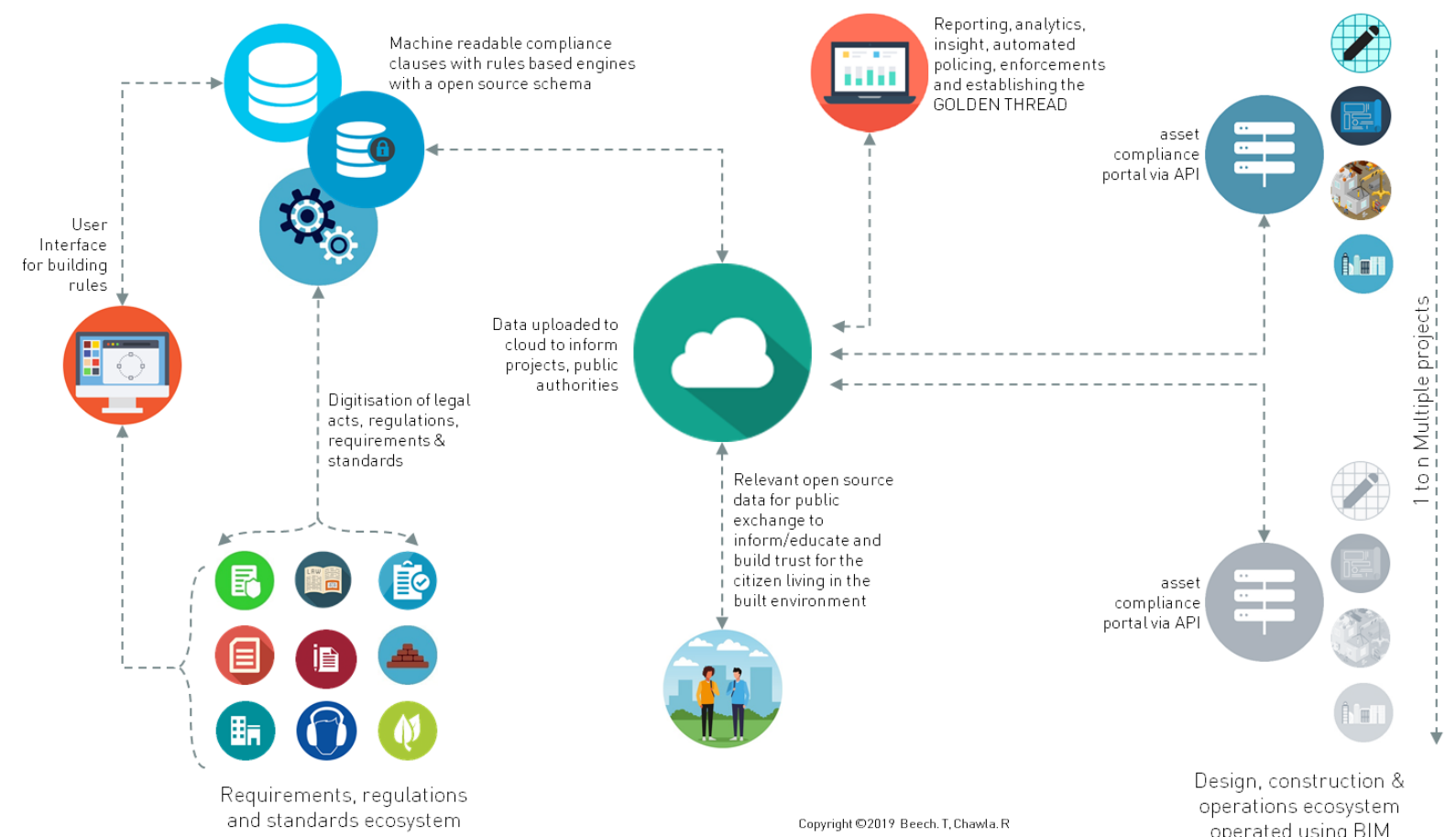
The key objective is to ensure that the information that is generally written in a text form **can be read by a machine**. This requires the data to be in a format that can be easily processed by a computer without human intervention, while ensuring no semantic meaning is lost.

As a general rule all machine readable information needs to be structured. This will be a natural progression to the use of AI (Artificial Intelligence) allowing the machines to learn from the data that is captured.

The key areas that will need to be digitised are;

- Relevant policy and legislation
- Interpretation of the legislation
- Client requirements
- Regulations and guidance
- Relevant standards
- Products & their performance

PLATFORM AT A GLANCE

Machine readable compliance clauses with rules based engines with a open source schema

Reporting, analytics, insight, automated policing, enforcements and establishing the GOLDEN THREAD

asset compliance portal via API

User Interface for building rules

Data uploaded to cloud to inform projects, public authorities

Digitisation of legal acts, regulations, requirements & standards

Relevant open source data for public exchange to inform/educate and build trust for the citizen living in the built environment

asset compliance portal via API

1 to n Multiple projects

Requirements, regulations and standards ecosystem

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Design, construction & operations ecosystem operated using BIM

BENEFITS OF DIGITISING

There are several benefits that will have a far reaching impact on society as well as professionals and regulators which will underpin the business case for digitising the compliance system.

- Compliance **certainty** that leaves an audit trail and digital footprint of all stakeholders engaging with the system, reducing risk at capital and operational stages

- **Cost savings** through better control of compliance, enabling greater human oversight

- **Improved ROI** and asset performance through a view of "true cost of quality"

- **Reduced data errors** and reduced time spent to investigate root causes of failure

- Build in **greater control** of compliance and policing capabilities and avoiding manual compliance

- **Real-time self-compliance** during design, construction and operation

- **Time-saving** in searching, collating and processing field reports to generate compliance in all phases

- Enhanced **data for analytics and insights** in real time, to inform decision making

THE CHALLENGES

There are challenges in digitising the compliance system and buy-in is required from each stakeholder to enable this. This will necessitate:

- Stakeholders such as regulation and standards publishers need to **develop new business models** to enable digitisation

- Shared **open standards** for regulation clauses

- **Cultural change** to accept automated compliance checking

- Establishment of a **public right** to see compliance data

- Implementation of a **strict legal responsibility** for compliance

- Formation of protocols for **products** and creating a **clear chain of custody of data**

- The structure of standards for writing future **regulations to be prescriptive**

- Clear **government mandate** towards automated compliance checking

- **Industry** to show leadership in **leading and digital transformation** and enabling key areas for reform to take place

- **Avoid a multi-tiered system,** such as those being suggested to create a New Homes Ombudsman, penalising SMEs.

CLOSING REMARKS

The advent of Building Information Modelling (BIM) in the construction and infrastructure sectors is starting to build a stable and secure standards base. BIM will start to mature only when other processes surrounding it also start to transform and digitise.

There will be caveats and suggestions, that automation should have human oversight. This is fundamental when affecting transformations.

D-COM acknowledges and recognises that until trust is established, automation, in near future will include Human Aided Design Policies.

END

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CENTRES OF COMPETENCE

Cardiff University has been involved in research relating to the automation in compliance checking since 2012. They were the technical lead in the RegBIM project and led the development of a complete methodology for regulatory compliance (from specification of regulations by regulation experts, to data mapping between regulations and the IFCs, to rule based execution). Since the RegBIM project this technology has continued to be developed incorporating the latest advancements in semantics.

Bryden Wood are a multidisciplinary consultancy of Architects, Engineers, and Data specialists. In addition to data analytics which inform platform-based designs and design for manufacturing technologies. Bryden Wood are working to unlock the power of big data and transform the way the construction sector interfaces with information, developing data tool kits which automate the design process, and interfaces including AR and VR which help organisations understand and engage with their data.

AEC3 has been implementing, developing, and researching automated compliance of regulatory, requirements and recommendations since 1998, culminating in the development of AEC3 Require1.

MACE is an international construction and consultancy company founded on the 'pursuit of a better way' of delivering the built environment. In recent years we have helped large public and private sector clients in digital transformation programmes, initially as part of the transition to BIM Level 2, but now more directly at each of enterprise, programme, and project level. As part of this digitisation, we are

helping clients explore the opportunities of automation, which includes automated checking and validation, and smart asset management.

HKA is the largest provider of construction claim and dispute resolution services globally. HKA advice on how digital ways of working can address common points of failure and have been commissioned to undertake the most comprehensive BIM assurance review of the UK supply chain to date, advise the Mexican Government on national digital transformation, and investigate the legal opportunities and blockers of emerging digital technologies for PIF & i3P.

Innovation Factory (previously known as Process Innovation Forum **(PIF)**) is an innovation platform where challenges are matched with innovative solutions. It scouts for ideas and innovations and graduates these within the AECO (architectural, engineering, construction & operations) industry sector groups. PIF specialises in innovation management, discovery projects, developing business from innovations, industrialisation of products and processes, and scaling to market. It provides business support and diligence for new innovations.

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