Nesta...

INNOVATION IN THE PUBLIC SECTOR

HOW CAN PUBLIC ORGANISATIONS BETTER CREATE, IMPROVE AND ADAPT?

Version 1

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November 2014

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Nesta...

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INTRODUCTION. **EMBEDDING THE ABILITY TO ADAPT AND IMPROVE**

This paper brings together the results of many years of research and experience at Nesta on how public sectors can become more effective innovators. This is a field that combines brilliant people and examples, along with a fair amount of hype and snake oil which results in methods spreading more because of fashion than effectiveness. Here we set out our approach to combining greater creativity with more attention to evidence and impact.

The background is that the world's public sectors face acute pressures to adapt: fiscal pressures, pressures from public expectations and pressures to tackle challenges such as ageing, climate change and migration. According to conventional wisdom they're bound to fail. There's a preconception that bureaucracies lack the competitive spur that drives businesses to create new products and services; that their rules squeeze out anything creative or original; that their staff are penalised for mistakes but never rewarded for taking successful risks. So while businesses develop new chips, iPods, aeroplanes and wonder drugs, the slow and stagnant public sector is perceived as acting as a drag on everything else.

This account is commonplace. But it is at odds with the history of innovation. Two of the most profound innovations of the last 50 years were the internet and the World Wide Web. Both came out of public organisations: the Defence Advanced Research Projects Agency (DARPA) in the first instance and CERN, the European Organization for Nuclear Research, in the second.

Despite popular opinion, business was not particularly innovative until at least the late 19th century. Instead, the most important innovations in communications, materials or energy came from wealthy patrons, governments or from the military. The idea that businesses and markets are alone in being powerhouses of innovation, or 'innovation machines' to use William Baumol's phrase, is a very recent one. Even today, the caricature of public agencies as stagnant enemies of creativity is disproven by the innovation of thousands of public servants around the world who have discovered novel ways of combating AIDS, promoting fitness, educating, vaccinating vast populations or implementing new methods like intelligence–led policing or auctions for radio spectrum. The world's most competent governments are also the ones doing the most to make innovation more systematic.

However, there are good reasons to doubt the public sector's ability to innovate enough. Innovators usually succeed despite, not because of, dominant structures and systems. Too many good ideas are blocked, filed away or simply forgotten. Public services remain poor at learning from better models – even on their doorstep – and only a handful of governments have any roles, budgets or teams devoted to innovation in their main areas of activity: welfare, security, health or the environment.

What's stopping public sector innovation?

- No investment models for innovation in organisations.
- Lack of dedicated budgets, teams, processes and skills.
- Discouraging reward and incentive systems.
- Departmental silos blocking the sharing of innovation.
- Lack of mature risk management methods for experimentation.

In contrast, over the last century mature innovation systems have taken shape in science and business. In science, both the public and private sector invest billions, and the difficult task of turning scientific insights into useful products was long ago taken away from lone inventors in garden sheds and placed at the heart of great corporations and great public laboratories. We have seen the structured use of experimental methods, evidence gathering and the creation of global networks, peer-reviewed journals and large complex teams. Innovation in this sector has big public support (£25 billion in the UK).

Meanwhile in the business sector, the 20th century brought the creation of in-house labs and Research and Development (R&D) teams, and in recent years more widespread use of open innovation, user innovation, service innovation, design. This has also benefited from significant financial investment (£140 billion in the UK).

However, in the public sector there are few comparable models for innovation. It is rare for an organisation to be able to give a coherent account of how they innovate. There are few mature roles; budgeting methods; or assessment methods. Instead new ways of doing things tend to be created in a much more arbitrary fashion. This leads to:

- The top-down imposition of unproven new ideas, or
- Creative but disorganised local innovation, or
- Reliance on quasi-markets without the R&D necessary for radical innovation.

The result of this is productivity stagnation in public services across the world, including in 45 per cent of EU GDP.

Perhaps the fundamental reason innovation is hard in the public sector is the same reason that makes it hard in any other sector. There are big returns to be gained from innovation for whole systems, explaining the most productivity growth, and indeed the most progress. Yet the rewards for any individual unit or organisation – such as a school or hospital – are much lower. Indeed there is likely to be significant risk associated with any innovation, making it more rational to focus on adopting the ideas developed by others. This imbalance between systems wide benefits and organisation level risks is of course why governments subsidise innovation in science and business – through a wide array of tools. What's odd is how little the same logic is applied to the public sector itself – yet here too experiments need to be pooled, while the benefits need to be pooled too. The policy challenge for the public sector is how to share both risks and rewards. That is what this publication sets out to explore, drawing on extensive research conducted by Nesta and its

partners over the years, as well as direct experience of running major programmes in the areas of health, education and local government. It also shows:

- Why innovation in the public sector matters more than ever at a time of austerity.
- How innovation in the public sector is best managed at every stage, from the origins of an idea to large-scale impact.
- How public sector innovation can be organised within bureaucracies.
- How new tools – ranging from open data to crowdsourcing – can accelerate innovation in public organisations.

1. WHAT IS PUBLIC SECTOR INNOVATION – AND WHY DOES IT MATTER?

In the public sector, as in other fields, innovation can mean many different things. It can mean new ways of managing organisations (such as Public Private Partnerships), new ways of rewarding people (such as performance-related pay) or new ways of communicating (for instance, through ministerial blogs). Distinctions are sometimes made between policy innovations,[1] service innovations and innovations in other fields. These fields include democracy (with e-voting and citizens' juries) and international affairs (with prepayments for new vaccines and the setting up of the International Criminal Court). Some innovations are so radical that they warrant being seen as systemic, for instance the creation of a national health service or the move to a low carbon economy.

Innovations can develop through many routes. Sometimes politicians may be the instigators – like the Brazilian Mayor Jaime Lerner. Sometimes NGOs pioneer new methods that are then absorbed into the state – as happened with hospices. Sometimes academics develop new ideas – like Cognitive Behavioural Therapy. Sometimes business lobbies for new roles – as happened with Private Finance Initiatives. Good governments are open to good ideas wherever they come from.

Put simply, public sector innovation involves creating, developing and implementing practical ideas that achieve a public benefit. These ideas have to be at least in part new (rather than improvements); they have to be taken up and used (rather than simply remaining ideas); and they have to be useful. By this definition innovation overlaps with, but is different from, creativity and entrepreneurship.

Governments and public agencies around the world are constantly innovating new ways of organising social security or healthcare and developing online portals, smart cards, public health programmes and imaginative incentives to cut carbon emissions. Some of the more prominent recent examples in the UK would include the work of the Government Digital Service (GDS) and the Nurse-Family Partnership Programme. There is also India's Unique Identification Project (UID), conditional transfer programmes in Latin America and

municipal bike and car rental schemes like Vélib' and Autolib' in Paris. Examples Nesta has been involved in include innovations in health such as group consultations and social prescribing, technology tools such as Buzz and Patchwork, a wide range of innovations in education as well as innovative tools for government (such as the design of new statistics to measure innovation and creativity in the economy).

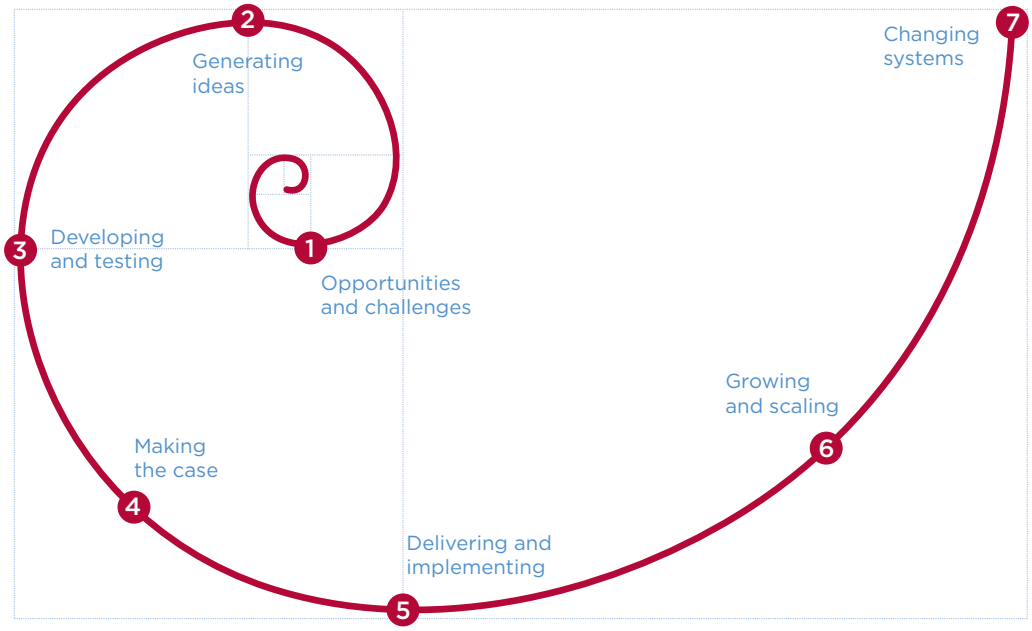
Public innovation isn't always a good thing – and a world in which civil servants experimented continuously with traffic lights or taxes on pensions would be a nightmare. But the overall lack of seriousness about innovation is striking, and contrasts starkly with other sectors.

2. HOW CAN INNOVATION IN THE PUBLIC SECTOR BE MADE MORE EFFECTIVE?

The most important task for any public agency or government is to tackle each stage of the innovation process. These each require different methods and cultures of organisation. But the biggest impact comes from linking these all together into a coherent system of innovation.

In essence that means: generating more ideas; focusing on the few that really work; and spreading and scaling these. This process is captured in the innovation spiral. Real innovations don't always proceed neatly along this spiral, and there are many loops back, detours and jumps. But it provides an invaluable tool for thinking more systematically about which methods and skills are needed at each stage.

STAGES OF INNOVATION



Better understanding opportunities and problems

Innovation often begins with a prompt or trigger which makes it either possible or necessary. Sometimes innovation is forced – by a crisis, cost pressures, or political demands. Sometimes it's catalysed by a new technology – so the spread of mobile phones prompted people to think about how they could be used for cheap banking (like mPesa in east Africa) or healthcare (for example with SMS messages to remind people to take their prescriptions).

Most organisations wait for outside pressures to make them innovate. But the best try to prompt themselves more systematically, by keeping attuned to new trends, customer demands, data or technologies. Innovations can be prompted by many things – including problems, failures and complaints. This study[2] looked at how complaints could be turned into a positive force for improvement.

The methods for generating ideas include many for understanding how people experience services or social issues – some come from ethnography (which often involves long interviews, or sharing everyday lives).[3] Some try to map 'service journeys' using diaries and video to track what it feels like to be a patient or a customer.

Many innovation teams around the world have put an emphasis on better understanding how people live their lives, and how services are really used, to help improve them. This is in part a reaction against excessively abstract, consultancy and expert–driven approaches to reform which often work on paper but not in practice.

In each case the aim is to find new insights into what people really need, so as to end up with a clearly defined problem. Much of the creativity of innovation comes at this stage – defining questions rather than answers. How we see the problem can make a big difference – for example: is the issue delivering energy to consumers or reducing the need for energy? Is the goal to help older people avoid illness or to maximise their wellbeing?

Generating more useful ideas

The next stage involves ideas. As double Nobel Prize winner Linus Pauling put it – the best way to have good ideas is to have lots of ideas and discard the bad ones. But generating lots of ideas isn't easy, particularly for hierarchical bureaucracies that are better designed for killing ideas than nurturing them.

Luckily there are plenty of tools to prompt creativity: some are designed to help groups come up with more ideas, like the creativity tools promoted by figures such as Edward de Bono. There are creative design tools that prompt thinking – for example, how might you invert roles and think about your potential users as providers? How would you redesign services to meet the needs of the most extreme users, like the severely disabled? How to translate ideas from one field to a very different one, for example from airports to hospitals?

There are also more lateral methods – like finding random words as prompts for dreaming up new ideas, drawing cartoons and dreamscapes. Some have suggested elaborate methods for multiplying ideas – like the TRIZ tools developed in the USSR and then widely used in US technology businesses. Others have created roles – like artists and social entrepreneurs in residence to encourage a change in chemistry. The right kind of meeting format can also

accelerate creativity – like two day social innovation camps which have to build a working website to meet a social or public need.

Public organisations often struggle to generate enough ideas – partly because well–trained civil servants are too quick to see what won't work. The Fast Idea Generator, a tool featured in the DIY Toolkit,[4] provides a framework for groups of managers, frontline staff or users to quickly develop new options.

DIY 20

I want to generate new ideas
by thinking differently

FAST IDEA GENERATOR

THE APPROACH		THE NORMAL RULE	BENDING, BREAKING & STRETCHING THE RULE
Inversion	Turn common practice upside down	Doctors treat patients	What if patients became doctors?
Integration	Integrate the offer with other offers	People access a range of services in different locations	What if different local services had one point of access?
Extension	Extend the offer	Schools provide learning opportunities to children and young people during the day	What if schools also offered sport and recreation and community learning provision out of hours?
Differentiation	Segment the offer	There is a 'one size fits all' approach	What if a service was personalised and differently segmented?
Addition	Add a new element	Supermarkets deliver groceries	What if supermarkets delivered groceries and also provided hot meals to older people in their homes?
Subtraction	Take something away	Prisons are critical to an effective criminal justice system	What if you had to close three prisons?
Translation	Translate a practice associated with another field	Hospitals and airports are different kinds of operations	What if airport management practices were applied to hospitals?
Grafting	Graft on an element of practice from another field	Teaching and coaching are separate practices.	What if coaching were introduced as part of secondary school education?
Exaggeration	Push something to its most extreme expression	Schools support children and young people to learn, but only within designated times and in a designated space	What if students could access learning, anytime and anywhere they chose?

These can be very useful – but it's worth remembering that the best way to have ideas may be just to cultivate silence: quiet walks, lying in the bath, have been shown to be better sources of creativity than brainstorms.

Another set of tools uses incentives to encourage creativity. Prizes have a long history stretching back to the prize for measuring longitude in the 18th century and prizes for canned food in the 19th century. More recent examples include Nesta's Big Green Challenge for communities cutting carbon emissions, to prizes for reducing isolation amongst the elderly and Nesta's revival of the 300 year old Longitude Prize in 2014. In technology leading examples include Kaggle for data and algorithms and Innocentive. One of the roles of prizes is to tap into the imagination of people who don't work for big organisations and aren't networked into power.

Prizes and competitions can be good ways of bringing in ideas from beyond the usual suspects. An overview of how prizes can be designed and used can be found here.[5] A recent example of a prize is the EU social innovation prize[6] which elicited over a thousand ideas for using technology to address unemployment. The best 30 received intensive advice and support, and the top three received a cash prize.

Prototypes, pilots and experiments

Ideas are never born fully formed. They are always partial and imperfect and need to be refined and developed. That can be helped by criticism, or dismantling the idea and putting it back together (innovators aren't served well by bland encouragement).

Then before long the idea needs to be tested out in the real world. No plans survive their first encounters with reality intact, and often the fastest way to develop an idea is to put it into practice, usually on a small scale so that the risks are contained.

Here there are many alternative approaches. Some are very formal like pilots or experiments using randomly selected participants and control groups. These are good for testing out a new drug or medical treatment (though it's important not to draw strong conclusions until quite a few experiments confirm the same result). In civil society it's the norm to try things out on a small scale and see what works in a more iterative way. This is the approach adopted more recently in design and software – rapid prototyping, beta testing. Trying things out in these more informal ways can save a lot of money, and usually throws up surprising results.

Governments are increasingly using formal experiments to test ideas. Creative Credits[7] was a pioneering programme run by Nesta to test different ways of supporting entrepreneurial businesses. The Innovation Growth Lab is a new partnership between Nesta, the Kauffman Foundation and governments in Denmark, the UK, Australia and Finland to test out ways of backing innovation and high growth firms.

Thomas Edison famously tried out some 10,000 different materials before finding the right one for electric lightbulbs. More recently James Dyson tried over 5,000 different prototypes before finding one that worked well enough. Few organisations have the patience or resources to prototype anything to that extent: but periods of intensive experimentation and adaptation can greatly increase the chances of long–term success. This is also where different kinds of lab can play a role – incubators, accelerators and labs try to become good at rapid experiment and adaptation.

The prototypes that then work best will often be hybrids, that bundle together a mix of elements. The iPod is a brilliant example – at one level it is a coherent and beautifully simple design. But beneath the surface it is a hybrid of many digital music devices made in Silicon Valley in the past; the MP3 music compression technology developed by the German Fraunhofer Institute; the music listing approach of Napster; and the manufacturing brilliance of Foxconn and others. Successful innovators are unashamed about borrowing good ideas from others and fitting them into new forms.

Measuring and testing to identify what works and what doesn't

It's in the nature of innovation – and all kinds of evolution – that it generates lots of possibilities but only a few survive and succeed. This is unavoidable. And being tough minded in discarding what's not working is critical to success.

There are many ways of finding out whether an innovation works. You can simply track data on what's happening – including financial data on revenues or profits. For social projects you can track who has got a job from a jobs project, succeeded at school or avoided prison. More

sophisticated measures try to make sense of outcomes achieved – like distance travelled for a young person trying to become employable, or success relative to a baseline against which changes can be assessed.

Another step up, in terms of serious methods, is the use of control groups. This is standard for testing medicines – which randomly assign people to receive the intervention and compare them to a similar group who don't, but less common in other fields.

Measurement is vital if you want to spread an innovation and persuade sceptics to pay for it. It may be worth spending a lot of scarce money to demonstrate impact. But it's equally vital not to measure too soon or in the wrong way. Early in the life of any innovation success is likely to be ambiguous at best. Great innovations, from computers to cars, didn't work at all well early on and were less efficient than the alternatives (such as manual computing or horses and carts). Rigorous measurement becomes more relevant only once a model has become reasonably stable and has had time to establish itself.

When measurement and assessment seriously kick in, it's important to assess the right things and with the right measures of success. In education for example it's reckoned that any intervention has to achieve at least a 40 per cent gain to be worth considering (because children are learning all the time anyway). Another example is ageing. Projects designed to help older people stay out of hospital may appear to be very successful, but even without an intervention most get better, the phenomenon known as 'regression to the mean.'[8]

Evidence can guide innovation – particularly the more incremental innovation that adapts and improves existing methods. New ideas are far more likely to be effective if they are grounded in awareness of what's already known. Some more radical innovations have to jump well ahead of the evidence – but they are the exception rather than the rule. And sooner or later, they will also need to prove that they work.

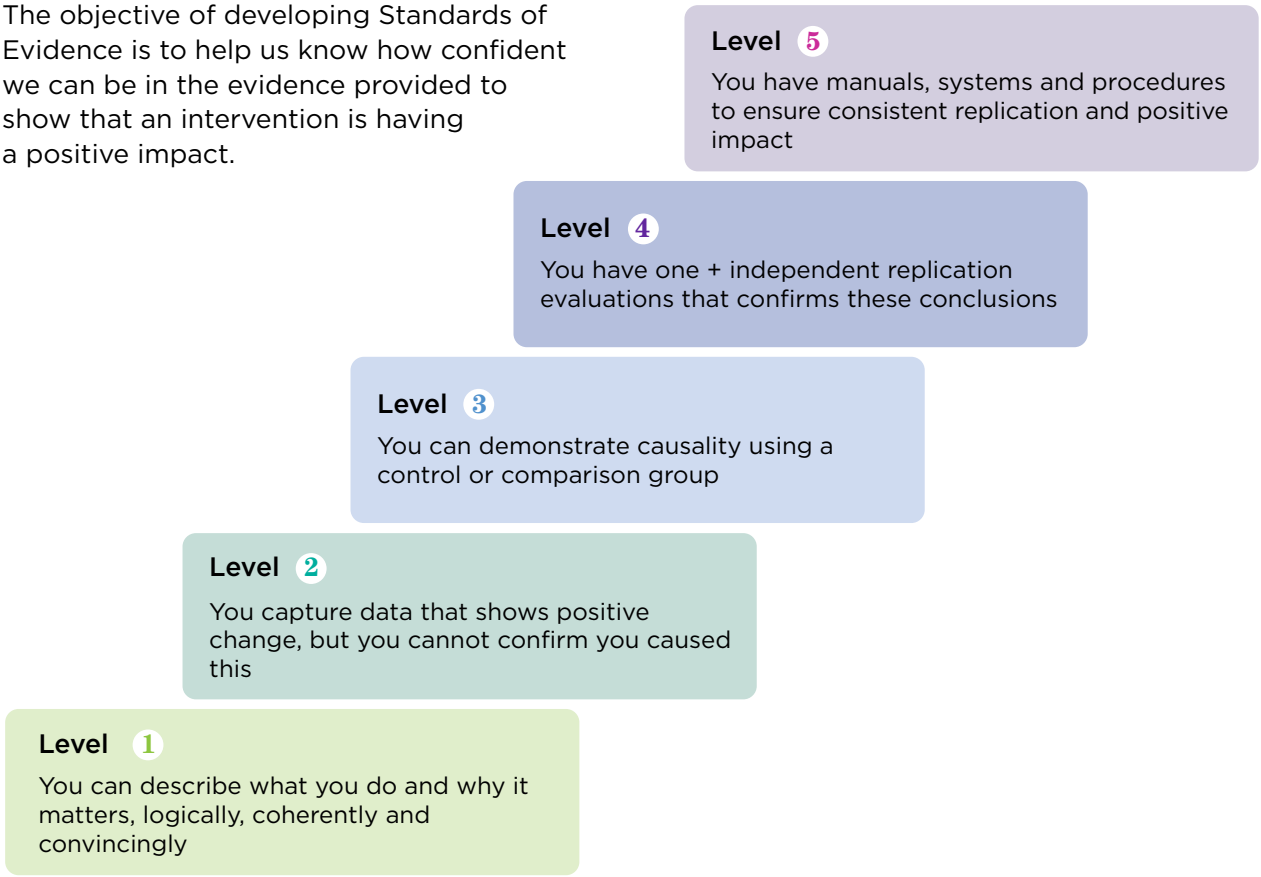
We see stronger methods and institutions for evidence as a vital part of an effective innovation ecosystem. Specifically, we have advocated for new institutions for evidence, and seven What Works Centres are now either in operation or in development. Some are large organisations, such as NICE (with several hundred staff) and the Education Endowment Foundation (with well over £100 million of funds), and some are smaller, focussing on policing, local economic growth, early years and an ageing population. The What Works Centres[9] provide a new way of making evidence more visible and more useful for policymakers and practitioners in different fields.

We have also developed a better common framework for thinking about evidence. Rather than trying to impose a single methodology we've shown that it is more beneficial to encourage all projects and initiatives to clarify the standards of evidence they have now – what grounds they have for thinking that they achieve desirable impacts – and to put in place plans to improve them.

The 'Standards of Evidence' framework,[10] summarised below, provides a common language for talking about evidence and how confident can we be that something really works. The ladder of evidence summarises our thinking on this – drawing similar frameworks that have been developed around the world.

The Nesta Standards of Evidence

The objective of developing Standards of Evidence is to help us know how confident we can be in the evidence provided to show that an intervention is having a positive impact.



This framework is now being used in many fields – by the UK Cabinet Office, Nesta's own investments team, by programmes like Project Oracle (linking youth projects in London with academics and commissioners) and by private firms – notably with Pearson, the world's largest educational firm, in the lead.

Effective implementation

If an innovation can be shown to work, both in economic and social terms, how should it then be sustained? The world is littered with promising pilots that didn't take off, or piers that didn't turn into bridges. There are many ways for an innovation to become sustainable, and to become part of people's jobs and daily routines. In the private sector it has to show a profit, and then can be provided by a private firm, either new or old. This is where business plans and business cases become essential. Tools like Bell–Mason can show what's needed to put the idea into practice. The barriers to sustainability will include money and market demand, but also skills, cultures and capacities.

In the public sector, the key may be to persuade policymakers or commissioners that the new innovation is not only needed but also effective. It may then be backed up by law, spending commitments, or directives for agencies. In any sector sustainability depends on someone being willing and able to pay for it.

Public organisations often struggle to close existing services down – yet that is often key to creating the space for new ideas to flourish. The Nesta report *Art of Exit*[11] studied many good examples of 'decommissioning' services in order to move to more effective approaches.

The step from pilots and prototypes into sustainability involves choices about what's the right organisational form to make it work. It also involves a change in attitudes to risk, with lower thresholds for risk and usually more need for finance.

In all innovation the ability to implement well is all important – careful attention to the detail and practicality. That's why it is so important to involve people with front line experience in the design of innovations, since even the best ideas have little chance of success if they are poorly implemented.

Scaling things up and improving adoption

The challenges of scaling and growth mirror the questions of sustaining. For an innovation to move from small to big two things need to be in place: first the innovation needs to work, and be seen to work. That's usually the result of a lot of improvement and adaptation. It's very rare for an idea to be ready to scale early on. The second is demand: enough people and organisations willing and able to pay for it or support it. It follows that for some new ideas the top priority is showing that it works: building up more evidence or showing the savings it can achieve. That may also require simplification so that it's easier for others to take up and use. For other ideas the priority is advocacy – creating demand where there isn't any. There's little point perfecting an innovation that nobody actually wants (yet).

There are then a series of choices about how to grow innovations. In business the most usual approach is to grow a new business around the innovation – like Google, Apple, Dyson or Easyjet. The best way to grow may be to become so attractive that a much larger firm buys you out. Alternatively the idea can spread as a franchise (like MacDonalds or the Body Shop), or by licensing a technology for others to make. For social and public innovations there are also more choices. Most ideas spread just by being copied – and their creators evangelise about the virtues of a new approach to microcredit or parenting education without expecting any payment or credit. Policymakers can scale ideas by law and decree. Or ideas can spread in a more cellular way, through networks and federations. *Making it Big*[12] looks at how social innovation can be scaled. It shows how many different routes to scale there are, and why sometimes big isn't always beautiful.

Scale always requires more capital – whether that's concentrated capital invested in a single enterprise or multiple sources of finance invested in a myriad of copies. But it can also involve some painful choices. When an organisation grows it usually has to change its character. The freewheeling informality of startups has to be replaced with more formality and structure; the charismatic founder may have to cede power to professional managers; and the need for more money may bring with it more accountability to outside investors or commissioners.

For the public sector scale is paradoxical: on the one hand governments are uniquely well placed to scale ideas up; on the other hand public services are notoriously poor at adopting new ideas, even when they are supported by strong evidence.

In some cases there may also be good reasons why innovations don't spread. What works in one place may not work in another. What one group of people may find useful another may find useless. So rigorous methods are needed to understand what's transferable and what isn't. The fact that a randomised control trial (RCT) proves something is not enough to justify widespread adoption.

There is a surprising lack of hard data about how and where innovation is best adopted. So at Nesta we have been experimenting with new tools to track adoption which, in time, could significantly change the landscape for scaling innovations. For instance, taking health as a test case we have looked at recommended treatments and methods, and then linked these databases to the databases of local doctors prescribing choices to patients. We've discovered a very clear pattern – or, to be more precise, the striking lack of a pattern. The adoption of innovation by local doctors is more influenced by the encouragement of colleagues than the strength of evidence. At the start of the study, we had hoped to find 'superadopters' who were generally good at acting on evidence – but this wasn't the case.

Nesta's research on adoption of innovations in healthcare[13] is a path–breaking new approach to studying how well a system uses new ideas. Using big data sets, it showed how well local doctors were taking up proven new approaches. In the future it may be possible to extend this to other services like education and policing, thus providing more encouragement for delivery organisations to draw on the best available knowledge.

But things needn't be this way. There is a possibility of a future where the innovation system is more transparent, where there is more shared knowledge about which innovations work best and who is or isn't taking them up.

Systems change

We tend to think of innovations as being specific products or services. However, the biggest impacts often come from how these are put together, and in many fields the ultimate goal is to reshape whole systems: to change the ways in which we manage health, energy, food or care. Systemic innovation is used to refer to a series of related innovations that change the way a whole system works. By its nature it's harder to manage and orchestrate than innovations in individual products and services, and there is no easy recipe book.

Much systemic change involves an interaction between at least four elements: new technologies, products and services; new laws and policies; new types of market; and changes in behaviour and social norms. Waste is a good example that has seen a dramatic shift away from landfill and towards recycling and incineration, thanks to pressure from all of these factors over many decades. There are many ways in which it's possible to contribute to systemic innovation – from visionary work on possible futures, through detailed design and experimentation around elements, through to advocacy.

3. HOW CAN INNOVATION BE BETTER ORGANISED IN PUBLIC SERVICES?

There are two schools of thought regarding how innovation could be better organised in public services. One advocates creating dedicated units to drive innovation. The other subscribes to the belief that innovation is everyone's responsibility and so should be a part of everyone's job.

Our research shows that there is a value to having separate specialised innovation teams, as they bring in new methods and new people and also act as catalyst for change. But it is also vital that these teams work with existing agencies and departments – for instance, by using their budgets and some of their staff – otherwise new ideas are seen as being created by outsiders and are too easily rejected. Connectivity is the key.

A high proportion of teams and networks of this kind then need to be deployed across organisational boundaries, reporting directly to central departments like the Cabinet Office, Treasury or Chief Executives' departments in local authorities. These teams may focus on problems (for example the rise of Alzheimer's disease or gun crime) on groups of people (such as migrants with poor English language skills) or places (for instance depressed seaside towns). The Centre for Social Action[14] Innovation Fund is a government/Nesta supported fund that uses stage-gated funding to back new ideas. The Behavioural Insights Team[15] is an unusual example of using experimental methods at the heart of government – testing out applications of new ideas from psychology to tasks such as tax collection and welfare services. The i-teams[16] study – done jointly by Nesta and Bloomberg Philanthropy – looked at innovation teams in national and city governments around the world. A related blog looked at the broader field of public labs and how they balance being simultaneously inside and outside the system.[17]

Public innovation cannot be simply institutionalised or planned. But there are many things that governments can do to improve the chances of new ideas creating value for the public. For instance:

- They can do more to cultivate and scan the hinterlands which new ideas will come from.
- They can recruit proven innovators.
- They can deliberately design and test promising new ideas.
- They can provide markets for solutions and outcomes rather than inputs.
- They can create protected spaces where radical ideas can evolve.

4. CRUCIAL BUILDING BLOCKS FOR A SYSTEMATIC APPROACH TO INNOVATION

Strong teams to catalyse innovation can play a hugely valuable role in accelerating change. But they are only part of a more comprehensive system of innovation – good at understanding needs and opportunities; able to generate ideas; assess and test; scale and spread. A more mature system will include at least the following key elements:

Leadership

Governments are hierarchical systems. Without very visible commitment from leaders – both political and official – others are unlikely to take risks.

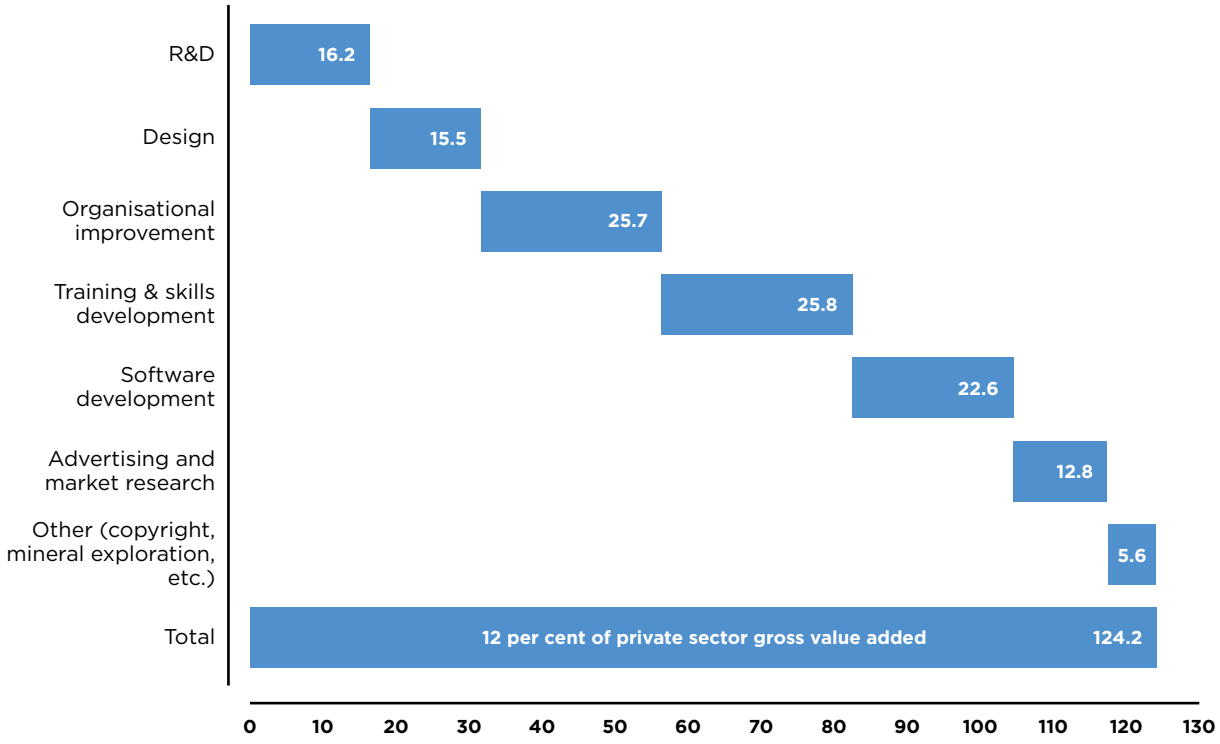
Money

Innovation isn't always dependent on money but money certainly helps. So what is a reasonable proportion of public spending to devote to innovation? Is it around 3–4 per cent, which is generally thought to be the right amount for a modern economy to invest in R&D, or the 20–30 per cent that is more typical for a biotechnology company? Innovation certainly needs money for research, trials, training and evaluation. But there is no formula that can define what budget allocations are right. There are few circumstances where the figure should be less than 1–2 per cent of turnover, and in relation to fields of relative failure – such as offender management or congestion – the figures need to be higher.

Money can then be allocated through departments and through cross-cutting budgets. From there, it can be directed either to individual projects or, more fruitfully, to teams with good track records, as well as intermediary organisations. Incentives can be offered to local authorities to encourage them to play a more explicit role as laboratories for national policy, to user groups to engage them in commissioning innovations, or to networks of collaborators. It could be:

- Organised in stage gate funding for ideas following open calls (for example, as is done by Nesta's Centre for Social Action).
- Accelerators for individual ventures (such as Nesta-support Bethnal Green Ventures).
- Prizes that reward innovations that can meet specified goals (such as open data challenges).
- Programmes aiming for more comprehensive systems change.
- Purchasing of outcomes, as with Social Impact Bonds.

At a macro or organisational level there is a need for better ways of organising finance. Business is developing better ways of measuring investment in innovation. Nesta's Innovation Index a world–leading method of doing so at the national level, and is now being adapted in Malaysia to map patterns of investment at the level of individual businesses, distinguishing classic R&D, spending on organisational development, software, design and other categories relevant to innovation in practice. In time, we hope some comparable measures of public spending may be feasible.



People

Public organisations also need people with the right mix of skills and attitudes to innovate. It's hard to find all of the right skills in the same person so team construction is vital, allowing for creativity and scepticism, explorers and deliverers. As will already be clear innovation involves almost contradictory mindsets – on the one hand very creative and open approaches to ideas, and on the other rigorous approaches to evidence. So what is needed is recruitment and development policies that don't squeeze out creative people, as well as pay arrangements designed to encourage risk taking (for example with bonuses when ideas are taken up) and training courses that acclimatise officials to innovative processes. New hybrid positions may also be needed – for example, keeping innovators on the civil service payroll so long as they can find willing departmental paymasters for at least half the year.

Culture

Much has been written about how cultures can either encourage or inhibit innovation. Encouragement involves visible reward and recognition; leaders who are seen to care; promotions that validate innovators. The cultures needed for innovation are varied – ranging from grand projects to the many fast, smaller innovations of more recent innovation teams. But

we can generalise that innovation depends on what can best be described as a spirit or ethos: the imaginative flair that tells people at an emotional level that innovation matters and isn't just a new box to tick. A common concern is how to handle failure. It's often said that innovators need to embrace failure, and it's true that if there are no failures then insufficient risk is being taken. But simplistic embrace of failure can be as problematic as denying it altogether. Most successes are failures in the middle; they become successes because of hard work and persistence. If failure becomes too easy there's likely to be more of it. All real innovation projects will involve periods of failure; the mark of the best innovators is that they persist and adapt to turn failures into successes.

Governance: accountability for the future as well as the present

Innovation needs to be recognised and supported by the people with power. That means ministers within each department with a remit to protect and nurture innovation, and, where relevant, board members responsible for providing the money and backing. It means paying attention to how the future is unfolding (for example, situating health innovations within the broader shift to greater self–management of long–term conditions and the steady move away from a health service centred around hospitals and acute illness). Innovation should be thought of as one side of accountability: any leadership or management team should be held to account for how well it performs in the present, and for how well it is preparing for the future. It follows that any governance structure that does not regularly assure itself that there is a flow of potential new ideas, ranging from high risk and high impact to relatively low risk and low impact, isn't doing its job.

Risk management

Risk is often cited as the reason why innovation is so hard in the public sector. If things go wrong those responsible will be mercilessly blamed: by hostile media, opposition politicians. Experiments that don't work will be denounced as a waste of scarce public money. So it's natural to default to safe bets. A better approach is to see risk as something to be managed. This is why innovation is often best organised on a small scale, and fast, so that the costs of failure are minimised. Risk then needs to be adjusted depending on various factors: how much are those involved in any experiment able to choose whether or not to take part (as happens with clinical trials)? Where choice is involved it may be legitimate to take bigger risks. How reversible is the experiment? We take a different approach to life and death issues – like heart surgery or nuclear power safety – than trialling a new way of organising classrooms. How serious are the threats if things go wrong? Experiments in welfare payments need to be handled carefully because those at risk are vulnerable than for example handling fines or tax collection. What are the risks of inaction? Where these are high we may be willing to take bigger risks. These are just a few of the criteria which can be used to manage risks intelligently.

So what might be a reasonable success rate to aim for in radical innovations: one in two, or one in ten? DARPA in the US aims at a 10 per cent success rate and is generally understood to achieve a lot less, perhaps 2–3 per cent. It's a very wealthy body that sits alongside a more traditionally organised R&D system, and probably represents the outer limit of risk appetite in a public organisation. For others, the key is to experiment fast and small and get failures out of the way as much below the radar of intense public scrutiny as possible.

Innovation as part of a broader system

Innovation in governments only thrives if it aligns with the wider system of decision making and allocation of resources. It's vital that the main processes of everyday government, from budget setting to audits and inspections, appraisals to pay, encourage and reward effective innovation. Any regular strategy or spending reviews should take stock of which policies are working, where new priorities are emerging and which promising innovations, whether in the UK or abroad, should be adopted or adapted. In this paper I set out how the centres of government need to be reshaped today to take advantage of new technologies and new thinking about achieving results.[18]

Future technologies and public sector innovation

It's impossible to predict what new methods will become prominent in public sectors around the world. But it is not so hard to identify some of the technologies which are likely to become more widely used as tools. The opening up of data over the last few years is now bearing fruit – with well over a million datasets opened up, and thousands of new applications in transport, crime and other fields. Much more systematic use of data, more availability of data in machine readable form, and a greater emphasis on data skills all look likely.

We can also expect more use of:

- Predictive algorithms, of the kind already used in health services and criminal justice to predict who will be at greatest risk of such events as emergency hospital admission or reoffending.
- Technology platforms allowing not just direct payments into bank accounts but also virtual monies and internet–based payments, secure identities and personal accounts.
- Digital tools allowing states to orchestrate marketplaces for provision, for example of care supports, or learning, using credits provided by the state.
- Social network analysis and informal 'collaboratives' to help partnerships and cooperation across professional and organisational boundaries.
- New SMS and other tools to nudge people into changing their behaviour.
- New financing tools such as social impact bonds to incentivise outcomes and make the notion of social investment more concrete.
- More use of machine learning not just in fields like healthcare (to interpret population level patterns of disease and cure) but also to help improve the effectiveness of everything from traffic light systems to school curriculums.

This short list is far from exhaustive but it gives a sense of some of the fields of public sector innovation in the decade to 2025. Clarifying the best opportunities emerging from these maturing technologies is going to be a theme of Nesta's work over the next year.

Conclusions: more attention to what's proven, promising and possible

For public sectors to become more adept at innovation they need to treat it with the same seriousness they deal with handling risk, financial controls or regulatory enforcement. That will require better structures, skills and methods. Above all it may require faster learning – so that it becomes natural for any public official to be aware of what in their field is proven, and worthy of adoption; what is promising; and what is possible.

ENDNOTES

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November 2014