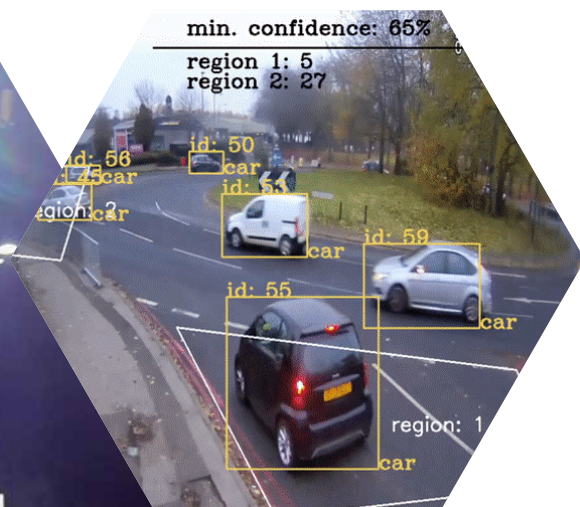


ADEPT

LIVELABS

ADEPT SMART Places Live Labs



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Skills for
innovation
programmes

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SKILLS FOR INNOVATION PROGRAMMES

This is the sixth in a series of white papers from the £23million ADEPT (Association of Directors of Environment, Economy, Planning & Transport) SMART Places Live Labs programme funded by the Department for Transport (DfT).

These papers are part of our commitment to transparency and are intended to share learnings and insights as they happen. This allows industry colleagues to capitalise on work done through what is a wide-ranging innovation programme covering the smart materials, energy, communications, mobility, and environment spectrum.

We hope that these white papers are useful and will help accelerate innovation for local authorities across the transport, planning and environment sectors. More details on our teams and their individual projects can be found on the Live Labs pages of the ADEPT website.

The Live Labs programme was created with the intention of bringing innovation to local roads, environment, and transport, as discussed in the SMART Places research programme 2017/2018¹. However, through our commitment to knowledge-sharing both within and between local authorities, business partners and citizens, we have identified opportunities to deliver wider social benefits. Although the imperative for innovation is arguably stronger now than five years ago, it is questionable whether it has yet to become a Business as Usual (BAU) way of working across the highways and transportation sector.

Informed by the ADEPT Live Labs programme, which has concluded the bulk of its innovation work, this white paper considers the skills necessary to enable us to capitalise upon innovation in all its forms to meet the mounting challenges ahead.

¹ ADEPT SMART Places Research Programme - <https://www.adeptnet.org.uk/news/using-digital-innovation-create-road-system-future>



Change is constant

It is commonly recognised that we are in a period where societal and technological change - which has been accelerating over recent decades - has been amplified by the recent pandemic. This has resulted in an unprecedented scale and pace of innovation impacting almost every facet of our society and economy.

In the UK highways and transportation sectors, we have long established systems, processes and standards that are recognised and admired across the world. With the challenges ahead, including the existential challenge of climate change, there are key questions that we must address:

- How can we innovate within this long-established landscape?
- How do we do this to minimise the risk of failure?
- How can we learn quickly from those failures if they do occur?
- How can we consider the benefits so that they lead to a wider application and a new BAU?

The convergence of transport, new mobility, energy and digital is now an interdependent reality. Taking a systems approach to our challenges - if we act in one sphere, we need to ensure we interact with the others to maximise the outcomes and benefits.

We must also think in terms of those outcomes and benefits. Solutions for solutions' sake, whether technological or otherwise, are a fool's errand. Given the pressures of time and scarce resources, we don't have the luxury to tilt at interesting windmills, we have to get innovation right and make it purposeful.

We must also view innovation through a new lens, that of resilience: resilience to the changing climate and resilience to shock events (be that pandemic or economic change). This will ensure that not only do we have the available capital resources to deliver, but also the long-term revenue funding streams to consistently bring about the outcomes we planned for.

Live Labs observation

The Live Labs programme was clear in its aim and supporting objectives as outlined in the 2018 prospectus²: "Through deployments at scale we will achieve a step change in the normalisation and uptake of new techniques, materials and solutions in the local highways realm to meet the needs of today and tomorrow." We've seen solutions come forward that have become BAU within individual geographies, and some even gain type approvals (3D printed lighting elements) and influence UK standards (data and sensors). However, Live Labs sits alongside numerous other innovation programmes in the sector where cross fertilisation could reap dividends.

THE CHALLENGE

If we do what we've always done, will we be too slow and miss opportunities?

If we 'move fast and break things', are we wasting scarce resources such as capital, skills and human energy?

How do we move at pace and scale whilst ensuring value for money?

² ADEPT Live Labs Prospectus August 2018 - https://www.adeptnet.org.uk/system/files/documents/ADEPT_Live%20Labs%20Prospectus_Aug%202018.pdf

Critical thinking and collaboration

We live in an age of innovation, an age which some argue is limited only by our collective imagination.

That's an exciting prospect, but in the transportation and mobility space we have established systems, processes, operational regimes and overarching standards – factors sometimes at odds with the promise of a new way of doing things. We also need to deliver demonstrable outcomes and benefits for our people, places and communities.

At the root of innovation is a need to understand or anticipate a problem or opportunity and define a vision and objectives. This sounds simplistic but is essential for the task in hand. We need to define the outcomes that we think are desirable and, critically, iteratively validate these against user and stakeholder needs to ensure we are on the right path.

In doing this we need a range of perspectives around the table. Technical specialists who understand the technology, network operators who understand the implications, academics who can rigorously examine the benefits, as well as futures experts who can anticipate change. Add to these behavioural experts who understand customers, and the private sector which develops solutions and services. This list is not exhaustive, the additional of social scientists and the arts sector can bring in perspectives so often missing.

The World Economic Forum has outlined the skills it thinks will be needed for our uncertain future³ all of which are highly relevant to innovation in the sector. These skills can help equip all professionals with additional tools to help them achieve those desired outcomes.



³ World Economic Forum – Top 10 Skills for Tomorrow - <https://www.weforum.org/agenda/2020/10/top-10-work-skills-of-tomorrow-how-long-it-takes-to-learn-them/>



Bringing together and adopting design led thinking, including the Design Council's "Double Diamond" approach⁴ coupled with Systems Thinking⁵, sets any innovation project off on a different footing. Putting users, customers and stakeholders - rather than the solution - at the heart of the equation is essential.

So often missing within the innovation process is early critical analysis - thinking widely about the subject to gain a deep and impartial understanding and get to the heart of the challenge or problem. This does not start with one person's assumptions and we must resist the temptation to shortcut to a solution, dismiss previous attempts or cede to the loudest voices.

With these tools at our disposal our mantra should be, so what?

The 'so what' is a rolled-up question to check and challenge our biases, to circle us back to the vision, the objectives, and the outcomes we desire. The 'so what' leads us to consider:

- Is this best way to get the outcome we want or is there a simpler approach?
- Is this prone to risk or potential failure?
- What are the interdependencies?
- Can this be sustained, and is it commercially viable?

Live Labs observation

The Staffordshire Live Lab held an innovation competition at an early stage, so that industry could respond to headline local challenges rather than the authority pre-supposing technical solutions. Similarly, the Cumbria Live Lab used different commercial solutions in very different use cases – ranging from town to high on the fells - for its plastics in roads to determine performance across its whole and very diverse asset base.

⁴ Design Council Framework for Innovation - <https://www.designcouncil.org.uk/news-opinion/what-framework-innovation-design-councils-evolved-double-diamond>

⁵ National Leadership Centre, How systems thinking enhances systems leadership, Hobbs and Midgley, Centre for Systems Studies, University of Hull - https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/926868/NL-thinkpiece-Systems-Leadership-HOBBS-MIDGLEY.pdf



Adopting agility in approach

Our sector is expert and well-practiced in waterfall decision making, planning and delivery, but in order to really capitalise upon innovation, we need to take the best parts of waterfall processes and couple these with more agile⁶ working methods.

Government and local authorities have funding and election cycles, committee and approval cycles and strict, long-established governance and regulatory processes. These checks and balances are there for good reason, both to ensure robust decision making and that resources are allocated wisely. However, through private sector eyes these checks and balances can sometimes be seen as blockers. Balancing the requirements of good governance with the pace innovation needs can be tricky, but not insurmountable. Many of our Live Labs faced those challenges head on and through collaboration between procurement, legal and technical experts, found creative and practical solutions.

For innovation to really thrive, we need a breadth of voices in the room: public, private and voluntary sector; academia; start-ups and SMEs; science, technology and engineering expertise; and social sciences and humanities to ground us in people-focused outcomes.

Those voices must understand the established processes within which innovation exists, but that doesn't mean that they can't be challenged, flexed and changed. Generally, the private sector wants to demonstrate quickly with a view to capturing the market, but the public sector is more risk averse having to demonstrate value for money, democratic decision making and critically, manage perceptions and opinions. Active listening and creative planning to unpack and tackle these challenges is essential.

Being agile - taking an uncertain approach to the tasks ahead and flexing along the way - can be scary in local authority circles. Careful consideration of the interdependencies, checks, challenges and stage-gates within a no surprises culture can reap dividends. This approach doesn't circumvent any processes or expectations on the journey, but fosters a positive, problem-solving ethos for all to enable a faster pace and earlier outcomes.

Live Labs observation

Many of our Live Labs have had to juggle the competing demands and priorities of public and private sector, academic and SME viewpoints. At times this has not been easy. For example, our large-scale programmes in Buckinghamshire, Suffolk and Thames Valley show that being agile in their approach, solving unforeseen problems and working in collaboration can deliver innovation over large geographies. In Central Bedfordshire, the locations selected for the energy harvesting solutions had to change but despite this, use cases are highly replicable across the full breadth of the transportation sector. The sensor programme in Suffolk embraced opportunities to use equipment from North American suppliers who reached out following international press coverage.

⁶ APM, Agile Project Management - <https://www.apm.org.uk/resources/find-a-resource/agile-project-management/>

Gathering evidence throughout

Without evidence of measurable change, innovation is an arguably pointless exercise. Like technology for technology's sake, innovation for innovation's sake is a waste of time, effort and resources.

Whilst we should focus on the outcomes and benefits derived once an innovation is stable and functioning correctly, it is essential that we capture evidence (good or bad) along the way. The focus is so often on the end goal - the deliverable - that the micro-innovations, agility and creativity in solving day to day problems, are lost.

It is vital that we consider all innovations through the benefits they bring to the end users - the customers who use the assets and networks day in day out. Does the intervention improve their experience, result in less downtime and improve or make journey times more reliable?

We must gather evidence at every stage of the innovation process. Although the outcome may indeed be great, the way in which it was achieved could be ineffective, resource intensive or even unnecessarily stressful. Understanding what leads to success - the decisions, processes, thinking and collaboration that fostered it - are all key factors.

The behavioural response of customers to any interventions must also be considered. These could be individuals, businesses or organisations and will vary by life-stage, socio-economic background and other factors, but is essential to understanding the real benefits and outcomes of our interventions.

We need to take the systems thinking approach and apply it to our innovation progress:

- What are the interdependencies with externalities (sometimes out of our control)?
- How did we capitalise upon them?
- What insights and opinions led to innovative problem solving?
- What risks were taken and why?
- How were these managed?

Capturing these micro-innovations, evidencing them and sharing to a wider audience could be the key to unlocking some of our industry-wide issues. To really be agile in a collective approach to innovation, we need to reduce the waste in repeated working, loosen the stranglehold of (sometimes perceived) intellectual property and be collaborative - even open source - in sharing or insights and evidence.

Live Labs observation

The Transport for West Midlands (TfWM) Network Resilience Live Lab undertook work to develop specific 'granular personas' for those travelling on the network. These were designed to help inform operational decisions derived from the millions of data points coming in from the enhanced network monitoring system. From the outset, Live Labs set out to capture programme measures under broad headings of Achievability and Attractiveness, alongside factors beyond the usual cost, through its Monitoring and Evaluation programme. This approach, as outlined in a previous White Paper⁷, illustrates how such an ethos can bring wider benefits to an innovation programme.

⁷ ADEPT Live Labs: A new approach to Monitoring & Evaluation, May 2021 - <https://www.adeptnet.org.uk/system/files/documents/Live%20Labs%20White%20Paper%203%20-%20Monitoring%20%26%20Evaluation.pdf>

Fostering a willingness to ask, learn and share

Silos are the enemy of true innovation, whether they be commercial or governmental. Undoubtedly there is a need for the private sector to maintain and grow its position as local government needs to fight its corner in securing respective resources. However, this can be unhelpful, especially with the pace needed to meet the real challenges ahead.

It could be argued that in the UK, we have a problem in asking for help, perhaps especially in traditional industries. The hierarchy of established careers can be a blocker to really listening, and viewpoints can become entrenched over time. As outlined earlier, the skills sets and perspectives required for immediate challenges are very different from those conventionally required.

We all need to be willing to listen to those voices different from our own – those outside our personal or professional backgrounds, the organisations we work for and with, or indeed our own interests, perceptions and views. When we don't know something, we must be willing to ask others for help, or when we think we do know something, to ask for check, challenge and opinion.

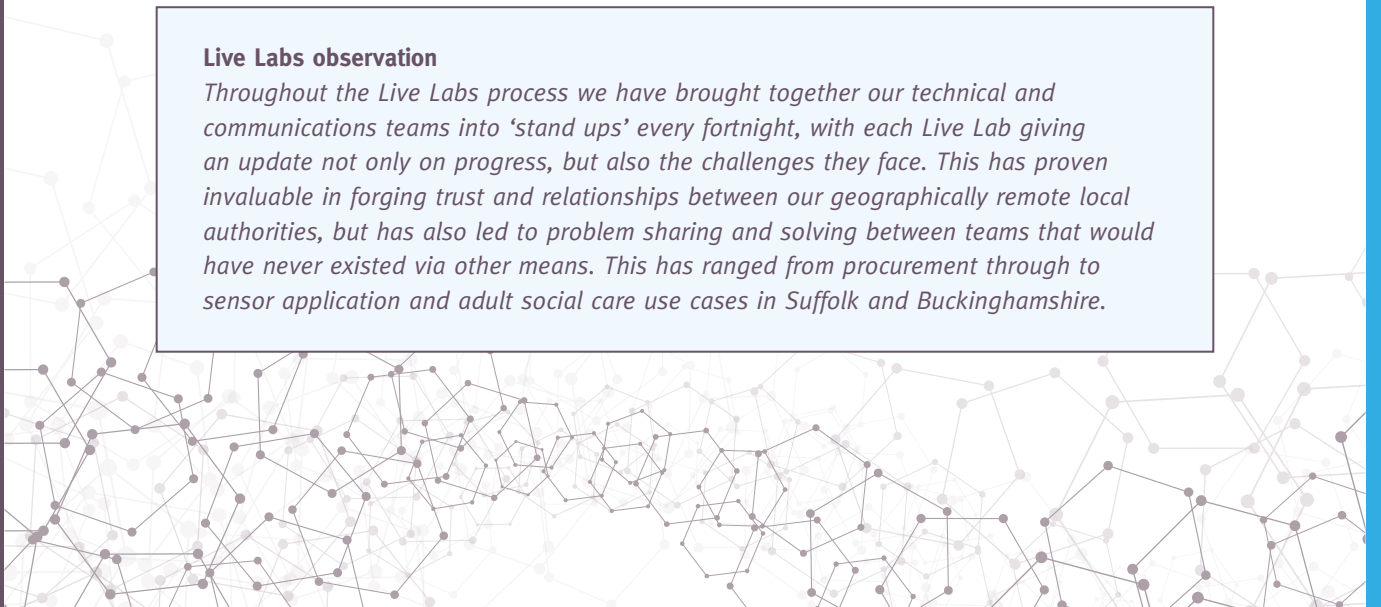
Local government boundaries can be unhelpful in this regard, worsened by the competitive environment in which they find themselves, sometimes fostering a 'them and us' attitude with neighbours both near and far away. Collaborating between public, private, academia and other sectors can also be tricky given differing needs and drivers.

The reality is though, that there are common challenges and common solutions being developed but sometimes in silos, and sometimes invisible. Asking for help can have stigma, but it could be a crucial tool for innovative success and reducing waste.

Equally, having a willingness to share learning at every stage can help build trust across industry, furthering innovation and accelerating pace. Taking a collegiate approach to innovation could unlock problems, release resources and, fundamentally, demonstrate to those holding the purse strings that industry can help shape, rise to and solve our contemporary challenges.

Live Labs observation

Throughout the Live Labs process we have brought together our technical and communications teams into 'stand ups' every fortnight, with each Live Lab giving an update not only on progress, but also the challenges they face. This has proven invaluable in forging trust and relationships between our geographically remote local authorities, but has also led to problem sharing and solving between teams that would have never existed via other means. This has ranged from procurement through to sensor application and adult social care use cases in Suffolk and Buckinghamshire.



Thinking commercially

With scarcity of funding and particularly revenue funding, there is a clear need to be more commercially minded when considering innovation. When piloting interventions or solutions to determine their potential efficacy, there should always be an eye on how they could lead to a new BAU, and how this could be widely applied.

If we are to use technology in the widest sense or new thinking to solve some of the ‘wicked’ problems we face (climate change, scarcity of resources to name but two), we need to think beyond the immediate challenge and consider the unit economics:

- How could it be scaled?
- What are the potential markets for the scaling?
- How could it be commercialised to reduce costs in planning, delivery and operation?

We must also balance this with the wider social and environmental benefits that accrue from the careful application of technology.

As before, siloed solutions are equally as damaging as siloed thinking. They result in duplication, and in disconnected and sometimes conflicting approaches and standards, all resulting in wasted investment and effort.

The commercial imperative has two primary drivers across highways and transportation: being viable for the private sector to scale and bring to market, and for the public sector to demonstrate effectiveness and doing things in a better way overall. Both perspectives must be tempered by the needs of the customer, be they individuals, communities or businesses, and focused on delivering improved outcomes that are relevant to those needs.

Live Labs observation

Across the eight Live Labs and their geographies, we’ve seen a suite of innovative solutions, many at a large scale. These have been interconnected with other systems and programmes that have helped demonstrate the efficacy of the solutions, not as stand-alone interventions but as part of wider systems. Live Labs such as Kent and TfWM have demonstrated how such interventions deliver broader benefits and outcomes alongside developing new ways of working, and becoming the catalyst for further innovation.



In summary: a blueprint for innovation

If we are to tackle our challenges head on and use innovation as a tool to help us achieve beneficial outcomes, we should be adopting the following blueprint components. These are intended as a guide to prompt discussion and interpretation.



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