

CS501147

Future of Work: How Do You Implement That?

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Learning Objectives

- **Learning Objective 1:** Learn about common causes of dispute and loss in requiring or accepting requirements for transformational change in projects
- **Learning Objective 2:** Learn how to minimize or avoid causes of dispute and unintended liability in implementing transformational or digital change
- **Learning Objective 3:** Learn about how to best incorporate common future thinking and digital change requirements into contracts and scopes
- **Learning Objective 4:** Learn about the key internal processes that will effectively support the implementation of digital change and transformation

Description

Autodesk is providing insights, technology, and training to help you and your business prepare for the future of work. However, how do you practically implement this transformation-whether its greater automation, AI (artificial intelligence), or digital twins-effectively in your projects? Are you accidentally exposing yourself to (potentially uninsured) risk and liability? Are you taking on more than you expected or costed for? In this practical and pragmatic class, receive guidance and tips on how to minimize risk and maximize profitability and effectiveness through clear documents, scope, and processes.

Speaker



May is a senior construction and construction insurance lawyer of over 18 years' experience. She is recognised as a leading specialist in construction technology and digitisation, and speaks at conferences worldwide and is the author of various papers on these topics. Her AU2020 class on overcoming the legal and contractual risks of cloud computing was listed as the first of the top recommended classes for EMEA Region. She has worked for and within various international organisations within the design and construction industry, as well as advising and representing insurers in this area.

Within BuroHappold, she takes the lead in digital and BIM legal and contractual risks and matters including improving documentation, processes, reducing risks and considering the impact and supporting the development of new digital and technology-focussed procedures, software and services.

About Buro Happold

Buro Happold are an international, integrated consultancy of engineers, consultants and advisers, with a presence in 31 locations worldwide, over 70 partners and 2,200 employees. For over 45 years we have built a world-class reputation for delivering creative, value-led solutions for an ever challenging world. As a truly inter-connected community of experts, we value human wellbeing, curiosity, embrace mutual responsibility and genuinely care about the impact and legacy of our work.

When it comes to future thinking and technology, it is not just something we do, it is in our DNA. Buro Happold's integrated approach to harnessing technology – coupled with in-depth, sector-specific knowledge – helps clients navigate this dynamic environment to create business value. Technology and digital services range from data analytics to BIM and computational engineering consultancy to deliver a transformational, data-driven approach to solving problems, maximise outcomes and improve efficiencies.

Accepting Digital and Transformational Change in Projects: The Common Causes of Dispute and Loss

Despite the many challenges recent and ongoing, our industry has taken great leaps in the last decade assisted by transformational and digital change. Although adoption of such change has often been at a frustratingly slow or inconsistent form and pace, the benefits are significant, ranging from reduced cost and time to increased quality, safety, and profitability. This in turn increases the attraction of the industry to the next generation of workers; much needed with the current talent shortage. However, the implementation of new technologies and working methods brings with it uncertainties, risks and potential misunderstandings, all of which in turn have potential to lead to expensive disputes if not properly mitigated. If you simply digitize and change your business whilst ignoring such issues, you do this at your peril. Disputes and unintended liability will only detract from the benefits of any transformational and digital change.

The potential causes of dispute and loss could be broken down into a few categories as set out below.

Copyright and Ownership

A more digital and collaborative way of working introduces more variables into the question of “Who owns what?”. There will obviously be design and design materials prepared for the project. Such designs may be developed by different parties over the course of the project - for example a design may be handed over to a modular manufacturer to be developed in a way suitable for the manufacturing process. Some aspects of the design may have significant future potential for use in other projects or continued development of a new service, for example design of a particular type of software or kit-of-parts.

At present many contracts, as standard, transfer copyright in all designs and materials created during a project to the client; the author only retains copyright in its pre-existing materials. However one must ask if this accurately reflects the nuances of this new way of working? To take a couple of examples, the product’s designers may want or need to retain control or use of some of the coding, templates or data to facilitate the growth of its intended services to other clients. Equally, a client may prefer to have some restrictions on the designer’s use of pre-existing design materials insofar as it may result in a directly competing product or deliverable, and indeed an overall general exclusion or restriction from creating a competing product for a certain period of time. Competition is a less relevant issue for traditional construction but in the digital realm becomes crucial for businesses seeking to develop unique offerings and portfolios.

An equally important question to be asked to the parties is “What do you want to own?”. Where the ownership and control should sit for each element must be considered at an early stage so a reasonable position can be expressly agreed for those parts that matter to you. If this is not done, there is a real risk that the contract and documentation will not expressly deal with these

elements (as the contract drafters are usually blissfully unaware of their existence) which can lead to a disagreement later on when the right of a party to use, or restrict use, of a document, code or data set post-project is unclear. Gaps and uncertainty are often the biggest source of disputes as there is no readily available resource to determine whose position is right; you'll need a court or negotiated settlement for that, which is almost always costly and time-consuming.

The know-how and knowledge gained by a party during the project is one category that often gets forgotten. Whilst one may assert that the know-how and knowledge in one's head cannot be handed over or given up, the same may not be true of the manuals, reference booklets and notes prepared recording the same. Again, many contracts as standard pass over ownership of all documentation, including work-in-progress and internal notes, to a client. A consultant or contractor may want to retain specific documentation that, for example, set out its digital strategy, process and calculations that it intends to apply as standard across certain projects. However, as mentioned above, a client may have its own strong motives for restricting use in documentation that, in their view, could facilitate the development of competing outputs to its own.

Finally in the realm of copyright and ownership, there is the question of ownership of any physical items produced. These may include for example, modular components, 3D printed items and, perhaps less common, AI-developed items. Ownership for all these may be straightforward in many cases, i.e. ownership should sit with the client. The devil will be in the detail. At which point should ownership transfer? At time of payment, or at time of delivery? If the former, is it clear between the parties when the risk and security of these components and items also transfers to the client (or another party)? For example, such responsibility may pass between different parties from point of production to transportation to installation to finished construction. As a side note, when it comes to any items produced with significant input for AI, there are ongoing debates on whether ownership should sit with the AI itself – that is outside the scope of this handout though!

Ultimately, it is a business decision for each party as to which of the various data, designs, documentation, data and other materials are important to it, and which it is willing to forego to the other party. The trick is not to simply ignore this question until you've already started arguing over who owns what.

Liability and Risk

Turning next to the most common cause of dispute... Who is responsible for what, and who accepted a particular risk?

This issue can be most easily considered by splitting it between the potential liable parties.

Your own liability and risk

First, what have you promised to provide? There are numerous examples of where a client, genuinely and honestly, claims that deliverables do not match (their interpretation of) an agreed scope but the project team member has a directly opposing view. This can often arise from vague scope detail and the lack of standardized terminology or understanding across industry and between regions. A client's understanding of what it will receive when simply asking for a "digital twin" is likely to differ radically from that of a specialist engineer.



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Figure 1: Don't just assume everyone understands a vague scope the same way

In an alternative scenario, a client may not realize they are asking for things which are simply not possible to deliver, such as when they require "clash-free models" or a form of automation that will link seamlessly with all operating systems. The client will be disappointed in not receiving their anticipated end result, and when lawyers get involved, they will hold the project team to the strict letter of the requirements even if these requirements don't necessarily make sense to an experienced technical specialist (the lawyers being unlikely to know this fact without explanation, in any case). If you agree to something, technically you are bound to deliver it even if it is nonsensical to you; you cannot rely on a tacit understanding of all parties that the element was impossible to comply with.

Then even if you do produce deliverables to the satisfaction of the client, the risk doesn't end there. You or the client will pass on these deliverables and works in progress to different members of the project team to use and refer to. There are numerous examples of disputes within the industry where data and materials were used for purposes or stages of a project for which they were not designed or intended. Some

sections being relied on may be incomplete or unchecked or simply unsuitable for the purpose (such as schematic models being used for detailed design), with problematic results of delay and rework. You then have an argument of what was reasonable for the relying party to assume and understand because they received the materials without express restrictions. You can waste a lot of time and money proving you are right, and they were unreasonable.

Liability and risk of other project team members

On the flipside, you will also be receiving data, information, and deliverables from other members of the project team. There may be delays in delivery, bad data or errors within the data and deliverables received. You should not assume you are entitled to additional time and costs for the consequences of this, or that you will escape liability where, for example, your data output or deliverables are also late or defective as a result. If you want certainty of an entitlement to time, money or protection in such circumstances, you need to agree to it in a binding, contractual way beforehand.

Indeed in this new way of working, we are all exchanging vast amounts of complex, and sometimes sensitive, data between various parties involved in the project. Regardless of any confidentiality agreements, a party could accidentally give access to the wrong parties or fail to withdraw access from terminated subconsultants or disgruntled employees. I read of a case where a consultant accidentally gave electronic access to data to all tenderers instead of a particular selection, leading to the cost of a complete re-tendering process. What if a disgruntled employee amends a section of the data and this goes unnoticed until significant wasted costs are incurred? Is there an agreed access and security protocol in place for the project? Is it clear that everyone is responsible for policing their own use and access to data received, or that this obligation sits with one coordinating party or even with the client?

Client's liability and risk

The client plays a central and important part in the success of a future-thinking and digitally forward project. The new international standards, the ISO19650 series, contains helpful direction on the role of a client to ensure the success in such projects from the outset. Readers are advised to refer to the [UK BIM Framework](#) website which provides detailed guidance on implementing the ISO19650 series processes, with different levels of guidance available for different categories of users of the standards.

From your point of view (unless you are the client), one of the key issues will be for the client to ensure compliance with any agreed process and programme by the other project team members. Digital ways of working are more sensitive to a failure to follow an agreed process and strategy. For example, parties using different naming conventions or different versions of a software can have real knock-on effects to the efficiency of the project.

A client will also inevitably be providing various data and documentation to facilitate the services and works. Contracts often specify that the client makes no warranty regarding the accuracy or completeness of such materials, so it is up to the recipient to check it and decide if it is sufficient. Depending on the project, this may or may not be practical or fair. Any checks and reviews of such materials will need to be factored into the price, as in such a case, it will not be an additional service.

If the client is responsible for setting up the common data environment or data sharing platform, the timing of this will be important to avoid a messy and ad hoc exchange of information between parties. Is it clear that the project team will not bear the consequences of delay or issues in setting up the common data environment or data sharing platform? What if you are hosting on behalf of the client? Is it clear you are not responsible for problems in accessing the common data environment or data sharing platform, whether due to the service provider or otherwise?

Miscellaneous gaps

At the most basic level of managing the risks, you fundamentally want to avoid any 'gaps' i.e. parts of the project, duties or risks that are not allocated to any party. Those gaps can cause the most heated disputes when it is revealed that parties have polar opposite understandings of where the duty or risk should lie. This is often aggravated by a simple failure to properly collaborate – if you do not discuss matters openly and regularly, potential gaps may not be discovered until there is a problem. Simply talking to each other and working together in a consistent, standardised way can avoid a host of issues - future thinking and digital change cannot succeed in silos without such collaboration.

Lastly, it is important to consider whether the processes you are implementing have any specific risks inherent in them. For example, modular or off-site manufactured components need to be transported from the factory to the site and then installed. Is it clear who is responsible if damage occurs at any point in that process? Are they insured for such potential damage? Equally, during uploading or exchanges of data, files could get corrupted or damaged. Have parties agreed whether the sender is responsible for avoiding any such corruption or damage, or are they going to simply argue about it if it occurs?

Acronyms and Jargon

The industry abounds with acronyms and undefined phrases – TIDP, MIDP, net zero carbon, digital twins, sentiment analytics... even BIM falls within this category. Specifying or requiring any such items or agreeing to deliver them without any further detail equates to not much more than saying you want or will give some "stuff". Whilst the industry is developing, and the technologies are being implemented in different ways, there is a lot of danger in failing to explain what, exactly, will be deemed to be compliant with the stated word or phrase.

Training and Software

Clients, consultants, contractors, and supply chain will inevitably be at different stages of understanding and development in implementing a particular digital process or transformational change. Do parties require or expect training or access to software? Is this implied or expressed in your scope of services? Is it built into the price or is it an additional service, and can it be declined? There may not be any clear end date or programme for this particular service. Does it complete at handover or is there a continuing obligation for update training sessions or continuing to provide (and pay for) software licences for other parties?

In over a decade of specializing in this area, I have noticed that some parties may throw up their unique challenges. Is there a party known to have a mindset against digitisation or forward-thinking ways of working and so will ignore the required process? Is it clear they will be liable for the consequences of such behaviour? Are there parties who are less advanced in their processes and so will likely require others to provide more detailed data and materials than budgeted for to facilitate their own outputs? Is it clear this would amount to additional services, and any limits on one's liability for the accuracy and use of this additional detail? What known behavior patterns are likely to cause tension and disagreements; can these can be mitigated at the outset to avoid wasted costs and frustration?

How Can These Risks Be Mitigated or Avoided

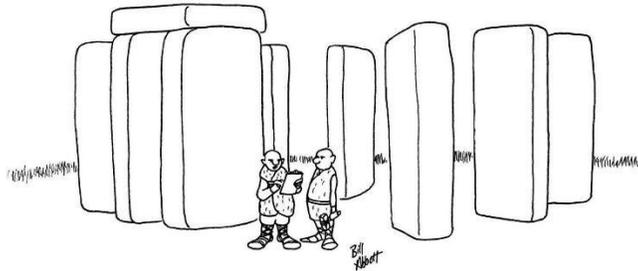
Sensible risk management needs to be a matter of balance. Too much risk management procedure gets in the way of efficiency and collaboration; too little opens up a minefield of loss and disputes. In implementing transformational and digital change, your organisation will need to maintain a degree of flexibility and agility, adapting your risk management processes and protocols to suit changing technologies and your organisation's intended ways of working.

Different projects, available budgets and different regions may require different implementations or lead to different interpretations of a particular risk management procedure or policy. Whilst there can, and should, be organisation-wide overall standardized policies, there will be no one size that immediately fits (and satisfies) all. Risk management however will only have impact if the implementation and plans take into account the peculiarities and personality of one's particular organisation. Discussion with knowledgeable, relevant parties within an organisation is essential to gather supporters and champions prior to roll-out, and ensure the intended policies are fully informed of and applicable to real facts and experiences. An organisation may be best advised to introduce the more disruptive procedures and policies in bigger projects and regions with bigger budgets, as they have greater flex to develop and perfect them, allowing the successful and proven risk management to then be rolled out to smaller projects and regions (or departments) with less financial flexibility.

Some suggested risk management and risk mitigation steps are detailed below. How the proposed steps are in fact successfully implemented will need to take into account the entire landscape i.e. the business's type of services or works, their existing practices, the attitude of their staff and the terms of the contracts they are binding themselves to.

Risk Allocation

One of the main ways to mitigate the risks described above is to ensure that there is clarity in the risk allocation between all parties, and then manage the risks allocated to oneself via procedures, records, insurance, or other methods. To put it simply, be sure it is objectively clear who does what, when and how? Repeating an important point made above, are you comfortable there are no obvious gaps in risk allocation as these will be real sources of potential dispute.



“Like it says here, none of these pillars are to code, you’ve built in protected habitat, and you’re not using Druid labor. Construction stops till these issues are rectified.”

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Figure 2: Do you know what you actually agreed to in a project?

Sufficient Detail

There are a few important areas that one should ensure have such detail and clarity, namely the scope, deliverables and description of any key tasks required for the digital or new process to be successful. If contractual clarification is impractical, ambiguity within the scope could be helped, if necessary, via agreed discussions recorded in minutes or emails (to avoid differing recollections later!). Don't be afraid to ask questions or seek confirmation if anything is not clear; better to discover what is intended now than face disagreements or dissatisfied parties later. Deliverables ideally must be prepared with the completed asset and use in mind. This may mean that the intentions behind the scope need to be discussed and bottomed out. Are particular formats preferred to be compatible with planned post-completion systems or is there a particular functionality that will assist the client's business plans? It will obviously not be reasonably possible to discuss and cater for every eventuality within the scope and discussions, and parties should remain vigilant regarding any entitlements to additional time, costs and other remedies and raise this, as appropriate, at the earliest opportunity to inadvertently avoid losing such rights.

Responsibilities

As mentioned above, any key issues or activities required for the implementation of the intended digital change should be clearly allocated to ensure they are carried out appropriately (or indeed at all). Some common additional issues or activities specific to

such new way of working include responsibility for setting up the common data environment or data sharing platform and controlling access to it; responsibility for ensuring parties comply with agreed processes and monitoring or checking data and deliverables issued; and responsibility for the security and content of data and components during transit and transfer. Related to the final point is also the level of responsibility accepted for the accessibility of data or deliverables and durability of components or items. There may be no history or examples to refer to on these – we may need to be making informed assumptions as we go along. If that is the case, it is imperative that the level, duration, and scope of responsibilities for the various issues highlighted is agreed upfront to ensure everyone has an agreed understanding. Parties also need to check that they are fully insured. When taking on new digital roles or responsibilities, it is heavily advised to have a discussion with one's insurance broker to confirm these all fall within one's existing insurance policies, or whether extensions are required to the cover, to avoid a risk of uninsured obligations (that will then be borne by the organisation itself).

Collaboration

The reality is that our industry is still not naturally very collaborative, though we have admittedly progressed in leaps and bounds in this area in the last decade. If left to their own devices, a project team may or may not collaborate and may collaborate in an ad hoc way. This is both inefficient and will likely lead to some failures in the intended digital or forward-thinking processes. Whilst it may seem counter-intuitive, making some collaborative processes binding and obligatory will ensure a more organized and successful collaboration. It is likely parties will find, during this obligatory journey, that collaborating results in a better experience and project, thereby being more willing to collaborate next time. So what sort of collaborative processes might this include? At its simplest, a requirement for parties to meet at regular intervals and discuss issues is not a bad start. Importantly, a standardized digital strategy including processes for data formats, naming conventions and exchange and compilation of data is a necessary component to avoid delays, rework, and confusion (followed by finger pointing for liability of the same) as parties will otherwise by following different processes and procedures. We have seen how a failure to do this can have bad consequence in BIM-enabled projects and should take heed of lessons learnt to date as they apply to the wider digital environment. On a similar vein, parties should remember to take steps to avoid interoperability and version control problems when using software and exchanging digital data.

Agreed compliance with the ISO19650 international standards will definitely help both risk allocation and collaboration. These standards are designed and created to help parties achieve clarity of roles, risks and responsibilities in future-thinking, digitally managed projects, and provide a comprehensive starting playbook between parties working in a future thinking, digital way.

Contracts and Documentation

To get what you want, you have to make it clear what you want in the first place.

Clear construction agreements are important



Figure 3: Clarity avoids disputes later

You Agreed to What?

Without clarity of language and sufficient detail to inform a uniform understanding, there is a real risk that parties will simply have different expectations of the requirements and restrictions of the contractual documentation. This confusion is aggravated by the lack of standardized meanings for a lot of the terminology in use. What do you think you mean when you say analytics? How about energy management system, building management system, Internet of Things platform or a digital twin? Some important clarification steps include:

- Including an agreed definition for all technical terms
- Detailing the key contents of a required deliverable including, where relevant, what system it should be compatible with rather than simply asking for a 'kit-of-parts' or a 'digital twin'
- Avoiding requesting or accepting requirements for deliverables which are not achievable or realistic, such as 'clash-free' models
- Taking the time to ensure all essential deliverables and processes are listed and priced in, to avoid unexpected costs down the line. The problems in this area can be due to a failure by the bidding team to fully engage with their organization's digital or specialist team early enough in the process to obtain accurate feedback and pricing; don't be one of those!

- Ensuring any new role, e.g. as a digital coordinator or smart buildings advisor, has a detailed scope including a list of exclusions for the role's duties
- Avoiding excessive, undeliverable and/or uninsured requirements or promises in one's excitement to progress the project. These may include references to 'best in class' or 'very highest standards' or that the design will be 'fit for purpose'. Do take specialist legal advice regarding the legal interpretation of the scope
- Considering early on what likely or potential changes or developments may occur during the project, and whether these will give rise to a right to additional fees and time. Are there any such likely issues that you want an express right to claim against, for example as you have specifically not budgeted for them?

Copyright and Ownership

If you take a blank piece of paper (or a blank text document, if you prefer) and list all the intended outputs of the project, which of these do you particularly want ownership or control of? Which are you happy to forego? The answer will be different for different parties and projects but is an essential question to consider before a project commences. You cannot expect your legal advisors to understand the subtleties in the number of copyrighted elements involved – they are not digital specialists, and this is not their world. You will need to give them the detail of those things you want to keep ownership or control of, so they can ensure this is built into the contract.

The list of potential items could be long, and would include:

- Design
- Models
- Existing Data
- New Data (including databases)
- Source code, object code and templates
- Kit-of-Parts
- Software (including publicly available software)
- Digital tools
- Documents (including manuals, technical documents, and calculations)
- Internal correspondence and notes

Also consider this - Even where you do not require ownership of some outputs or materials, you may want a licence to use them for related projects, future projects or simply for internal research and development and in anonymized presentations to potential clients or funders. Such a right, if required, needs to be built into the contract to avoid a later awkward conversation requesting permission.

Two other areas that it would be wise to spell-out within contracts in this area are:

- Access and ownership to documentation (e.g. manuals, playbooks, guides, and notes) detailing know-how and knowledge gained from the project – do these all get handed over to

the client or are the project team entitled to keep copies subject to specific restrictions of use and confidentiality?

- What right the parties have to independently develop or create something that is similar to, or in direct competition of, the deliverables or other project outputs. Avoiding similar output is easier when designing an office building but becomes more complex – and more far-reaching to an organization’s business plans – when one is talking about software development, automation, or other digital deliverables.

Limitations and Clarifications

In a bid to avoid misunderstanding and differing expectations, which in turn would lead to unsatisfactory deliverables and confused performance, it is always advisable to clarify what one is and isn’t responsible for.

All This Data

Thinking of data and other electronic outputs received and issued, does the contract or the scope make it clear:

- Who is verifying the accuracy and completeness of items issued, i.e. does the receiving party bear some responsibility or can they completely rely on it thereby claiming compensation for the consequences of errors discovered later?
- Who is validating that the items issued are in the correct format and uncorrupted? There may be a third party, like an Information Manager, expressly appointed to do this job.
- To what extent does a project team member have a responsibility to update the data, deliverables, and other outputs of a project, bearing in mind the fast-changing nature of this aspect of the industry? Has any continuing obligation been priced in, or will it be an additional service after a particular point in time?
- Who can, and cannot, rely on the outputs of the project team member, and for what purpose? Are there any restrictions for use and reliance for a digital twin or analysis report issued, for example, to ensure it is not misunderstood or used when outdated?
- Who is responsible for paying for any third-party software licenses? Does the client understand this to be included in the price, and if so for how long given the cost of such licenses can be quite expensive if extended over a period of time?
- It is always sensible to also clarify the extent of obligation and liability for others’ design, services, works and deliverables. Do you have no responsibility for them at all, or do you have some limited checking and review obligations (but no more)?

The [Autodesk Report, Harnessing the Data Advantage in Construction](#), makes a compelling case on the significant percentage of bad data on projects, and the resulting bad decisions and huge consequential costs estimated to be in the region of \$1.84

trillion. The potential liability for such losses where it was your data, or data you analysed, is a risk of magnitude it cannot be ignored.

Putting this into Practice

Below is an example of one of Buro Happold's projects where clear contractual specifications and overall strategy were developed collaboratively with the client, maintaining a user-centric design mindset that successfully made the asset a better place to be and a result that was as anticipated by both parties.

The intended end product and complexity meant that, if the specifications had not been appropriately clear and strategy agreed and understood by all parties, it was likely that the client would have been dissatisfied and/or the deliverables would have failed to achieve the intended result.

The Buro Happold team considered the various aspects, i.e. the ICT, iBMS and AV, as a combined technology unit and did the concept and scheme together. The team looked at the project overall and did a lot of work around considering user journeys to identify technology packages required. They then made use of a technology matrix to identify, analyse and determine which packages they could take forward, or not. There was no identified operator which meant the team could not properly elicit requirements to develop within the design and end product. As such, they had to overcome this challenge within the technology matrix quickly and in an easily digestible form.

The Design Principles Applied

- Comprehensive, multi-layered design (digital infrastructure, AV, iBMS)
- Activity across the network is constantly monitored, enabling realtime reconfiguration and alteration for optimal service
- Coordinated network infrastructure provides underlying communications platform for all hardware and digital service
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- Activity across the network is constantly monitored, enabling realtime reconfiguration and alteration for optimal service
- Coordinated network infrastructure provides underlying communications platform for all hardware and digital services
- Bespoke procurement dashboard and technology matrix enabling procurement strategy and cost plan

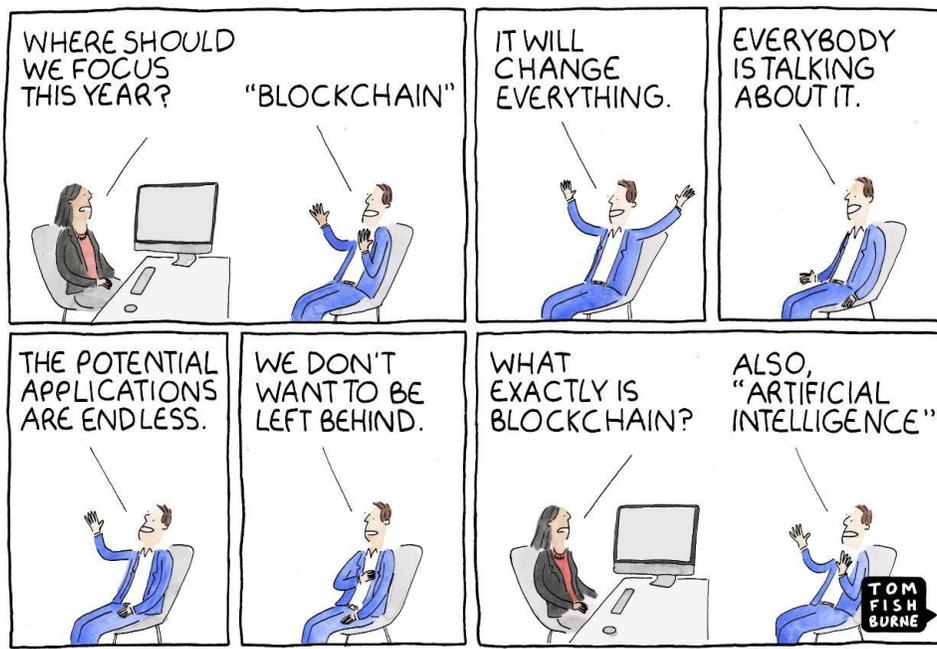
Some of the Positive Results

- Two networks, one exclusively for security data and the other for all other traffic
- Networks designed to be highly available, highly resilient, and scalable allowing them to cater for use immediately and into the future
- Network devices operate as a whole; directed and controlled from a central process
- Enjoyable experience for all users of site
- Flexible, easy to use tools that can be updated

Internal Processes

It may seem obvious, but the first thing to do from an internal perspective is to have a plan or strategy. Consider what your current systems and processes consist of, and the intended future-thinking strategy you want to implement in the medium and long term. What are the resources and technologies that are required? How will they:

- Be funded by the organisation, e.g. internal funding, public funding or via projects?
- Be selected, taking into account which technologies are likely to become business as usual soon and should be implemented now to be ahead of the game?
- Fit into team members day job, i.e. how will the balance be achieved between implementing new technologies and ways of working with day-to-day obligations?
- Be introduced and implemented internally in a way that is easy, intuitive, and accessibly non-technical for those in the organisation who are less technically minded? An analogy can be drawn with smart phones; everyone uses them without a second thought but many of the same people hesitate at use of similar technology in the workplace – how do you create a safe, welcoming environment for them to embrace the intended changes?
- Be analyzed to determine the return on investment? Senior management may need to be forewarned to keep an open mind on the type and timing of the return on investment as the benefits may be indirect (but business imperative) or longer term.
- Be used to encourage staff recruitment and retention, as the younger generation seek organisations who are committed to future thinking and progressive policies.



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Figure 4: Understand what you're implementing and why

When considering what technologies and future-thinking strategy to implement, one must not be seduced by the latest buzzwords and promises of a panacea to all your perceived problems. Any new systems being considered need to be analyzed carefully for suitability for your intentions and organisation, to avoid wasted costs and chaotic attempts at integration. Indeed, the integration requirements between existing systems and the intended new ways of working could be regarded as a common gap (see the visual below). Any strategy should bear this in mind and build in a rigorous analysis of proposed new processes and technologies to ensure they are right for the particular organisation or projects concerned. This analysis should normally comprise of 3 fundamental questions:

- Capabilities: What does the technology do? The use of technologies can roughly be divided into: centralize, analyses, control, optimize and engage. Which of these does the technology do, and is that needed by your organisation?
- Stack: What combination of hardware and software does it use to produce those capabilities? Are you satisfied with the practical and financial investment this may require?
- Scope: What existing devices and systems will it connect to? Is this compatible and user-friendly for your organisation?

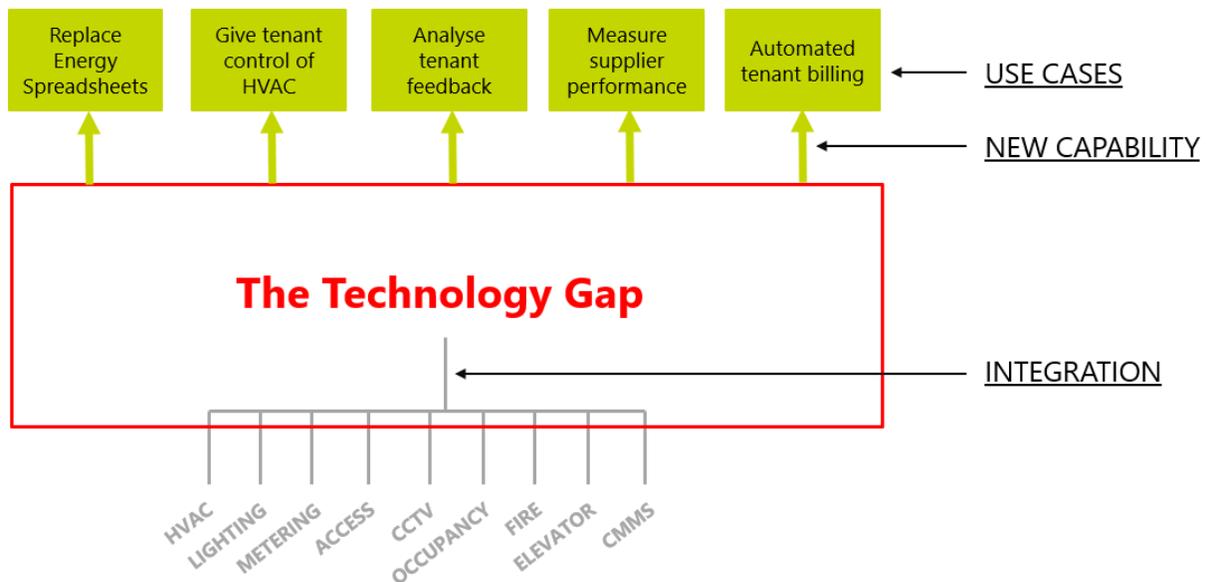


Figure 5: The Gap – The void between existing systems and new technology
 (credit: Tom Hopton, Buro Happold Global Leader for Smart Buildings)

To facilitate the successful implementation of any such strategy, an organisation will also need to consider how to imbed the following within their sturcture and various teams:

- Ongoing and continuous learning, via relevant tools and training programmes with built-in measurements of effectiveness (Autodesk provides a number of helpful resources in this area)
- Upgrading of skills and technology at regular and relevant intervals, which will require both funding and pre-planning
- Collaboration and knowledge-share with the wider industry; this being a constantly developing area and we would be wise to pool our knowledge for mutual benefit and progress
- Staged implementation of any planned introduction of new resources and technologies, as different regions and teams may require slightly different rules or timings. An organisation may trial certain processes and technologies in one team or region to iron out any kinks before rolling it out organisation wide.

It bears noting that none of the above will succeed without both supportive leadership and supportive culture within the organisation. This arguably includes the freedom to fail in the implementation of a future-thinking process or technology; to guarantee something will work is by its nature to be limited to do only what has been done thousands of times before.

New Ways of Working

Our industry is changing, although arguably not as fast as it should. Some aspects of the future of work will have direct impact on our internal processes and arrangements, and it is important to bear this in mind as an organisation looks to develop and implement new or progressed strategies. We are moving increasingly to front-loading the design process, which brings multiple benefits in avoiding rework and increasing quality but impacts funding and pricing arrangements. The introduction of a more digital way of working is also moving us steadily to more industrialized construction, i.e. the use of innovative and integrated techniques and processes such as building information modeling (BIM) and common data environment (CDE) to connect the design-to-make process. Arguably, industrialized construction is key to the “Future of Work”.

We have access to vast amounts of data that can be analyzed by our digital platforms and processes at a fast rate. But what do we do with it all? Some of this data was not accessible before, e.g. data obtained from wearable and portable technologies and digital passports on materials. What analysis results will be most useful?

This is why it is vital to make a coherent plan now on how your organisation or team intend to integrate and utilize this future way of working, as best suits your desired data outputs as well as your ethos, plans, projects, and available funding. A failure to consider your internal processes in this area will not just leave you behind your competitors, but also lead to ad hoc, messy, and risky implementation anyway.

The People Element: Moving towards People-Centric Design

In this world of talent and skills shortage, attracting and retaining staff is essential. An attractive workplace has shown to be a selling point for potential staff, leading to enhanced retention, enhanced attraction of talent and even a settling point for external client visits. It promotes a strong brand and confidence that an organisation demonstrably knows what it's talking about. Despite the hybrid working environment, people want to enjoy coming into work; few want to work full time from their front room or home office. A negative space and/or feelings that the organisation is not responding to the needs of its staff in this area, can lead to a negative, counterproductive, or even passive aggressive atmosphere.

Making the Space Attractive

According to the specialists in this area within Buro Happold, the main things to consider in designing or re-designing the space for the new world we live in are:

- How do the staff use the space to collaborate and exchange ideas?
- How can we use the space to be both useful and welcoming, or what space is needed to make this a reality? This may include adding more collaboration spaces or quiet spaces, depending on the particular office's users.
- How can we use technology to work better both together and individually – even better than before the pandemic – using the improved refecation and alignment we have gained in the last couple of years?
- Consider what you want the (new) norms to be within the organisation and workplace and progress the design to support that intention.
- Facilitate a hybrid, agile workforce to work collaboratively, such as by facilitating more intuitive booking of spaces. Do not underestimate the negative impact of a slow or unnecessarily complex experience.

For further discussion on setting the norms, see:

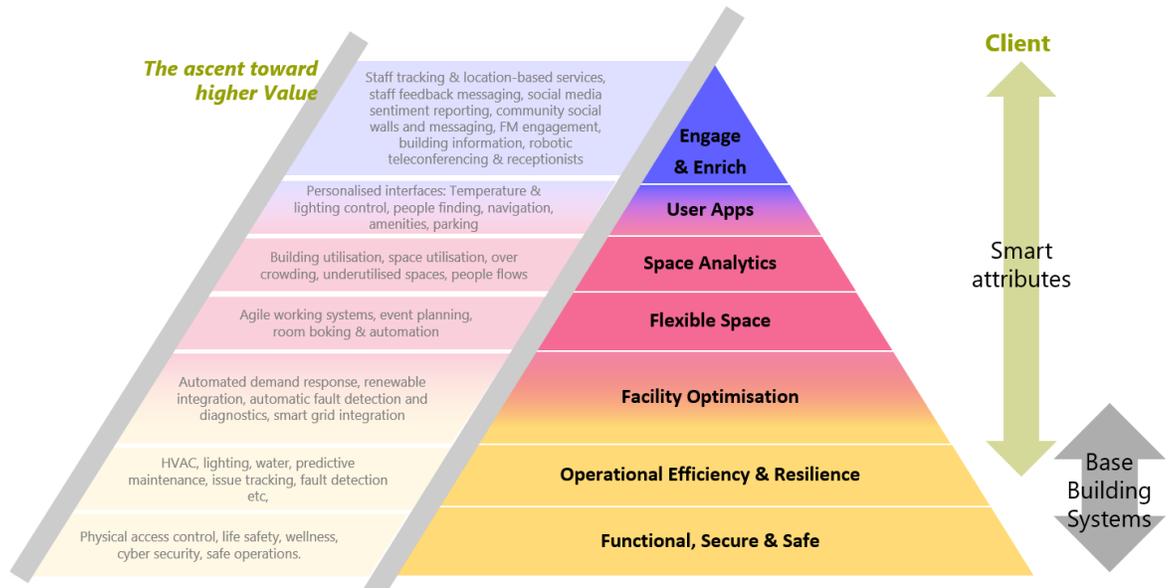
<https://www.brightspotstrategy.com/workplace-policies-procedures-noise-management/>

Does It Really Make A Difference?

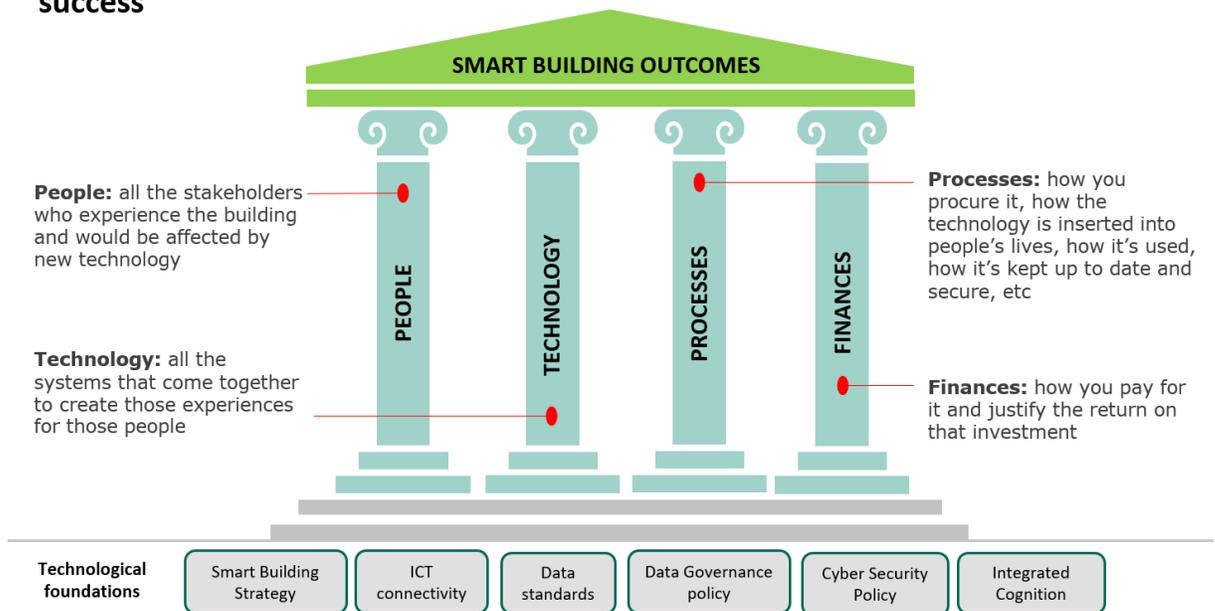
Assertions of a workplace with people-centric design is all well and good but does it actually make a difference to employee wellbeing and success of our service delivery? Below are some powerful statistics from a Buro Happold project which prioritised staff and other stakeholders' needs in its smart buildings design to powerful results.

How were those needs taken into account?

The **Smart Building Vision** is guided by the principle that...
A smart building is only truly smart if it builds on the hierarchy of stakeholder needs, an adaptation of Maslow's hierarchy of human needs

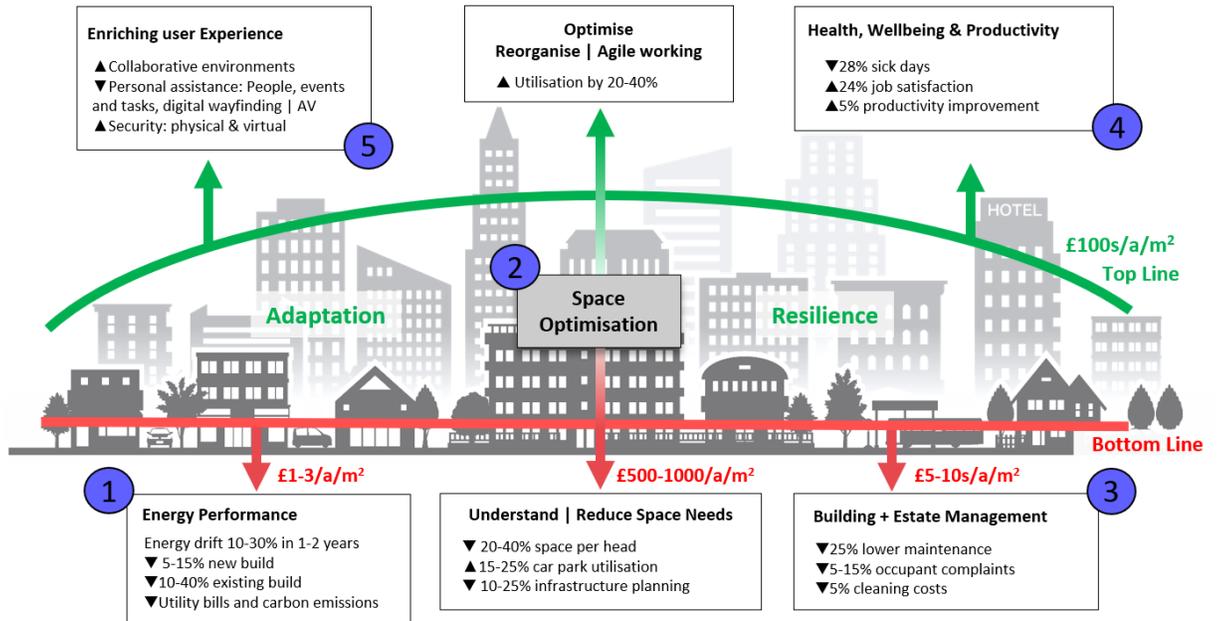


... deploying a framework for delivery, built on solid pillars and foundations for success



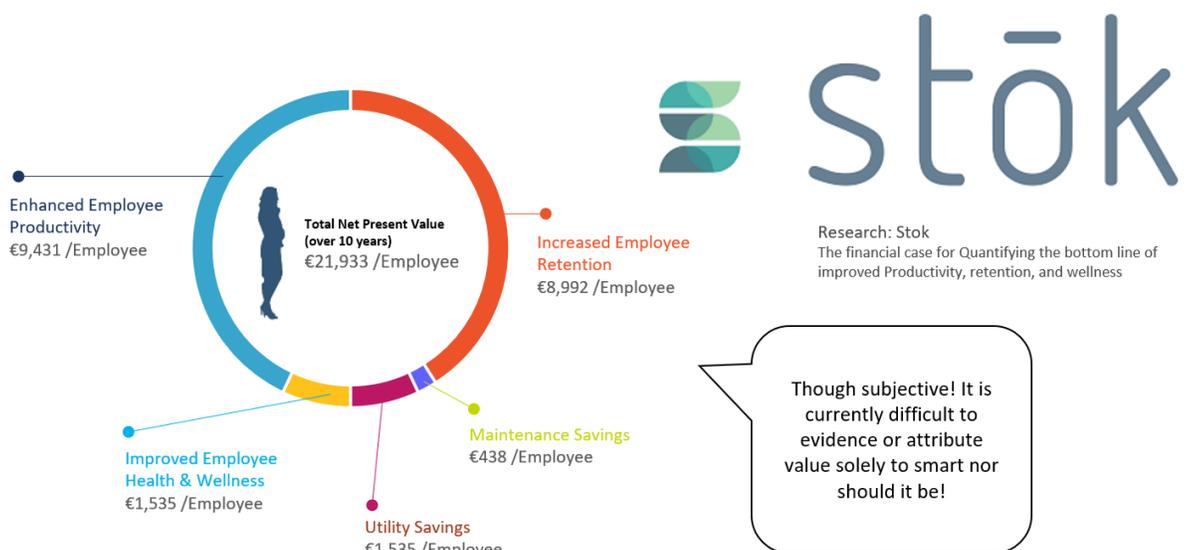
The Results:

It's not about tech, it's about holistic building performance...



But don't just believe us, here is some independent research in this area as well:

The Human Capital perspective...



Continuing Improvements

What do you do once you have this great, improved workplace and working environment? One key area must be to ensure feedback loops are set up within the organisation to enable continuous evolution and refinement to respond to the changing needs of the staff and the organisation. This is no different to the ongoing feedback request when we purchase a mobile phone or various other items, but is a tool surprisingly rarely deployed by organisations.

If you don't ensure people feel heard and communicate the reasons for any changes clearly, how do you know what is going well and what is going badly, and how do you ensure people are supportive and committed to the change? Buro Happold's own regular surveys seek to obtain the 'pulse' of staff on various issues to facilitate this continuing improvement. Seeking feedback could also obviously be not just directly via surveys of the staff, but also from clients, HR, Comms, and relevant knowledgeable Business Services to get a fully comprehensive picture. Communication to the staff in turn can take various forms to reach a wide spectrum of staff as people now consume information in different ways. The key is making it accessible. For example, it could include a change roadmap to make things as easy to understand, and comment on, as possible for those not directly engaged in the digital change processes.

Next Steps – The Soundbite Version

So what is a summary of all this explanation?

Combine agility and future planning with water-tight (but reasonable!) risk management. As the first step, take a blank piece of paper (or blank document, if you prefer), listing the things you are happy to accept as standard in your scope, the things you *definitely* don't want to do, the big things that could realistically go wrong and the main things wrong/that need changing to achieve the future of work within your organisation. That will give you a good starting point for a powerful playbook.