Bulletin 03

Summer 2019

Disruptive Innovators Network

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Ian Wright blog:

Summer thoughts on Innovation

With summer hopefully arriving at last, I've been reflecting on some of the challenges being faced by Network members and the barriers to being more innovative and agile.

One of the biggest challenges has been around how they can work best with the numerous start-ups who have pitched in front of them at DIN meetings, with most of them working in a Cloud environment.

There are so many brilliant potential solutions with companies readily wanting to engage with housing providers at speed. However, our ability to procure from start-ups is not where it needs to be.

I've asked several DIN members whether they are aware of the G-Cloud framework and, if so, how many have used this to contract with start-ups? Very few, if any, seem to have.

The UK Government G-Cloud is an initiative targeted at easing procurement by all public-sector bodies of commodity IT services that use cloud computing. The G-Cloud consists of a series of framework agreements with suppliers and an online store – the 'Digital Marketplace' - where you can find people and technology for digital projects.

G Cloud is going to be important for any organisation wanting to work with start-ups who utilise the power of cloud computing but don't have the track record of incumbent suppliers. Version 11 of G Cloud has just been launched and may be worth sharing with your procurement teams. Click **here** to view it.

I'd be interested to hear from any DIN members who have cracked working with start ups and have managed to navigate the procurement process effectively.

I have also been struck by the value delivered by our first international learning exchange with our peers in the Netherlands and Belgium (see feature on pages 2 and 3). Our European housing colleagues face similar issues to us but are approaching them in a very different way. Members were particularly interested in Qlinker, Holland's, first totally digital housing association. Imagine building your organisation from scratch with no physical presence. It's an early-stage idea and one we'll be watching closely.

In other news, our events offer has now ramped up a couple of levels and with a full programme that I hope is distinctly different to anything else out there. Everything from hands-on new tech workshops to study tours of Amazon warehouses to building a virtual human, all culminating in our annual Disruption and Innovation Summit on the 12th November at BT Centre, for which registration is now open. DIN members get one free place at the Summit, so if you haven't registered yours yet please do so via **this link.**

Finally, we are about to commence our first piece of sector wide research looking at the potential benefits and barriers of migrating to a Cloud-based solution, the findings of which we will share at the Summit.

Once again, a personal note of thanks to all those members who have been supporting DIN and for being part of this exciting journey with us.

See you in the Autumn!

Ian Wright, Managing Director - ian.wright@disruptiveinnovatorsnetwork.co.uk

Founding partner rhp

Delivery partners BT amazon web services rackspace the #1 managed cloud company Microsoft

Dutch (and Belgian) courage

It's a courageous leader who takes 20 social housing leaders on any trip, let alone one into foreign lands and on a mission to find the unknown. 'Hats off', then, to the Disruptive Innovator Network guru Mr Ian Wright for giving it a go.

Less than a year old, this felt like it could be a defining moment for the Network. Four days, two countries, bags of learning later, with new cross-cultural connections to help us, and many shared meals and some Belgian beer to fortify us, I think we can claim that the trip was something of a success. As we split up in Leuven at Friday lunchtime, I'm sure I wasn't the only one with a head full of ideas, a host of new friends and a new resolve to make a difference back at work on Monday.

It had started on the Tuesday at Microsoft in Amsterdam – just a short way as the drone flies from Schipol Airport. Microsoft showed us how Dutch housing associations were embracing new technology – two thirds have or are in the process of migrating to the Cloud. Fellow DIN member Jane Porter told us about Optivo's digital business transformation, its initial success and plans for a chatbot and sensors in homes and some candid thoughts on failure - such as how they underestimated how electrical vehicle charging demand would increase in winter due to heating in the vans!

That evening, with the remaining adventurers joining up with the group, we ate right by the famous *I Amsterdam* sign by the A'dam Lookout on the north bank of the IJ river. A perfect sunset helped us all get in the mood and as we wandered back to our hotels, the only clouds were those emanating from Amsterdam's most famous tourist attraction – the coffee shops.

Social housing has more than its fair share of geographers – just as well as there was a bit of an orienteering challenge to get to the events of the next two days – very cool co-working spaces hosting entrepreneurs working with technology on a wide range of social and environmental issues. Sadly, by the second morning we were already one man down after an unexpectedly close encounter with Amsterdam cobblestones and the Dutch health service.

Two thirds of Dutch housing associations are migrating to the Cloud... as we wandered back to our hotels the only clouds were those emanating from Amsterdam's coffee shops

But most of us were able to concentrate on the interesting and varied presentations – ranging from an exploration of the methods of creative thinking to practical demonstrations of virtual agents, environmentally sustainable homes, new approaches to lettings and thinking about how we could help residents turn their data into currency. The Internet of Things was a recurrent theme. We learnt that researchers believe there is a 50% chance that by 2064, Artificial Intelligence will be superior to humans *in all respects*, and that companies in Holland are using Escape Rooms as learning centres – teams having to answer work-related questions correctly and solve problems to get out.

We discussed innovation themes such as keyless homes, sensors in buildings, 'no gas' homes, helping residents get paid for their behavioural data and a landlord digital panel in the home enabling the tenant to contact their landlord. I would love to hear others thoughts about these ideas...

Gary Clark,
Chief Executive, Golding Homes

Our next night was in Leuven in Belgium, where the beer was widely sampled and enjoyed. The experience next morning was even better. Health House, led by Professor Koen Kaas, was a tour-de-force. We were taken through the practical steps to make future health care 'delightful' for people receiving treatment. We discovered how - with a lot of thought, and with the benefits of genomic medicine, big data and cutting-edge technologies - it is possible to switch the objectives of a health system from curing the sick to keeping people well.

And all too soon it was over. The experiences will stay fresh in the memory for a long time. The challenge is to make at least some of the ideas we saw and talked about stick in the UK context, so that our businesses – and more importantly our customers – take full advantage of the incredible opportunities which emerging technologies represent. What a delightful time to be alive.

Matthew Gardiner,
Head of Ideation, L&Q Group

Transformation and technology underpin everything I do

Interview with Jane Porter, Chief Operating Officer at Optivo

Optivo manages 44,000 homes across London, the South East and the Midlands, providing a home for over 90,000 people. Jane is responsible for all housing services (including asset management and shared ownership), social impact, legal, corporate health and safety, technology and transformation and residential care – and she manages over 1300 staff.

We are continually transforming Optivo by focusing on new tech an enabler for our own ideas

The recent achievements that mean the most to me are:

- developing an end-to-end on-line lettings process (including sign-ups)
- applying predictive analytics to income management and using it to improve the sign-up process and embed a Rent First approach
- introducing robotic process automation (RPA's) to key parts of our business
- creating our avatar chatbot called IVON
- deploying customer 'personas' to help target communications to residents
- successful IOT pilots involving
  - » remote monitoring of water temperature to reduce risk of legionella
  - » over 100 'connected homes'
  - » 25 smart boilers

Our next steps will be to make more use of our avatar chatbot IVON and introduce 'landlord hubs' for all blocks of flats

We see our IVON avatar as more than a chatbot that answers the phone. We see 'her' as an umbrella that helps drive all business innovation. This is partly because IVON can help us in every aspect of our business and because IVON is 'real' for staff and residents so it is easier to explain the implementation of assisted technology in our homes and our RPA for Universal Credit claims by saying that 'IVON will do it.'

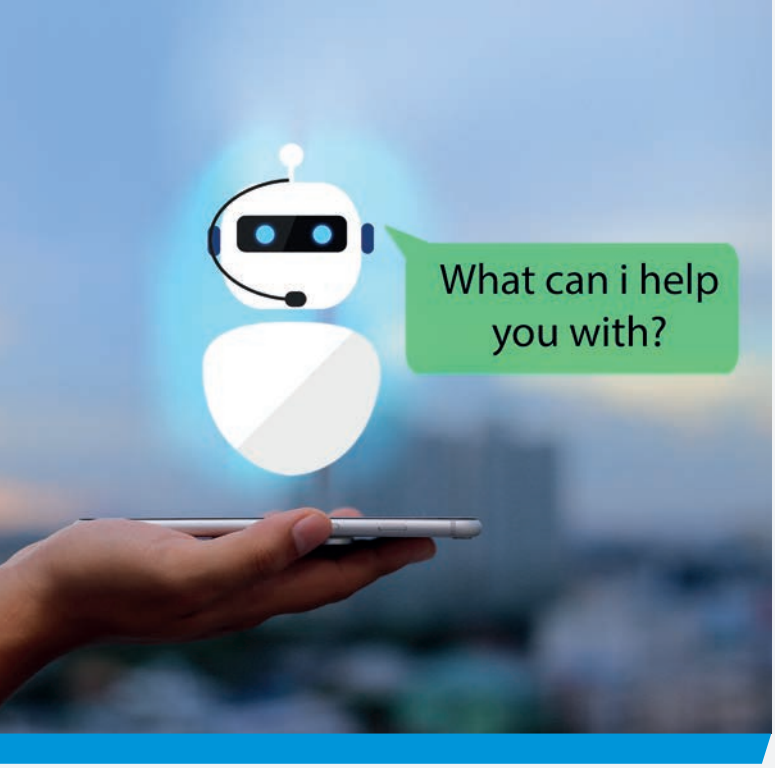
Robotic Process Automation (RPA) is the new tech that excites me the most

Short-term, the aim of our natural language processing project is that IVON sorts every incoming email into a CRM activity queue without anyone having to read it. Longer-term, we want IVON to answer calls and process customer enquiries for the business. We want residents to be able to contact IVON and ask "Hi IVON can you report a repair for me?" and IVON will recognise their 'language' and then do it all.

Robotic Process Automation (RPA) is the tech which excites me the most and having introduced it to parts of the business we can now see how much more we can do.

RPA is as useful for improving 'back office' efficiency as well as front-line services. If IVON answered phones and only took callers through our three security questions we would save 135,000 staff minutes per year – time that could be spent talking to customers and helping them to pay their rent, which secures our income which helps us build more homes and makes us a more efficient business.

In a compliance environment, RPA also provides a greater level of assurance. For example, we have developed an automated process for Universal Credit claims verification involving 4,500 individual cases. If a flaw emerges in this process it could



take an officer up to 8 hours on the phone to DWP to fix it for each claimant but our RPA ensures the verification process is 100% right every time.

We are planning to make all our blocks of flats connected through landlord hubs. These hubs will remotely monitor all landlord responsibilities where we are currently sending people out to test for safety - lifts, fire doors, alarm systems and water hygiene and so on. We plan to introduce smart doors where residents can get in by using their fingerprints.

Our transformation is business-led not tech-led and most of our R&D investment is in people

Our entire corporate strategy flows from feedback from residents, staff and partners via an iterative bottom-up process.

We have a very lean investment model. We have a transformation team, a Futures Group and two R&D teams. We have transformation specialists in our technology team, and we work with partners to deliver our initiatives. Nearly all the work on transformation - idea generation, project design and piloting and building the business cases for adoption – is done 'in-house.'

I chair our Futures Group, a forum for all staff who are enthusiastic about using innovative technology. Anybody from housing officer to a senior member of staff can put an idea forward on our Futures Blog.

We do out-source where specialist tech support is required - such as (amongst many others) First Touch (apps), Mobysoft (predictive analytics) and BT (hothouse).

Any process can be made easier by tech – but the business case for investment may be conditional on a number of factors such as improving efficiency and customer experience.

When we use the term 'culture' we don't just mean the staff culture, we mean residents being at the heart of our business and co-designing services with them

Digital transformation is more about making our current business model more efficient than an overhaul of our model

What new tech is doing is giving us data about our homes and residents so we can put resources where we need them. Just using predictive analytics on income can help identify tenants who may need more support at first letting such as single parents with children under 18 - so that we can provide tailored advice to make the tenancy sustainable and secure our rent.

We want the majority of our services to be delivered on-line, partly to reflect changes in human behaviour and partly to improve data security. We know that 88% of our residents are online, that 56% are signed up on our customer portal and that over 12,000 residents check their rent account on-line every month. We have a very detailed roadmap for our on-line services – such as information on works progress and offering choice in kitchen and bathroom colour schemes.

It can be hard to verify the authenticity of people via an email account. So, following the example of on-line banking, we start a pilot this month whereby if a resident wants to contact us, they must go through the secure email route accessible through their My Account portal.

When transforming a business, culture eats strategy for breakfast

The success of Optivo is based on culture. When we use the term 'culture' we don't just mean the staff culture, we mean residents being at the heart of our business and co-designing services with them. Residents make up 25% of our Board.

Residents make up 25% of our Board.

Part of my role is to get cultural buy-in from across the business – staff, residents and Board - by getting them excited by the new opportunities that tech can bring. It's important to have your Board on side. Change is not just led by the executive.

In terms of residents, our biggest challenge is keeping up with customer expectations

My role also involves celebrating successes – like the IVON launch video which we are promoting to all staff via roadshows, so that everyone knows what the vision is and how they can benefit.

In terms of staff the key aim is for the business to 'own' the change. Our Futures Group plays a key role here. We sold the vision of IVON by creating enthusiasm and excitement. We have asked each business team to think about where IVON can be deployed to make work easier. Where initiatives go 'live' successfully – like the Universal Credit RPA - this creates enthusiasm for further deployment.

Transformation won't work unless its owned by all staff and the executive team and Board are fully committed to it. We all speak with a consistent voice because the only way you are going to get transformation is if you 'sing from the same song sheet.'

I would love to see more women in technology – I think that's a major challenge for all businesses and sectors

In terms of residents, our biggest challenge is keeping up with customer expectations. For example, the 'Amazon effect' means that everyone now expects instant communication on the progress of their transactions. There's a real business challenge of keeping up with the tech that people use in the rest of their lives, which is made harder because new technologies are arriving all the time.

The future of work in Optivo is about adapting to changing employee expectations, making the workplace great to work in and tackling diversity in tech recruitment

We will increasingly be recruiting millennials and they work differently. In the same way that the expectations of our customers have changed so have the expectations of our employees, such as in terms of digital accessibility and system speed – everything needs to be quick. Lots of millennials live in shared accommodation and don't have viable homework spaces - so although some may think that 'agile' means working from home, it doesn't necessarily.

We must make the workplace a great place to work which will encourage people to come in and collaborate. We need to have space to learn from, and share with, each other and this will not be achieved if we are all working from laptops in our bedrooms or living rooms. We need to have a different type of workplace. People might want to come in late but work late and they might then want to have a café or a gym. We shouldn't think that everyone has the tools to do their job working from home.

There is a major challenge around diversity. We are recruiting a Director of Technology and out of a very healthy 83 applicants only two were women. I would love to see more women in technology – I think that's a major challenge for all businesses and sectors.

Sprinting towards strategy:

Interview with Dominic Pride,
Founder and Instigator at Upstart Breakthrough Strategy

How do you kick-start innovation? A deceptively simple question. The answer, naturally, depends on the context.

An organisation may have little history of innovation and be struggling to even articulate its business problems. Conversely, an organisation might have a well-resourced innovation strategy and clear targets but want to refresh or 'stress-test' them by tactically evaluating the very latest business thinking or technology.

A board or executive may be seeking an internal consensus before embarking upon a change programme. Equally, an organisation may have a fund for employees to investigate new business solutions. Managers may wish to use their own budgets for unofficial strategy thinking that can be presented to senior managers if it produces a result.

In each of these examples, a short, sharp, flexible and economic engagement may help to kick-start the process.

Dominic Pride, Founder and Instigator at Upstart Breakthrough Strategy, outlines how applying lean start-up tools can add speed and focus to the strategy process.

Pre-transformation is about owning your own destiny before you go through the transformation process

Before any business engages in a formal transformation programme it needs to step back and do some deep thinking. What business are we going to transform into? What technology can support that transformation? What are the goals of the transformation?

Strategy in corporations has traditionally been an abstract discipline led by internal divisions or external consultants. It's the kind which is signed off at global board level and leads to a three-to-five-year implementation plan.

What's not working is the speed at which this process addresses digital disruption. Emerging technologies and low barriers to entry let start-ups gain a foothold in weeks not months. They weren't invented when your big strategy was signed off.

A strategy is a plan to achieve a specific objective within a defined set of resources. Strategy making needs to be collaborative, creative and continuous. Strategy-making should also be circular rather than linear and brief and focused. Strategy breakthrough can take less than a week

The aim of pre-transformation work is to own the journey as a business and as individual employees, to understand change objectives before procurement and to learn from other organisations before making decisions.

It's about understanding what business you could become by embracing new technology

Pre-transformation work will give a company time to build a common understanding of what technology can achieve and its impact on the business. The company will understand technology in a business-first rather than a technology-first context and the new business models that might be open to it by embracing this technology.

Specific knowledge can be gained on tech alternatives, likely levels of business disruption that will follow their introduction and the changes to culture and process necessary to make the transformation successful.

We believe this should be done by a partner which does not sell time-based consultancy and which has links to tech suppliers. The outside agent should be providing the time, space and fuel for teams to think, not defining the solution.

Most strategies fail due to lack of business ownership and it is the people who work in the business rather than external consultants or suppliers that should call the shots

The make-up and aptitude of the pre-transformation team is vital

You don't want to spend too much time on pre-transformation work. You don't want too many people involved either. The process should take no more than a few days of intensive activity.

We recommend that the pre-transformation team 'cuts across the business' and involves only three people with an appetite for innovation. A spread of skills involving operations, finance and technology is ideal. The participants must be willing to share knowledge in this safe and confidential environment and have the advocacy skills to promote the results throughout the organisation.

It is essential to involve someone senior from finance. They often play the role of the 'moderate sceptic' in the process and are vital in persuading the rest of the business to act on the outcomes. Where the CEO is aware of the exercise, they should offer sponsorship and 'air cover' but never get directly involved.

This team then works with three people from an external organisation, skilled in facilitating this process and bringing their own external knowledge of tech and, crucially, comparative or radically different business models to it.

The most important thing any business can do is to look outside its sector at different business models which may wish to adopt in 1/3/5-years' time.

Pre-transformation can – and needs to be - fast and agile

Stages in a fast, lean, approach to developing strategy

Stage 0 - Problem: Meet and agree a clear problem statement. Participants go away and gather information

Stage 1 - Understand: Pool knowledge and understand the problem from all angles

Stage 2 - Think: Think about what a solution can look like using lean start-up development tools

Stage 3 - Plan: Produce a crash plan for costs, teams and time

Stage zero is a 'problem statement' - a clear single sentence that embraces problems the business needs to solve or the opportunities it seeks to embrace. It can be surprisingly hard for businesses to admit to their problems. They often obfuscate their issues or blame them on external factors. Only one problem is tackled in the process, so they need to prioritise.

Innovation sprints are the core of pre-transformation work. In our Upstart extreme programme, they last for three lots of four hours, covering stages known as 'understand', 'think' and 'plan'

In Stage One: 'understand' - company participants bring knowledge to the table about the business, its objectives, the market it works in and so on. If there are constraints on solutions, such as regulation, these need to be identified at the start. Armed with this information, we then produce a pack of relevant knowledge – business solution choices, technology options and case studies from other sectors or industries. This is then combined with that of the company to produce a crystallised knowledge base.

In Stage Two: 'think' - involves design thinking where a path is developed to overcome the constraints and develop an ideal solution for the organisation. The process for finding the solution will not involve much 'blue sky' thinking. Instead it will be structured, following the Design Council's 'double diamond' methodology – diverging from the current norm, adding in constraints, diverging again, removing the constraints and diverging for a final time to create a specific and realistic hypothesis of what the solution might be.

Upstart applies accessible digital tools (enterprise versions of Slack, Trello and G Suite) - used in every start-up to cut down the barriers to collaboration and shorten communication and workflow.

Businesses are often good at forensically evaluating the cost of doing something – people, time and money. But they are far less effective in measuring the cost of doing nothing

Because digital technology is transforming the world we live and work in no business can afford to ignore its impact. Doing nothing will result in a loss of reputation, competitiveness and talent – even in a regulated industry like social housing

Stage three: 'plan' - involves thinking about what a solution can look like - using our tools - and producing a 'crash plan' for costs, teams and time. We have a very clear matrix of a 30/60/90-day plan.

When it comes to execution, the plan is not set in stone. Strategy needs to learn from 'operations' and execution, following a process borrowed from finance called 'continuous audit.' A cascade approach only works downwards. If, in the early stages of execution, a new problem or constraint is uncovered then the plan should immediately be amended. This continuous approach to strategy involves a series of interactive dynamic circles which challenge the strategy and ensure it has 'whole business' buy in.

Under this lean approach, if the strategy is unworkable you will know in 30 days rather than two years.

The output is a minimum viable presentation that can be widely discussed internally and kick-start or reset a more formal transformation process.

To create space and time to think in sessions, teams check in connected devices at the door

The minimum viable presentation will be raw, ugly and unfinished

But it will capture the learning from the pre-transformation exercise and a vision for the future. It will define the business problem(s) to be solved, the options for doing so and will set out a loose 'crash plan' for implementation. It will enough to persuade colleagues that change will add value.

An ugly, unpolished (MVP) after a week which you can use to test your hypothesis is better than a polished version a month later.

The MVP should be no longer than six slides. Its purpose is to make an impact on organisational thinking which means it must be accessible to staff at all levels of the organisation.

Brevity is everything. The MVP needs to spread virally throughout the organisation, generating a broader debate and – most important – collective ownership of the solution.

Our approach raises eyebrows at first – it's not what companies expect strategy work to look like. Yet, as disruption forces radical change in all aspects of business, developing and reformulating strategy at speed will become crucial to the survival of any organisation.

Could Data be the new Sex?

Colin Sales of 3C Consulting

This was a headline in the New York Times this April about Jessica Pels, the editor of Cosmopolitan. Jessica is trying to save the magazine from the jaws of Instagram and 'data' has become the strategic lifeblood of the magazine. Intelligence gained from copy that is read online provides the analytics to understand who is reading Cosmopolitan; what they are reading; and for how long they read it for. Future editions of the magazine are then designed around this intelligence and as a result, Cosmopolitan is becoming a more compelling read for many and circulation is once again increasing.

I categorically agree that good data is sexy. If I look back at my career as a Director, good data so often proved key to my success and shaped my quality of life

There are few things worse in business than to sit around a boardroom table waiting for your peers to pull your report apart because it proves to be factually incorrect or for you to know in your gut that a poor decision is about to be made, but not have the information available to prove it.

You then have the social angle. Organisations work best when the whole team have a shared purpose and I believe that those involved in the provision of social housing have enormous purpose. How many organisations can say that they are responsible for creating and maintaining exceptional communities and safeguarding the properties that so many of our next generation call a home? Schools can also claim to have incredible purpose as they play a critical part in the development of our youth. Data is information and a school's purpose is to provide students with this information and to teach them what to do with it. The best schools are those that succeed and help develop great adults that use data to enhance their lives, helping them to make the right choices and better equip them to achieve their ambitions.

So why is data so important to the social housing provider? There's the obvious answer, which is to use it to run the business more effectively, spotting areas for improvement and supporting inspired and qualified management decisions and good governance. There is, however, also a deeper more meaningful answer...
... using data to make your customers and staff happy.

Stick with me here. Exactly how does this work?

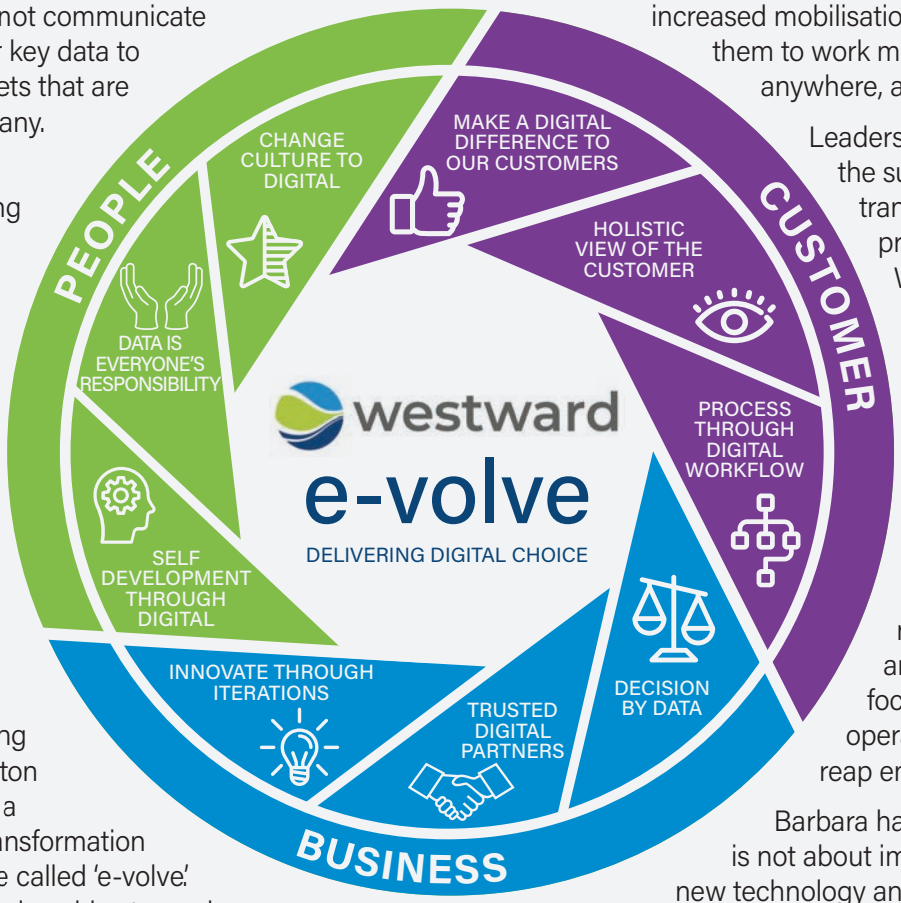
Happiness is defined as a 'nice feeling' and it is generally achieved when you attain your objectives in life. These can be long term objectives, such as having a good home, but importantly these can also be those objectives that you set yourself every single day. If at the end of the day you have achieved what you set out to do, you will probably be happy. If you don't achieve, you will find yourself frustrated and despondent. It therefore stands to reason that to make your customers and staff happier you need to make their dealings with you as effortless as possible. You need to stop them from becoming frustrated and be ready to offer support proactively when they do, spotting issues as they arise and helping to swiftly address them.

Those organisations that use data to drive business strategy and maximise the effectiveness of services are those that now tend to flourish

Moving to this style of operating model does, however, take time and leadership. The rewards are enormous, but you cannot underestimate the transformational journey that will be required. Fundamental to achieving success is ensuring that the data you hold is comprehensive, accurate, accessible and secure. Data must flow seamlessly across your organisation, free from departmental silos. There is no place for software

applications that will not communicate with each other or for key data to be held in spreadsheets that are inaccessible to the many.

The recipe for successfully navigating this transformational journey is not new and there are plenty of organisations already utilising data properly at the heart of strategy and operations. It's always good to be able to provide an example to help understand what 'good' actually looks like. Westward Housing Group, based in Newton Abbot, have adopted a visionary business transformation programme they have called 'e-volve.' At the heart of e-volve is a drive towards a data driven culture with three key components: -



- **Customer -** A holistic View of the Customer, properly understanding who they are and how they like to communicate and then building the business around 'them'
- **People –** Staff understanding that data is everyone's responsibility, ensuring that one of the organisation's most critical assets is respected and protected by everyone
- **Business -** Decision by Data, allowing the organisation to be responsive and agile, empowering staff and encouraging a culture of continual improvement based on accurate, real-time information

The e-volve business transformation roadmap has multiple project initiatives timetabled over a two year period. Such initiatives include a data quality audit; extensive re-configuration of the housing management system; a thorough review of processes to ensure they support and encourage digital channels that people will want to use 'by choice'; the recruitment of business analysts; a new Customer Hub; and the increased mobilisation of staff, allowing them to work more effectively anywhere, at any time.

Leadership is critical to the success of such transformational programmes and Westward's CEO, Barbara Shaw, is the inspiration and driving force behind e-volve, charismatically convincing management and staff as to how a progression to a new, more effective and customer focused target operating model will reap enormous reward.

Barbara has said "Westward is not about implementing shiny new technology and hoping this will, by default, deliver digital transformation. We are about maximising the benefit from the technology we have, choosing the new complementing technology we need and delivering services in the way our customers want. To achieve this, we are evolving the customer journey, developing our staff and embracing a digital culture, so that we will continue to be a high performing modern housing provider and somewhere people will love to work."

Westward provide a great example of how data should sit at the very heart of your business strategy. If you can get it right:

- You will improve the lives of your customers
- You will empower your team
- You will make your life easier
- and ultimately; you will make all concerned happier

If you are a business leader and ever wondered why you go to work, ultimately this should be it! You may question if data is truly 'sexy,' but there is no question that there are few things as strategically attractive as achieving such inspirational goals.

AI and Housing: Re-imagining the future of service delivery

The AI hype/reality check with Phil Brunkard

"AI could create an immortal dictator, from which there is no escape", warned Elon Musk in a documentary released last year. His concern is that if one company or a Government can develop super intelligent Artificial Intelligence (AI), then that super intelligence could outsmart humans and become our master. This is the branch of AI referred to as Artificial Super Intelligence – defined by Oxford philosopher Nick Bostrom as "any intellect that greatly exceeds the cognitive performance of humans in virtually all domains of interest".

You'd like to think Elon Musk knows what he is talking about given his investments in AI through his companies such as OpenAI, Neuralink and Tesla.

But futurist Ray Kurzweil advises "AI will not displace humans, it's going to enhance us". He envisages a future world (2045) where humans will link wirelessly from our neocortex - the portion of the cerebral cortex that serves as the centre of human higher mental functions - to a synthetic neocortex in the Cloud. We will connect with machines via the Cloud and we will also be able to connect to another person's neocortex. Essentially, a merged world of human and computer (machine) coexistence. He believes this could enhance the overall human experience and allow us to discover various unexplored aspects of humanity.

It is amazing to think that a term originally created in 1951 by Prof John McCarty, Professor at Stanford University, could 68 years later potentially have such a seismic shift on our future world.

How does that future world relate to where we are today with AI and the endless hype and talk about robots replacing our jobs?

In their analysis of the Future of Work, McKinsey have predicted that up to 30% of the world's jobs could be automated by 2030 and half of the work we do today could be automated with current technologies. Whatever the numbers, automation and the application of AI in the workplace will impact us. It is already happening and we need to be prepared. Technology displacing people and people and technology working together is nothing new. It has been a constant evolution. With AI, the difference is that the rate and level of impact is more profound. We will need to develop the skills and knowledge to work with and not be displaced by AI. However, we need to be clear about the scope of AI that is becoming increasing influential.

Narrow AI systems are able to process data and complete tasks at a significantly quicker pace than humans, allowing us to improve our overall productivity, efficiency, and hopefully quality of life

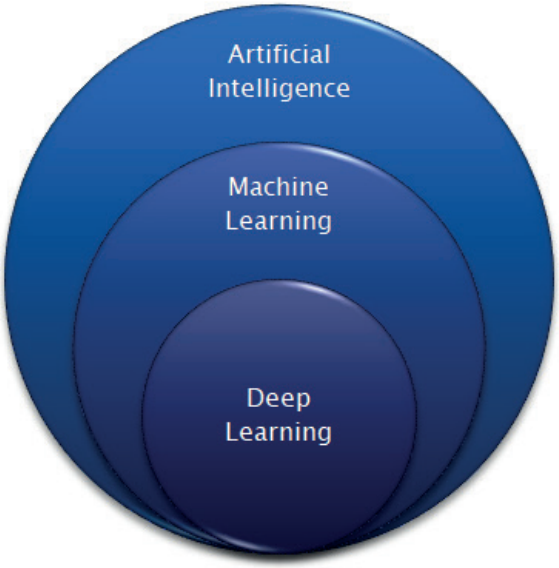
The reality is that Artificial Super Intelligence (as described above) and even Artificial General intelligence (what you see with Tony Stark in Iron Man) is some way off. For machines to achieve true human-like intelligence, they will need to be capable of experiencing consciousness, empathy and emotion. Unlikely - I think! However, we will certainly see Narrow AI (Amazon Echo, IBM Watson and Google Duplex and others) develop further. Narrow AI systems are able to process data and complete tasks at a significantly quicker pace than humans, allowing us to improve our overall productivity, efficiency, and hopefully quality of life.

For many housing associations, just when you're going digital and Cloud, what will this narrow AI mean for your organisation? When some experts are now

GET COMPUTERS TO LEARN AND ACT LIKE HUMANS

ARTIFICIAL INTELLIGENCE (AI)
Technique that enables computers to mimic human behaviour

MACHINE LEARNING
Subset of AI. Uses statistical methods to enable computers to improve with experience



DEEP LEARNING
Subset of Machine Learning. Uses multi-layer Neural Networks for computation for even greater learning to more closely match human cognition and behaviour.

saying you'll need a Chief AI Officer, never mind a Chief Digital Officer, will you be AI ready when you might still be facing the digital ready challenge?

AI and Machine Learning 101

In his article in DIN bulletin 1 (November 2018), Arturo Dell of HouseMark offered the definition of AI from Russell and Norvig – "AI is the designing and building of intelligent agents that receive precepts from the environment and take actions that affect that environment".

For me, Artificial Intelligence is simply the science of getting computers to learn and act like humans do, and improve their learning over time in an autonomous fashion. They achieve this by being fed with lots of data and other information in the form of observations and real-world interactions.

The key developments we are seeing in AI are in the areas of Machine Learning and Deep Learning.

Machine Learning is a subset of AI which uses statistical methods to enable computers to improve with experience gained from learning. Statistical mathematical methods have been around a long time. The difference is we have now combined the processing and storage power with the larger data sets to enable improved learning and hence reliable application of machine learning algorithms. That's one big reason why Google loves to collate your data.

There are many different types of machine learning algorithms, with hundreds published each day, and they're typically grouped by either learning style (i.e. supervised learning, unsupervised learning, semi-supervised learning) or by similarity in form or function (i.e. classification, regression, decision tree, clustering, deep learning, etc.).

Deep Learning is a subset of AI which makes the computation of multi-layer neural networks feasible, more closely mimicking how our brain works. It is different from traditional machine learning in that it looks for features or patterns in the data from which it can improve its learning. This is in the land of Google Deep Mind and the technology behind Google Duplex. Deep Learning has now risen from the world of academic research into the commercial world and is the root cause for much of the hype today. It is the area of AI that will drive (literally) autonomous self-driving cars. It is where and how computers are achieving near accurate natural language speech recognition through the use of recurrent neural networks. But don't be fooled into thinking it is a panacea for how AI will solve any problem. Behind the Google Duplex appointment booking example lies an army of employees behind the scenes manually defining intent models, training them with relevant utterances, and then connecting them to hand-authored responses.

The potential of AI for housing

I recently presented and hosted a panel discussion on AI at Tech@Housing where two key areas for the application of AI were particularly highlighted:

- Optimising customer experience
- Improving maintenance – making it more predictive and pre-emptive

Customer experience examples include:

- The infamous chat-bot - used to automate customer service text conversations
  - » The rise of chat-bots has been driven through people using mobile devices more than the traditional keyboard/mouse/monitor interfaces. It is easier to use a chat interface then expect a user to download yet another app onto their device
  - » Unexpected questions will likely 'break' the chat-bot system so consumers need to be clear that they are interacting with a machine
  - » KLM automates responses to over 50% of customer enquiries on social media by implementing a machine learning chat-bot. TicketMaster uses conversational voice and text chat-bots to improve event searching and ticket sales experience. Booking.com now resolves half of customer queries to its text chat-bot in five minutes and without human intervention by using semi-supervised learning. Marks & Spencer plans to automate all customer call routing with 90% accuracy using machine learning.
- Analyse and understand customer sentiment displayed through direct customer contact:
  - » Using voice and text analysis to uncover overall customer sentiment – negative or positive – sometimes in real-time as displayed when they contact the contact centre
- Monitor customer experience across multiple channels to build a holistic overview and identify high profile and high priority issues:
  - » Advanced analytics on all customer contact data across multiple channels to uncover insights to improve customer satisfaction and build a holistic picture of their status

Maintenance examples include:

- Automate inventory management for spares:
  - » Calculate and predict how many units are required where and when, in order to reduce inventory costs and minimise obsolete and excessive inventory
- Minimise the costs for replacement and/or upgrading of failing or under-performing parts or products:
  - » Rolls Royce plans to predict maintenance requirements for jet engines to improve aircraft efficiency using Microsoft Azure's machine learning
- Improve preventative maintenance and Maintenance, Repair and Overhaul (MRO) performance with greater predictive accuracy to the component and part-level:
  - » Predictive maintenance predicts when certain products or devices are in need of maintenance what sort of maintenance, the likely maintenance and replacement materials, and technician skill sets. EDF Energy plans to monitor power station conditions in real time and predict maintenance requirements using machine learning
- Optimise job scheduling based on factors such as weather, estimated travel times, technical capabilities and parts availability
- Optimise staff transportation routing based on factors such as weather, traffic, changing job loads and shifting priorities

While many housing organisations are still focused on digital as the main enabler for transforming services, there are benefits that machine learning will clearly bring. This will invariably be combined with other emerging and existing technologies and of course relies on quality data with volume for the algorithms to work effectively to give valuable business insight. That and a good dose of cultural change management will be crucial for success, with respect for data privacy. We can re-imagine the future of service delivery in this way. And it won't be about the robots taking over but true social landlords delivering a better and more valued through innovative and appropriate use of just another emerging technology.

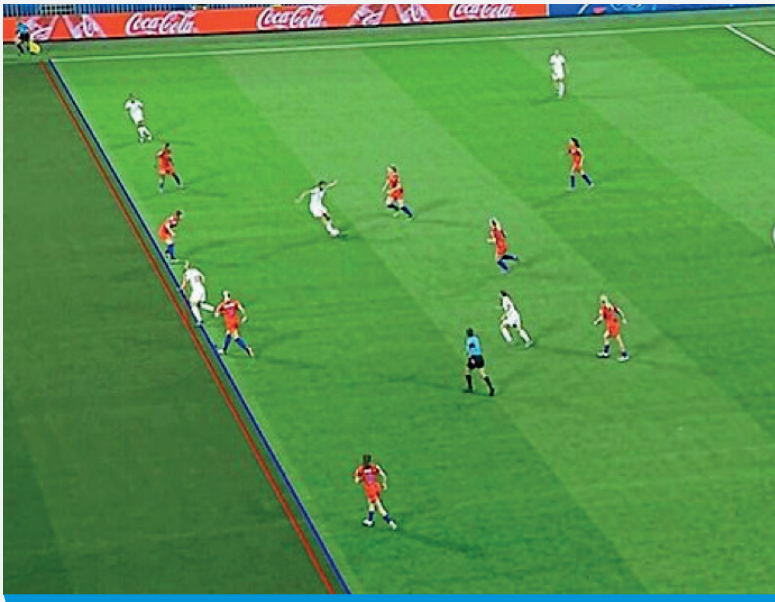
Data trust, dark patterns and the Women's World Cup: Why customers should co-design digital services

Arturo Dell, Director of Technology and Innovation at HouseMark

"Ellen White Scores! Oh no! It's gone to VAR..."

As the people in the pub jumped up and down with joy at the great goal scored by England's Ellen White in the women's world cup semi-final game against the USA, I had this nagging feeling, learned over the last few games in the tournament, that we may be celebrating too early. As the cameras focused on the wild celebrations, a dramatic cut to an image of the referee communicating with a high-tech media centre almost 300 miles from the stadium gave it all away. An acronym unknown only a few months ago would take centre stage again: VAR.

We know what happened; the goal was disallowed because the England player was offside according to VAR using the virtual offside line rule. Here's an extract from the **FIFA** website explaining this technology:



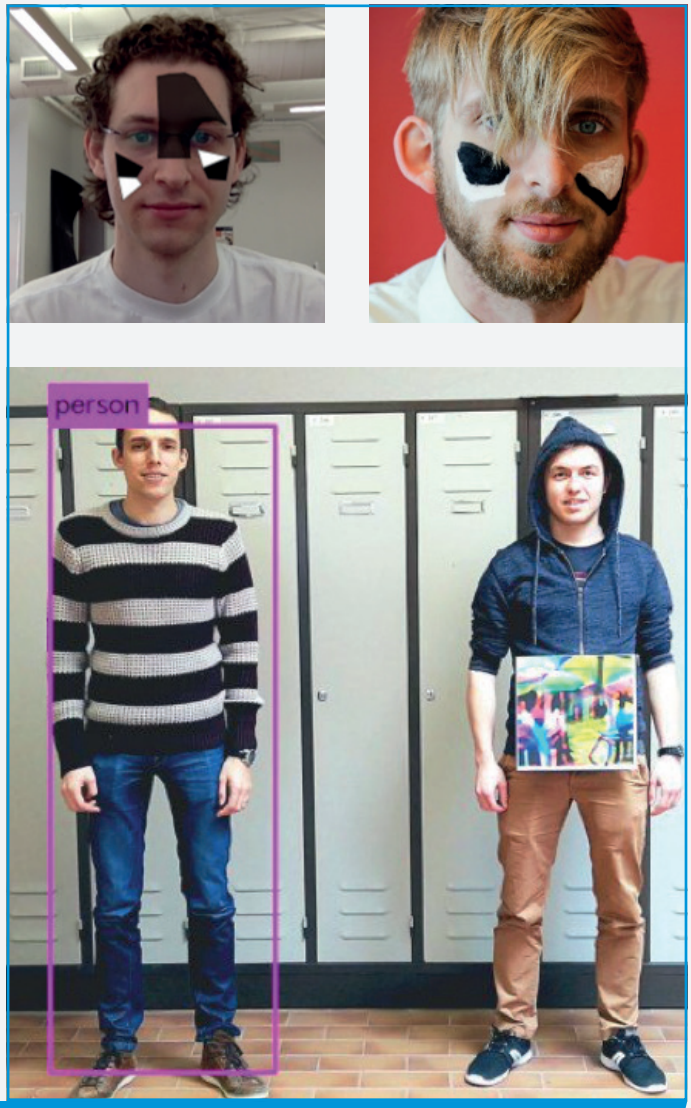
A spontaneous celebration reversed by technology. Ellen White caught offside by VAR

Virtual offside lines are superimposed on the broadcast image by computer software. Angle of view, lens distortion, field curvature and many other factors are considered when calculating the true position of these lines

There are a few interesting considerations from this single football incident, but to me the most fascinating one is the prevailing feeling that it was a fair decision. That even if we don't like it, there is an objective way to determine the truth.

How did we get there? How can irrational fans accept that their wild celebrations were short lived and ultimately pointless? There's only one answer: technology. Whereas in the past, referees would be turned into legends or hate figures because of their oversights or mistakes; today, thanks to technology, there is an objective truth created by the cold, impartial stare of computer vision and 3D modelling.

It is interesting to compare how technology can provide the objective truth in one domain but obscure it in another one. We are all familiar with the post-truth world created by mass scale disinformation enabled by technology. The examples from **Cambridge Analytica** and the recent debate around the **inaccuracy and bias of facial recognition techniques** used by police forces in the UK demonstrate this trend.



Using makeup or special a colour printout to avoid facial recognition surveillance. Credit: The Atlantic and MIT

How do we benefit from the potential of disruptive technology without eroding the trust of our residents?

This is one of the key questions for digital leaders in housing responsible for building an effective customer experience. We know that in housing, the trust between residents and landlords is weak and this has been emphasised by the **Green Paper for Social Housing** and its focus on consumer metrics aimed to provide a measurable improvement in customer experience. How does this work when the customer experience is shifting to digital and the most disruptive tools and approaches are suffering from a major public backlash (**techlash**)?

Some positive solutions to this challenge are emerging from the practice of **design thinking** which combines some of the skills and tools used by designers with a relentless focus on looking at issues from the perspective of the user. The UK government is a global centre of excellence in this discipline with a strong practice across departments, kicked off by **GDS**. The outcome of implementing these techniques in the development of digital solutions is a better customer experience because users have been involved from the start and services have been designed around their needs. This is essential to meet the demands of the Green Paper around resident involvement in the co-creation of services, but it is also good business sense as poorly designed digital services end up generating more back-office demand and decreasing customer satisfaction and trust.

A growing number of organisations have already realised the key role that good user-centred digital service plays on building trust and have embedded it in their design manuals guiding all their activities

Here are some examples from the **NHS**, **Coop** and a **template for charities**.

At HouseMark we are seeing a growing interest in design thinking approaches to digital services. Our **digital transformation programme** is focused on sharing skills and lessons from organisations inside and outside the sector who have transformed their customer experience. In partnership with **BT**, we take participants in the programme through an intensive 2-day hothouse at **Adastral Park** where design thinking and user centred design techniques are **put to the test**.

We expect a significant improvement in digital services in housing over the next few years as the need to deliver true co-designed services with residents gains momentum through the green paper imperative and colleagues in the sector embed user centred design into everything they do.

One of the foundations for building truly user-centred digital services is to carry out effective and regular user testing

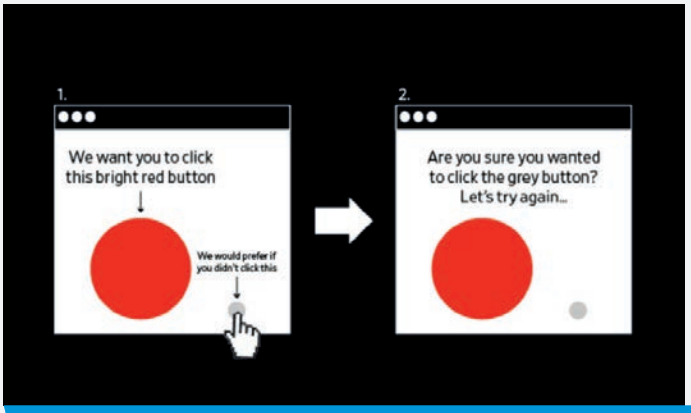
How can you build a service from the perspective of the user if real people are not involved in testing them and providing feedback? User testing is not some vague one-off consultation effort but an embedded practice which must form part of every transformation team.

Avoiding the 'dark pattern' trap

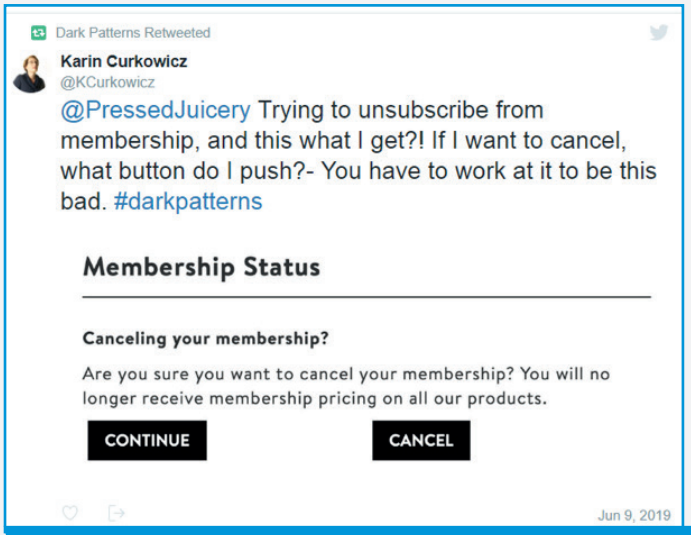
High quality user testing comes with some important challenges which are being highlighted recently in the debate around **dark patterns** and efforts to legislate them in the **US senate**. A dark pattern is a digital user interface which has been designed specifically to trick users into doing things. Examples of this type of design are everywhere on the internet, from the service that is easy to get into but almost impossible to escape; to the application where additional items are added to the shopping basket via imperceptible opt out options; to websites that ask for email or social media permissions for one purpose but then use the data to send spam emails.

Social housing providers need to ensure that in refining service design to stimulate maximum response they do not, inadvertently, replicate the customer manipulation being exercised by less scrupulous commercial operators. Customer co-design makes this less likely to happen

User testing will prove that a specific service meets the users' needs and delivers a great customer experience, but it can also prove that the desired user behaviour can be engineered by using things like dark patterns. Someone's design flair is someone else's dark pattern. Digital leaders in housing must be aware of these emerging challenges and be vigilant not to appear in name and shame lists such as the **#darkpatterns** twitter hashtag.



A dark pattern in action. Credit: The Wall Street Journal



The #darkpattern twitter hashtag used to name and shame companies

So, the next time you sit at a football ground wondering whether to celebrate or not while the person in black with the whistle waits for the decision of a computer to determine the truth of what really happened; don't feel despondent. At least in that stadium there is trust in technology supporting the truth. When you go back to work on Monday building disruptive digital services you will be negotiating a rather more nuanced environment and wondering how to make sure tech is on your side of the offside line.

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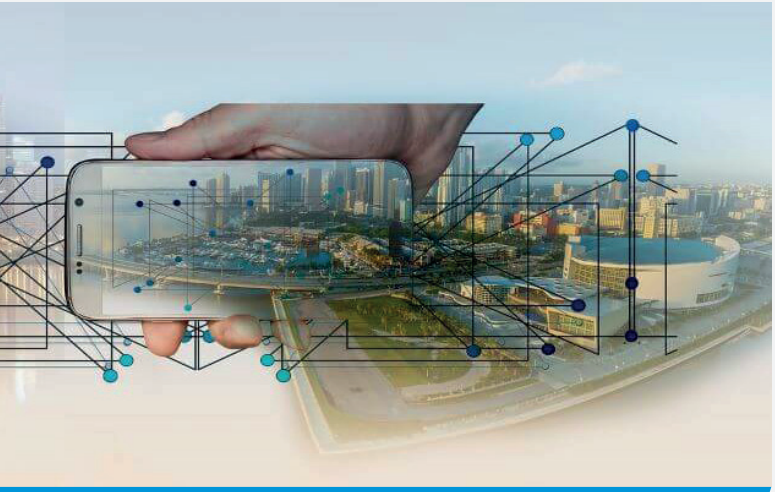
5 Industries Using Digital Twins

Simulating the realities of industry without the risk.
Sarah Finch, Staff Writer & Content Editor at D/SRUPTION



Digital twins are digital representations of physical objects or environments that exist in the real world. Central to the existence of digital twins are sensors and analytic technology, which enable the digital twin to collect real time information on its physical counterpart and adapt its state to match.

Digital twins are becoming indispensable in industry for a variety of different reasons. Using digital twins, operators can gain a better understanding of their systems – from measuring levels of wear in a piece of machinery to analysing traffic flows in smart city road networks. When changes need to be made, those in charge of such systems can also experiment with the digital twin first, without risking unplanned downtime or disruption to the real world model.

So, what sectors are championing the rise of the digital twin today? D/SRUPTION takes a look at five industries making use of this technology now.

1) Urban planning

With our lived environments becoming ever more connected, it is now possible to create simulated models of our towns and cities. This is one step being taken by Rotterdam in The Netherlands, which has placed sensors on everything from its waste containers to its canal bridges, collecting information on the operations of public services, traffic and even the way emergencies are dealt with in the local area.

Rotterdam's digital twin was facilitated by the city's wider commitment to smart solutions. By combining existing information such as maps, building blueprints and real time sensor information with a digital twin platform, solutions are being developed to improve urban life. More effective management by digital twins of mobility, public amenities such as waste disposal, and the provision of resources such as water and power brings economic and social benefits to our urban spaces, making them better, more profitable places to live.

Digital twins are digital representations of physical objects or environments that exist in the real world

2) Healthcare

When you think of twins, you probably think of people. And, as the name suggests, one of the most viable applications of digital twin technology is in the creation of digital simulations of our own bodies. Using medical monitoring technology, we can measure our vital statistics such as heart rate, blood pressure and oxygen levels, and transfer that data to a simulated version of ourselves. This helps healthcare professionals to monitor patients remotely, aiding in the diagnosis of disease – especially when AI is added into the mix.

Digital twins also enable doctors to simulate the results of procedures before they are carried out. Using digital twins of organs – such as the digital twins of the heart created by Siemens Healthineers – treatment can be tested to see if it is likely to be safe and effective. Digital twins can also be used to great effect in the healthcare industry in treatment complexes themselves, to monitor the buildings, machinery and care that is given to patients in a much broader healthcare ecosystem.

3) Automotive

Digital twins are on the rise in the automotive industry thanks to the emphasis currently being placed on self driving cars. In order to achieve the vision of an autonomous vehicle (AV) future, cars and road systems must be highly connected. This mass of data makes them ideal candidates for digital twins, as simulated models enable engineers to analyse how vehicles behave in specific conditions. Given the safety concerns surrounding AVs in particular, testing models via simulations is crucial before they can be unleashed onto the roads.

In more traditional products, digital twins can also be used to track the performance of vehicles from the moment of their manufacture right through to their end of life, helping automotive companies to better understand this journey. In addition, by giving manufacturers access to data on the use and state of repair of vehicles via digital twins, maintenance as-a-service packages can also be added on to initial sales deals. This not only generates additional revenue for automakers, but it also represents an improved service for the customer.

4) Asset management

Digital twins are revolutionising the way that businesses manage their assets – whether that be machinery on the factory floor, or remote industrial operations such as oil rigs or specialised vehicles. According to Oracle, more than 70 per cent of businesses still use manual techniques to locate and track their assets, a process which leads to inaccurate information and significant amounts of unplanned downtime when items aren't where they are supposed to be.

Real time asset monitoring via digital twins gives companies accurate information on the location of their assets, as well as their states of repair

This enables early fault detection and the predictive maintenance of machinery, to increase performance and minimise disruption to business operations. Asset management will further benefit from the growing convergence of digital twins with augmented and virtual reality technologies, as this will improve the visualisation of industrial processes and machinery, making them easier to understand and optimise.

5) Financial services

The worth of digital twins might be most easily visualised within heavy industrial settings, but this technology also has a role to play in modelling customer behaviour. This can be particularly useful in sectors such as financial services, where institutions can create personalised profiles of individuals and simulate the kinds of decisions they might take with their finances. Although modelling consumer behaviour is not new to the financial services sector, digital twin technology enables this to be undertaken at a much more personalised level.

At PwC, digital twins have been used to model individual policy holders and simulate their future balance sheets and cash flows. By considering the impact of sociodemographic, behavioural, financial and health factors on customer data over a period of time, asset managers and insurance companies are better placed to understand the needs of their clients – and how these might change in line with significant life events. By projecting the likely impact of various financial decisions, digital twins can help customers to find optimised and personalised strategies for managing their money.

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