# Building Better Systems

## A Green Paper on System Innovation

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**About the System Innovation Initiative**
This initiative of the ROCKWOOL Foundation's Intervention Unit connects knowledge and practice on system innovation to leaders, innovators and entrepreneurs who want to have more systemic impact and meet big, shared societal challenges in new ways. Over the coming year we will be working with system innovation experts and practitioners internationally and in Denmark to turn systems theory into systems change in action.

**About the authors**
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**The ROCKWOOL Foundation** is an impartial, financially self-supporting institution. The Foundation's objective is to strengthen the sustainability of the welfare state through the creation of new, independent knowledge about the challenges faced by society and through the development of solutions to these challenges. The ROCKWOOL Foundation Interventions Unit designs, launches and scales social innovations to address social issues which affect equality of opportunity.



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# 1

# Step Into It

**This paper lays out a series of** steps people can take to create the new systems we need to meet shared, public challenges. Systems are ubiquitous and powerful. We rely on them to support our daily lives: every time we turn on a tap, flick a switch for electricity, drop our child at school, jump on a bus or visit a doctor we rely on a wider system. There is a widespread sense, among decision makers and citizens that in the coming decades society will need not just new products, software and services, but new systems for living sustainably in a socially inclusive society. The need for better, different systems will be heightened by the impact and lessons of the Covid-19 pandemic.

Systems are productive precisely because they are more than standalone products. A system pulls together all the different ingredients needed to meet a need or to produce an outcome: the shipping container is a product, containerisation is a system; a contactless payment card is a product which only works as part of a payments system; an operation in a hospital can only take place because it is part of a wider health system. To understand how a system works it has to be seen as a whole, from the macro policy frameworks of social security systems right down to how a citizen goes about finding a job.

Many of the systems we rely on for care and work, energy and transport, education and health are under pressure to change. Society faces both deeply entrenched and growing challenges that are outpacing the systems we have. We also have opportunities to create new, alternative systems as new knowledge, values and technologies emerge, from artificial intelligence and bitcoin, to circular and renewable systems of production. Rising to the challenge of fixing an existing system and exploring the possibility of creating a new system are different undertakings. The first is about optimising what exists, the second is about creating something different and better. We want this project to yield practical insights for those who want to respond to the systemic challenges of today by stepping into the possibilities of the future.

Acting to change systems depends on new ways of seeing both challenge and opportunity: why systems come under strain and what unlocks the potential for alternatives. It depends on better understanding how new systems form, and what and who is part of initiating and driving the transition to them. In putting together this paper and the ones that will follow from it we want to clarify how to assess the need for, invest in and act on the process of deliberate system change.

Systems theory and thinking is a well established field. There is a growing body of historical knowledge about how systems have changed over time. What is lacking is practical knowledge to show how systems can be changed deliberately and how new systems can be brought into being. What we hope to do is to bring a focus on connecting theory to possibility, practice and people:

**Possibility:** to focus on the opportunity to create new, better, different systems, not just to optimise existing systems through incremental adjustments.

**Practice:** to turn historical knowledge of how systems have developed in the past into practical knowledge about how to make systems change, on purpose.

**People**: to show how people working together can shape systems rather than feeling powerless in the face of seemingly complex, impersonal forces which are larger than them.

In doing so we want to highlight what is needed for effective system innovation. There is a significant gap between the systemic innovation that society needs and the incremental and additive innovation which is most often produced. One reason that many social innovation efforts fail to have the impact hoped for is that these innovations are not designed to bring about wider systems change: they are like individual points of light when they need to form a new constellation with a shape and structure.

This first paper sets out some broad frameworks to help people who want to play a role in creating the kinds of systems we need to meet big, shared challenges, from their different positions. In particular, it is for people who play four critical roles in system innovation:

**Entrepreneurs** who are developing visionary and potentially systems-shifting activities on the edge of or outside existing systems

**Insider-Outsiders** who are working inside the organisations and institutions that are part of formal systems to open them up to the new approaches that are developing outside them.'

**Convenors** who are in a position to bring together the different people involved in acting to change a system. They might include foundations, national intermediaries, innovation labs or industry bodies.

**Commissioners** and enablers, such as political leaders and investors, who want to bring a new system into being.

*Building Better Systems* first addresses the nature of the systemic challenges and opportunities which make system innovation necessary. We go on to consider how to delineate 'the system' that needs innovation and to see it in a wider context. The paper then explores the way that change at different levels, from the macro to the micro can affect systems before looking at the role of purpose, power, relationships and resources in systems change. Finally, we look at the cast of characters involved in systems change, the roles they play and the alliances and coalitions they need to form in order to make change happen.

This paper also marks the start of our effort to identify the gaps between the promise offered by deliberate system innovation and the challenges that arise in practice. It is therefore also an invitation to practitioners, researchers and advisors to contribute their expertise in different fields of system theory, historical knowledge and practical experience of system change to better addressing some of the issues raised in this paper and to setting the further questions this initiative should tackle. We set out our initial ideas of what these might be in the final section.



# 2

# Making the Case for System Innovation

**Innovation comes in many forms,** from the incremental to the radical, the disruptive to the sustaining, commercial to social, creating new products and processes, services and software. Why and when is *system* innovation needed?

System innovation is needed when two conditions apply.

First when society faces a **systemic challenge** which requires a systemic response.

Second when society has a **systemic opportunity** to create a new kind of system.

Systemic challenges *push* innovation forward; systemic opportunities *pull* it. The first is about tackling a problem, the second about realising a possibility. While linked they are quite different activities.

Either of these factors on their own can create the conditions for system innovation, but when they are combined the need for system innovation becomes even more compelling.

## Systemic Challenges

Karyn McCluskey had a headache, a big one and so did her city, Glasgow.

McCluskey was the senior police officer tasked with tackling violent crime in Glasgow and she seemed to be having no impact. Glasgow had acquired a reputation as one of the most violent cities in Europe. Scores of young men died from knife wounds, many more were injured and many others went to prison for the crimes they committed, recorded on CCTV, in plain view on the city's main streets, unimpeded as the people about them shopped.

McCluskey says the best she could seem to hope for was that she might stop the problem getting worse. That was not something she could settle for: the trauma she witnessed, especially for the mothers of young men who bled to death on Glasgow's pavements would not let her do so.

There were many steps in the journey which McCluskey, her officers, colleagues and partners took in the coming months as she created a coalition across the city – of public, private, voluntary, religious and community groups - to create a new approach to tackle the problem. But one of the most important came right at the start. She decided to reframe the challenge, to see it in a different way.

McCluskey and her officers were working in a criminal justice system designed to arrest, prosecute and punish criminals. Instead she drew on her original training as a nurse to see the violence as if it were a disease: an epidemic which needed tackling like a public health emergency. Rather than responding to incidents once they had happened, the city needed to prevent the spread of violence in the first place. The criminal justice system treated each crime as the act of an individual, whereas the epidemic was the product of a shared culture of men and communities, entrenched by economic inequality and by domestic violence, drugs and worklessness.

That shift in perspective, to see Glasgow's challenge as a disease of epidemic proportions, enabled McCluskey to show that the problem was deep rooted and would only be addressed with a collective and systemic response. To fulfil her mission, to save lives and keep people safe, she had to change the city's culture, and to do it not from within the police force alone but by forming a coalition with her many partners in health, education, housing, employment and family support services, as well as local churches, businesses and community groups. Together they created a more effective way to intervene early, working with families, to prevent young men being drawn into a culture of violence and then to provide them with more attractive alternatives: education, training and employment. We think the process that Karyn McCluskey kicked off in Glasgow is a good example of a system innovation designed to meet a challenge that was systemic.

Headaches like this will not clear themselves up of their own accord; they are likely to get worse. Public servants, politicians and communities that have systemic challenges like these need to be able to step into system innovation to tackle them.

## Characteristics of Systemic Challenges

Society faces plenty of pressing problems, many of which could be tackled by incremental improvement and piecemeal reform. What makes a challenge 'systemic' and so in need of system innovation as a response?

We see two situations in which improvements to the same system is not enough. Firstly, when there are challenges that are 'stuck': there has been no significant change in outcomes despite investment over time. One example of that is the persistent minority of Danish young people who do not complete further education or participate in work. These challenges have defied conventional solutions for many years.

Secondly when there are challenges that are new, and growing in a way that current systems are not designed to deal with, even if they were expanded. The population is ageing, putting different pressures on families, care providers, health and pensions systems. Society needs new systems to enable people to age well, not just more day care centres. There is a growing divide between cities, which are rich in resources, attract young people and create jobs, and small towns, which are semi-detached from the mainstream economy. That creates growing challenges for people to find work, support their families and maintain their wellbeing. The consequences might show up in higher demand on health and social services, but the causes of the problem lie in the dynamics of economic and social development, the kinds of work there is and the skills people have.

More fundamental system innovation is needed to meet these systemic challenges, which share the following four characteristics.

A systemic challenge is **deep rooted**. The problems it produces keep coming back despite attempts to fix them from within the system. Karyn McCluskey was frustrated because she was going through the same routines, to deal with the same kind of cases, while having no impact. That produces a **persistent** pattern of failure. The challenge of knife crime in Glasgow was stuck and deepening.

Systemic challenges are **connected**. A systemic challenge does not affect a single component, nor even a single sub-system. This makes these challenges difficult to deal with because the response requires coordination across many government departments and agencies, as well as the private sector and civil society. This was

clearly the case when Covid-19 emerged: what started as a health crisis quickly became an economic and social challenge, which has placed huge stresses on the political system and the social contract. The violence in Glasgow was dealt with directly by the police and health services, but it touched work, family life, education, housing and communities. In time Karyn McCluskey would have to work with all these connected sub-systems to create a more effective way to tackle the challenge. Solutions designed in organisational silos do not work for challenges which are difficult to contain.

Systemic challenges are characterised by a **structural** mismatch between institutions, the context they work in and the needs they meet. A systemic challenge reveals fundamental issues about the purpose of a system and how it is organised to serve society.

In Karyn McCluskey's case the scale of violence raised fundamental questions about the role the police play in society. The police service saw its job as catching criminals and administering justice. But that was not making society safe. McCluskey got officers to see they had to prevent crime taking place by challenging the underlying culture which produced the violence. That required the police to work in new ways with partners who could tackle these underlying causes in households and communities. She posed an almost philosophical challenge to the policing system to understand its purpose in a new way and therefore how it worked.

Many systemic challenges trace their roots to the big transitions society is making: ageing, urbanisation, inequality, technology and climate change, which are challenging institutions designed in a different era. Institutions that were designed for one set of problems in another era are now being tasked to come up with solutions to quite different challenges in a different context. Social security systems designed 60 years ago are coping with the rise of flexible, independent work and the gig economy; mental health services designed for a small minority of the population are dealing with widespread anxiety and depression amongst young people.

Systemic challenges are deep rooted, persistent and connected, and structural. They make themselves felt in different ways. One of the most powerful is through a crisis which threatens to engulf the public systems on which society depends. Covid–19 has been a systemic crisis; so was the financial crisis of 2008. Climate change, food security, competition for water, migration all have the potential to generate systemic crises.

Yet often systemic challenges are chronic, longer-term social conditions which are getting slowly worse. One challenge for systems innovators is to persuade people that a chronic challenge demands urgent attention. Karyn McCluskey got the attention of her partners in Glasgow by getting them to see knife crime as an epidemic.

Indeed she did more than that. Karyn McCluskey's metaphor of an epidemic of violence gave people both a way to see the problem *and* the potential solution as modelled on disease prevention. She gave people a way to step into a systemic opportunity.



## Systemic Opportunity

The Bristol Britannia was one of the most efficient and comfortable long-haul airliners ever made when it was introduced in 1957 to fly across what was left of the British Empire. It was a prime example of an innovation aimed at systems optimisation: the culmination of years of incremental improvements to propeller powered airliners. The tragedy was that the Bristol Britannia arrived just as Pan Am introduced Boeing's game changing jet-powered 707.

Jet airliners were not just a new technology that would extend the reach of the existing airline system. They opened up the possibility of entirely new ways of travelling, working and living: a systemic opportunity.

Jet airliners could fly at higher altitudes which made flying less bumpy, more comfortable and safer. More people could be taken on a single flight but that required a change in the business model. Flying went from being an elite, niche activity to one which attracted a larger market of customers paying a lower average price. And the jets were bigger than the propeller planes, so they needed longer, stronger runways, bigger airports, on larger tracts of land in new locations with more taxis and buses to take people to more hotels.

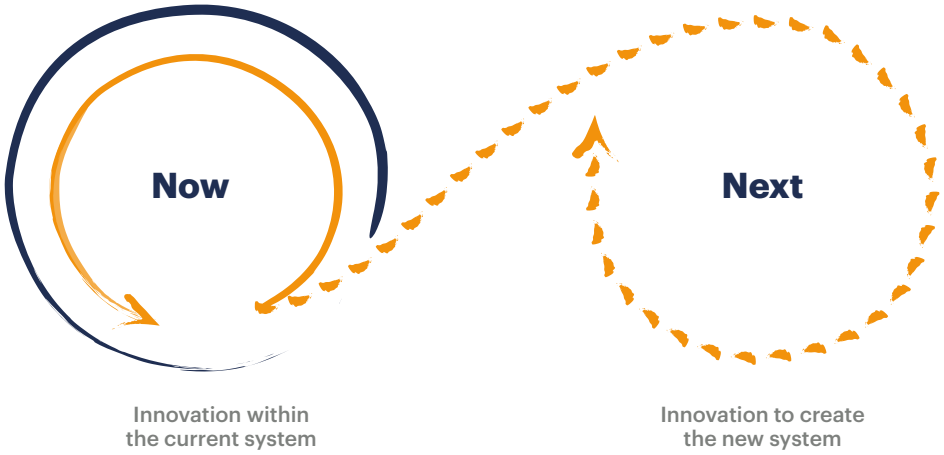
The Boeing 707 was not just an innovation in engine technology - it opened up a **systemic opportunity**. There was no systemic challenge to address: the economy was not failing because people could not fly more. Moreover, the technology itself was not that new: the Boeing 707 was modelled on military bombers. The airline industry had been held back from taking this opportunity by a 'cartel of fear'. No airline wanted to be the first to introduce a new technology that might not work. Pan Am broke the cartel of fear by taking the first step into a world of different possibilities. Everyone else would soon follow it. The Bristol Britannia was one of the unforeseen casualties of that shift.

This shift, from a system organised around the limits of the propeller planes to a system unlocked by the potential of jet airliners, is a relatively straightforward example of what we think of as a shift from the current system to the possible system, from System Now to System Next.

The Bristol Britannia was a brilliant innovation within System Now. Pan Am's introduction of the Boeing 707 opened up the path to migrate to System Next without it being clear at the outset what that would entail and what it would make possible. Eventually the entire industry, including consumers, regulators, airports, hotels and tourism would make this shift and a new pattern of relationships and new ways of life would take hold, which in turn led to huge investments in new resources: planes, runways, airports and air traffic control systems. That is why we think the Boeing 707 enabled system innovation. It was not a single point of light; it opened up a new world of possibility, with new constellations of value that created new markets.

## Characteristics of Systemic Opportunity

A systemic opportunity is **fundamental**, because it is based on a completely different operating model to achieve a different goal: for example, a health system designed primarily around homes and




communities to create wellbeing rather than one designed around hospitals to treat illness. A systemic opportunity is never just a different way to achieve an existing goal: it makes new goals, and ways of life, possible.

A systemic opportunity is more than a flash in the pan: it takes time to **unfold** because it is generative, it creates a mass of new value, economically and socially. The scale of that opportunity is rarely apparent to the initial innovators who may open it up. When Douglas Watson launched the Vegan Society in 1944 to promote plant based diets he could not have foreseen the vegan disruption of the hamburger, which in December 2019 led to International Flavors and Fragrances' $26.2bn deal to buy DuPont's nutrition and biosciences business. The merged company hopes to shape the future market for meatless burgers. That is likely to be just one of several waves of investment in alternative food systems.

A systemic opportunity can only be opened up fully through waves of investment in complementary innovations. A good example is the rise of containerisation as a system. For the first decade after the first containers were introduced in 1956 little changed in the shipping industry. It was only in the 1970s with the introduction of specially built container ports and ships that wholesale change in freight systems came about and it was only in the 1980s, with the rise of just-in-time supply chains linking manufacturers, suppliers, retailers and customers that the full value of the system was realised. The combination of climate change with the Covid-19 crisis may create a systemic opportunity to reconfigure these global just-in-time supply chains to create more sustainable, resilient systems.

Systemic opportunities require **collaborative** innovation because they require new connections to be made. The shipping container only came into its own as containerisation, the system, with ports, cranes, lorries and ships, but also specialist logistics systems and even legal innovations. Building out the entire system required a mass of complementary innovations. Systemic opportunities are hard to grasp because they require investment in lots of complementary innovations.

Systemic opportunities are fundamental, unfolding and collaborative. Spotting and then taking such an opportunity however requires both imagination and courage. That requires radical leaps, not just small steps. A mass of innovation is always going on within a system to prolong its life, raise productivity, improve quality and reduce waste. This kind of system change often goes under the name of modernisation or public service reform.

For a system to change in fundamental ways innovation needs to make possible radical leaps so that a society can not just adopt a new technology but create a new, better, different way of life. Incremental innovations like the Bristol Britannia build on the existing knowledge base for a field; system innovations like the Boeing 707 invariably involve connecting previously unrelated knowledge. That might involve bringing together previously unconnected fields of practice and vantage points. Karyn McCluskey made Glasgow's big leap possible by linking knowledge of criminal justice with epidemiology: it was the combination of these two unrelated fields of expertise that generated the innovation that reduced knife crime in the city. The systems theorist Frances Westley argues that important social innovations resolve apparent paradoxes by bringing together what seems incompatible. That is what Karyn McCluskey did.

The Canadian social entrepreneur Al Etmanski argues that those fundamentally different models come when we 'privilege the imagination', and ask questions which open up possibilities: *"Designing policy without an imaginative sense of where you are going means your best efforts will land you toward the front of the status quo, but not ahead of it. Imagination enlightens strategy, policy and programming and helps you break free of institutional thinking that leads you to piecemeal reform. The imaginative question isn't 'what needs to be changed about our existing social safety net,' but 'what kind of caring society do we want?'"*

However, knowledge is not enough to create a breakthrough. A systemic opportunity may exist only in theory until someone is prepared to take the step Pan Am took to break the 'cartel of fear' through an act of radical innovation.

This is why entrepreneurial ventures play such a vital role in systems change, whether they come from start-ups or from inside an existing business or organisation. They take the first step into a future system without knowing for sure where the next stepping stones might be. Taking a systemic opportunity requires a mixture of patience and timeliness on the part of system changing entrepreneurs, to turn a niche into the base camp for a new system.

These frameworks for understanding systemic challenge and opportunity help to explain why social innovation efforts often fail to reshape entire systems. They do not go deep enough, to touch the fundamental purpose of the system; they run out of stamina and patience to tackle persistent challenges or to explore opportunities which take years to unfold; they fail to mobilise the collaboration needed for complementary innovations.

## When Challenge Meets Opportunity

System innovation can start from the challenge or the opportunity. It does not need both. However, the case for system innovation becomes much more powerful when the challenge and the opportunity work together. A pressing systemic challenge makes the search for systemic opportunities more urgent; the emergence of an alternative system makes it easier to relax our reliance on the existing approach. Systems innovators step into this dynamic of challenge and opportunity: their role is to show how one can feed the other.

Crisis is one extreme setting for that. A crisis like Covid-19 has an important role in system innovation because it exposes underlying strains in current systems, accelerates change and creates the urgency for collaborative effort to find better solutions. Solutions that might once have seemed outlandish can come to be seen as obvious in the context of a crisis: witness the way that the Covid-19 crisis has pushed many governments to experiment with new forms of social security support for people who are self-employed and in insecure work. During a crisis we may take the first steps toward more lasting system change.

Creative social movements can play an important role by both campaigning against the shortcomings of existing systems and creating early models for alternatives. Climate change activists are both challenging existing business models and consumer habits *and* promoting alternatives based on circular, renewable and regenerative models of energy, and production.

An example of a movement which used a systemic challenge to justify the search for a systemic opportunity is the campaign to shift in social care systems supporting young adults with learning disabilities, where Canada has been among the leaders. The systemic challenge stemmed from a care system with its roots in the 19th century that was out of kilter with the aspirations of its modern users. There was something fundamentally awry with a system that treated its clients as incapable of agency. The systemic opportunity was to use individual budgets to create a new system organised around the right of the young people to shape their own care. That created amongst other things a new work-force of independent carers commissioned by young people to work with them.

System innovators articulate both the systemic challenges society faces *and* the systemic opportunities available to create better outcomes. We may see this combination of challenge and opportunity emerging in domains such food production, energy, welfare, mental health and ageing.

The first step in systems change is always to be clear about the challenge *and* the opportunity. We think the opportunity is more important than the challenge. A systemic challenge may push people towards system innovation but it is only when a systemic opportunity develops, to open up a new possible way of life and culture that system innovation gains real momentum. The combination of challenge and opportunity are where to start from in understanding how to see the system that needs changing.

# 3

# Seeing the System

**Defining the space for systems** change is like drawing out the field of play for a game. It sets the boundaries to the action. It also raises questions about whose vantage point matters to define the system.

The question you ask determines the kind of answer you get. The question: "How do we improve current mental health services for young people" will lead you to a slightly better version of the services that already exist. The question: "Why is there a seeming epidemic of poor mental health among young people, and what kinds of systems do we need to turn the tide?" raises both more fundamental questions and greater possibilities. The answer is not just to improve current services to treat diagnosed mental health disorders but to address how society generates mental wellbeing among its citizens. System innovation thrives on asking more open questions.

The first question invites people to address a known, bounded, system of formal services. The second invites people to see those services within a much wider setting of the position of young people in society, navigating the pressures of education and changing social norms in a world overshadowed by climate change and a future that looks highly uncertain. That invites a response which draws on initiatives and resources across society.

The system you end up addressing is determined by the question you ask at the outset.

## Formal and Informal

Systems have a dual aspect, a formal and an informal side. Often the formal, visible professional side to how they work commands more attention than the informal, hidden and social aspects. Systems innovators need to be able to see both.

Take health as an example. Hospitals are at the core of modern health systems. Yet the health of the population also critically depends on lifestyle factors, their diet, exercise and mental wellbeing, the kinds of homes and communities they live in; the air they breathe, the food they eat and the places where they work. Hospitals are the most visible features of a system that promotes health; yet the most powerful long-term determinants of good health are largely social and often informal. An excessive focus on the formal, professional systems at the expense of the informal social systems will lead to acute, clinical medicine taking precedence over long-term public health. The opportunities for impact from social innovations which affect lifestyle and behaviour will be neglected in favour of the technical and clinical innovations that work in hospitals and other formal settings.

## Setting Boundaries

Systems are themselves interconnected. They overlap and work together but can also be at odds with one another.

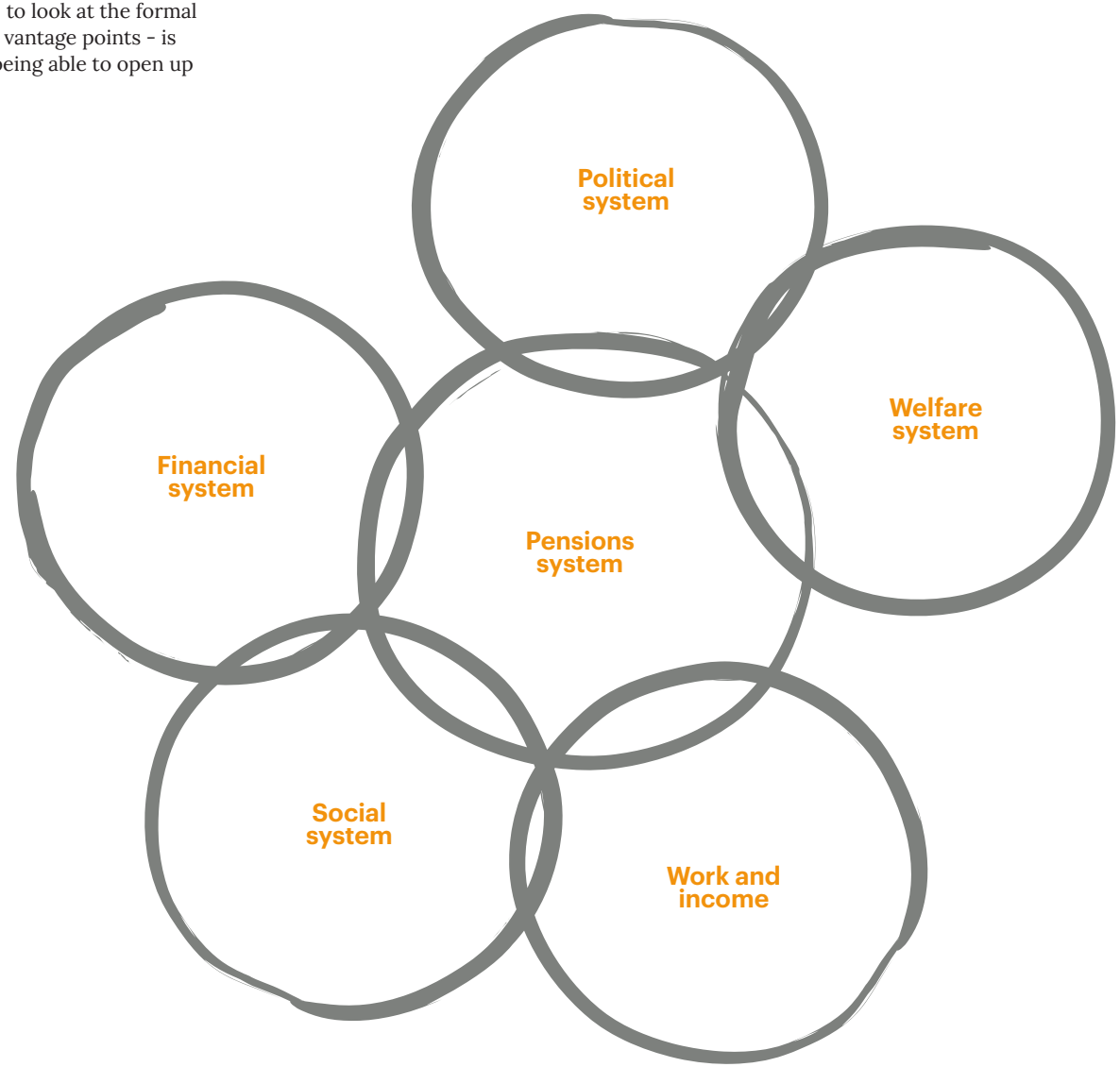
Take the pensions system as an example. The pension system is a foundation of the welfare state, serving social security and equity. Yet to achieve that end it is also a part of the global financial system, of banks and investment funds, which is run to make profits for shareholders. The money that goes into the pensions system comes from what people earn at work: so the pensions

system overlaps with systems of employment and the labour market. Meanwhile from another vantage point the pension system is part of a social care system for elderly people: it provides them with a flow of financial resources. Yet that is not the only determinant of how well people live in older age: the relationships they have, the communities they live in, the activities they engage in, the contributions they make to wider society all have a bearing on their quality of life.

These connections impose constraints upon systems: a change in pension entitlements may have an effect on how people work and what social care they can provide. Coordinating across different systems is hard work: even different systems within the public sector can seem at odds with one another. Yet these connections between systems can also open up opportunities for combined impact: for example, when new approaches to elder care open up new possibilities for social care work.

If the boundary to a system is drawn too narrowly then the wider influences upon it and opportunities to change it will be missed. Important social challenges usually cross the boundaries of public, private and social systems. Yet if the boundary is drawn too widely then the range of factors that need to be taken into account will be too broad and change will seem an impossibly huge undertaking. So a first step is to draw the boundaries of the system in a way which makes system change a viable activity.

This boundary setting question is never entirely settled in systems change initiatives: it keeps coming back in new forms. Being able to shift perspectives - to look at the formal system from different vantage points - is an important part of being able to open up avenues for change.



# 4

# Working on Three Levels

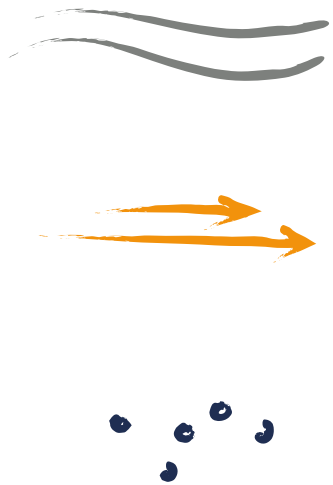
**One of the most thoroughly** researched models for understanding the dynamics of large-scale system transition has been developed by Professor Frank Geels, at the University of Manchester. His multi-level perspective shows how change comes about through a combination of developments at three system levels: the micro, the meso and the macro. Innovating across a system or creating a new system means engaging with each of these levels at the same time. To understand what drives this process of transition it helps to see how actions at these three levels work together.

## Three levels of system change

Changes at the **micro** level start through innovation, entrepreneurship and creativity in 'niches' where people start to develop radical new solutions, habits and ways of life. These niche innovators are not necessarily trying to change an entire system; they might be responding to local needs and opportunities. Eventually these niche innovations start to coalesce, forming the kernel of an alternative system.

The first mountain bikes, for example, were known as clunkers. They started off as homemade, improvised bikes made in the garages of avid mountain bikers. It was only ten years after the first clunkers were ridden that commercial mountain bikes came into production, made by Marin in northern California. By then these niche innovations in mountain biking had led not just to the creation of new bikes but also clothing, accessories and travel businesses as well as trails to be ridden. The kernel for the now massive global market for mountain biking was created by the coming together of these niche innovations.

### Three Levels



**Macro**
The 'landscape': values, ideologies, demographics and economic context

**Meso**
The 'regime': frameworks, rules and norms embedded in infrastructure, institutions and markets

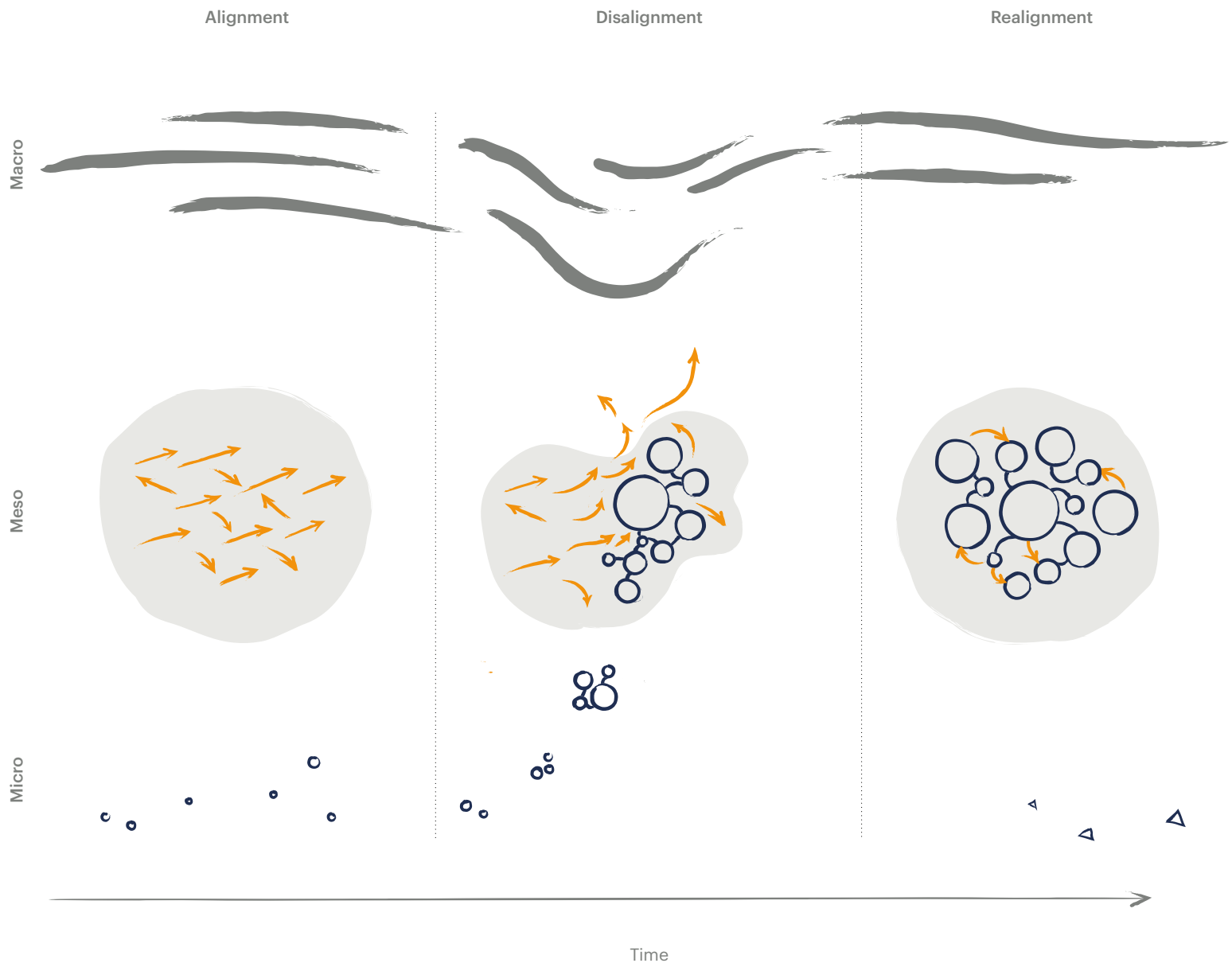
**Micro**
'Niche' innovations: new practices, technologies and lifestyles

Timing is vital to all of this. Entrepreneurial ventures, creating these niche innovations, are critical to the process of forming a new system, marking out the new territory for others to follow. However, they are more likely to take off when they give concrete expression to big shifts in values and needs: that is when they can catch a wave of change to take them forward.

That happens when they connect to broad changes at the **macro** level: in the 'landscape' of societal values and political ideologies, demographic trends and economic patterns which shape the context in which a system operates. For example, shifting attitudes, especially among younger people, towards the links between food, energy and climate change are shaping the landscape in which the food industry operates.

New developments at the micro and macro level are not enough to change entire systems, however. They create the context in which change becomes possible at the **meso** level.

In the middle meso level sits what Geels calls the 'regime': the combination of institutions, technologies, markets and organisations that give a system its structure. This is the engine room of the system. System transitions happen when one regime gives way to the emergence of the next. To develop a different, better system it is never enough for there to be change at the macro and the micro, there needs to be change at this meso level as well. There may be promising ideas and interesting experiments but without a new regime there is no new system.



## System transitions

System transitions take place as a result of complementary developments happening at all three levels. Innovations at the micro level start to gain momentum, at the same time as changes at the macro landscape level create pressure on the regime to change, which in turn creates windows of opportunity at the meso level for those innovations to take hold. An example of that process unfolding now might be the rise of vegetarian, vegan and flexitarian food.

Veganism was a niche lifestyle until quite recently when it was taken up more widely through social trends such as 'clean eating'. The philosophy of veganism, which first emerged in Europe in the wake of World War II as a niche lifestyle gained a much wider salience in the context of changes in the landscape - a growing awareness of the links between food production, animal rights and climate change. That macro shift in values helped encourage innovations in food production, retailing, and lifestyles: new products, like oat milk became widely available. Eventually developments such as this started to coalesce to provide the kernel for alternative, plant-based food production systems. Veganism and its many flexitarian and vegetarian offshoots is now reshaping mainstream food systems: in the UK vegan options are now available in most supermarkets and restaurant chains and Greggs, the largest high street baker, makes a vegan version of its iconic sausage roll. This is an example of how change at the landscape level (values and context) and the micro level (entrepreneurship and behaviour) creates the conditions for change in what Geels calls 'the regime'.

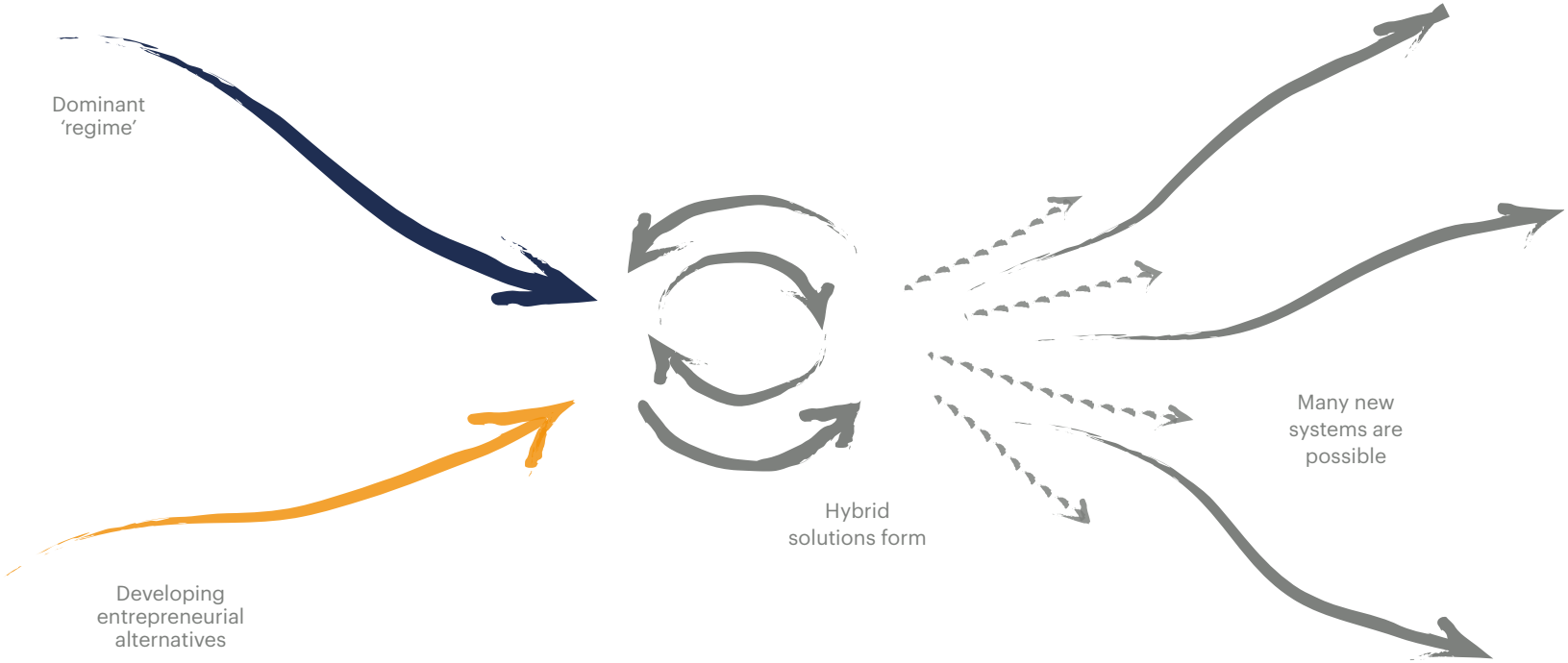
System innovation has to engage with all three levels, at the same time: that is one reason why it can seem daunting. By adopting this perspective we think it is easier for systems innovators operating at one level to understand how to work with allies working at the other levels. Entrepreneurs working in new niches have to be alert to changes in the landscape as new demographics, values, demands and possibilities take shape. They need to work with policy-makers and regulators who might help to open up the market for their solutions while at the same time finding ways to collaborate with innovators inside the 'regime' who want it to adapt to the changes going on around it.



# 5

# Getting into The Washing Machine

## The Washing Machine




**Systems change is a dynamic** process, in which long periods of relative stasis can suddenly give way to a disruptive vortex which releases a lot of energy. That energy will be both destructive and constructive. There will be resistance and momentum. Some things will be flying off in all directions, others will be coming together. It is disorienting to be in the middle of this but that is where the change happens. We think it is like stepping into a washing machine on the spin cycle. The model below is a simplified way of understanding the dynamics of change: we call it The Washing Machine model.

The now conventional account of how radical change happens in industries is the tale of disruptive innovation: disruptive challengers displace tired incumbents. We think this is at best a partial and often a misleading way to think about systems change. Rather than outside challengers attacking and displacing insider incumbents we think change in systems usually comes about by innovative insiders working with entrepreneurial outsiders. That is what happens in The Washing Machine.

In conventional accounts, the dynamics of change are presented as if they were a battle between insiders in the incumbent 'regime' (on the blue line which goes into decline) and outsider challengers (entrepreneurial alternatives which are on the rising orange line). Change happens as the challengers displace and replace the incumbents. In many private sector industries, for example banking, retailing, media and communications, new challengers - Spotify, WhatsApp, Uber, Airbnb and their ilk - are continually disrupting incumbent industry leaders, using digital technologies to do so.

We think that is not the story of how most systems change, especially public systems. The story is more nuanced.

In many industries the incumbent 'regime' proves much more difficult to dislodge than might be expected. Many industries in the US for example have become more concentrated in the last two decades with fewer companies accounting for a larger share of the market. Barriers to entry have grown. One reason for that is that incumbent companies are rarely static: there is usually a lot more innovation going on within them than might first meet the eye.

These factors may be particularly true of public sector dominated systems, with their dense interconnections, because there may also be limited room for new entry. There may also be a mass of adaptive innovation going on within them to optimise and strengthen the current system.

The other side of the equation is that start-up ventures often find it hard to reach scale unless they team up with large incumbents who have capital and market reach. This is particularly true of social ventures for whom the most obvious route to scale is to become part of the system they set out to change. On their own they are less challenging than might be thought. The failure rate among new ventures is dishearteningly high.

Our view is that real change in public systems much more often comes about when the old and the new combine and clash, collaborate and compete in the circle in the middle – The Washing Machine. The new does indeed represent a challenge to the old but can often combine with it to create new hybrids that are combinations of the old and the new. That process involves innovative insiders finding ways to work with entrepreneurial outsiders to form these new constellations.

The story of disruptive innovation is one of a clash which pits entrepreneurial outsiders against incumbents. Our story of system innovation is one of combination as entrepreneurial outsiders find new opportunities to work with the energy of innovative forces coming from inside the incumbent system who want to take it in a new direction. Making that connection productive is the task of creative convenors who can orchestrate this process.

That is what happens in The Washing Machine. This is where people inside the system, often struggling with deep seated challenges meet and combine with people from outside the system pursuing ambitious new possibilities. Out of the spin cycle of The Washing Machine many hybrids, variants and combinations can emerge (on the right-hand side of the diagram.).

Our hypothesis is that system change becomes more likely when more people step into The Washing Machine in this way. We need more:

**Insider-outsiders** who work inside systems but see their shortcomings, and act as conduits, connecting changes in their strategy and activities to new ideas and alternative ways of operating that are forming outside.

Karyn McCluskey was an insider-outsider. She had the credibility that came from working within the system; she could see its strengths and its failings; to be the conduit to bring in new ideas from outside. This combination of insider knowledge and outsider perspectives creates new hybrid approaches.

**Entrepreneurial ventures** with system changing potential, which do not just seek to scale a new solution but embody the operating philosophy of a new system, whether they are social innovations or businesses spawned by new social movements.

These potentially transformative ventures often start their life in marginal markets and promote not just products but new social philosophies. The world's largest producer of organic lettuce and greens, Earthbound Farms, started as a niche producer on a 25-acre plot of land near Carmel California. Organic food is now one of the fastest growing food segments in the US. Earthbound and other small niche organic producers provided the kernel to this alternative food system.

**Convenors** of space where insiders and outsiders, new and old, challenge and possibility can come together to find new, collaborative solutions.

A variety of organisations might make that possible, from dedicated systems change programmes to national intermediaries and industry associations, to collaborations between far-sighted funders who want to stimulate systems change.

The Washing Machine is both a dynamic and uncomfortable position to step into. This focus requires further shifts in how we think about and support the people and organisations playing these roles.

Entrepreneurs with a mission to change a system often have to live a double life: finding a way to make their livings in System Now while promoting the shift to System Next. To be successful in their system-shifting endeavour, they need to be recognised and supported differently compared to traditional start-ups. Achieving scale is not a reliable measure of system shift, for example: often new ventures reach scale by playing within the rules of an existing market, and a venture might disrupt an existing industry without really creating an alternative system. System-shifting ventures are particularly powerful when they come together with others with complementary approaches, meaning that the focus for investors might be on their collaborative, rather than competitive advantage.

Coming out of the Washing Machine, on the right-hand side of the diagram, new processes come into play to realise the opportunities it creates. New viable solutions have to be scaled by mobilising resources and opening up new markets, which raises new questions for investors about what it means to invest in the development of systems as opposed to discrete solutions. Outmoded systems have to be wound down to make way for new ones, which creates important considerations for insiders about how to disinvest from old, unproductive activities, which is vital to open the space in which new systems can grow.

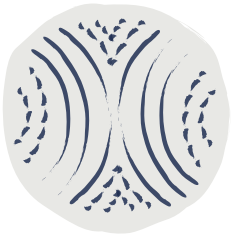
Increasing the capacity of people and organisations to play the roles of creative convenors, insider-outsiders and system shifting entrepreneurs, and to take on the further roles we outline in section seven, will increase the likelihood of effective systems change.

# 6

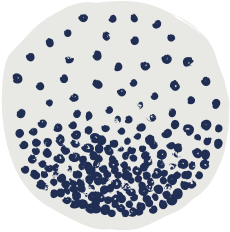
# The Keys that Unlock Systems

**System shifts are unlocked by** working with four keys: purpose, power, resources and relationships. These four keys provide a way to unlock a system which are far more powerful than thinking about technology and buildings, services and software.

## Four Keys



Power



Resource flows

Relationships

Purpose

## Purpose

The most powerful way to shift a system is to change what it is for, the philosophy underpinning it and therefore what its **purpose** is.

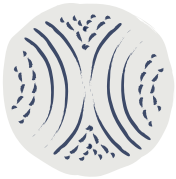
System innovators shift systems by developing solutions based on this very different operating philosophy that demonstrate a new system purpose, around which further activity can be organised.

The purpose should provide the point around which people, activities and resources are organised. Creating a new system invariably involves framing a new purpose. That process involves argument, challenge and dispute as well as imagination, vision and inspiration.

Karyn McCluskey asked a question about the system's purpose: how best to make Glasgow safe because it was a place where young men did not grow up in a culture of violence. The need and opportunity for system wide change was opened up by repeatedly asking a question about what the system should be for rather than how it worked.

New systems often develop in response to a new purpose arising from a shift in societal values. The system change in support for young adults with learning disabilities stemmed from a debate about the right to live independently. The innovation of individual budgets was enacting a different social philosophy, based on what young people had the capability and the right to do.

System innovation cannot succeed merely through the application of a new set of innovation tools, methods and processes. The entire process needs to be animated by this deeper reimagining of purpose: not just a different goal to be reached but a different philosophy to be enacted. We will return to the significance of this at the end of this section.



## Power

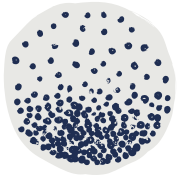
It is almost impossible to shift the purpose of a system unless there is also a shift in who has the **power** to determine how resources flow, what takes priority, who matters and what is counted as a good outcome.

Power works within systems in complex ways which those embarking on systems change need to think about carefully. Power can be both hard and soft; embedded in culture and observable in explicit instructions; for good and for bad, for public benefit and private gain. System innovators develop solutions that challenge and change the distribution of power within a system.

One sign that a system is shifting is the emergence of conflict over priorities, business models, working practices and hierarchies. Soft power, hidden in culture, is brought into the open through these pressures. Growing traffic congestion in cities, rising levels of air pollution and the risks of climate change are factors characterising the systemic challenge we face in urban mobility. Who should have priority, the demands of pedestrians and cyclists or drivers and businesses? The streets of many 20th century cities were shaped by the power of the car and the industries that made it. The streets of 21st century cities will only look and feel different through a challenge to the power of the traditional car industry.

Systems inevitably build up structures of power over time: professional constituencies and physical communities that resist change which threatens their interests. This defence of the status quo is rarely just economic. Many people - both workers and consumers - feel more comfortable with systems with which they are familiar. It is hard for people schooled in one system to imagine themselves adapting to another. The *gillet jaunes* protests in France, sparked by a rise in diesel prices as part of an environmental sustainability programme, are an example of the kind of conflict a system transition can set off. Conflict is an inevitable and important part of transition, and system innovators will not succeed if they are naive about the need to work with the resistance these efforts at change provoke.

A good example of a system that shifted when power shifted is the commissioning of support services for young adults with learning disabilities. When countries such as Australia, Canada and the UK introduced personal budgets so that young people were given money directly to commission the services they wanted, power to shape services shifted from social workers to the clients and their loved ones. The shift in power created a much more decentralised, diverse and personalised system of care. Families could make arrangements which suited them within an overall framework set by the policy (which puts some limits on what they could spend their money on.) Shifts in power are inextricably connected to changes to key relationships and the way that resources flow through a system.



## Resource flows

A system only shifts when the resources flowing through it change in a fundamental way.

Radical change can happen when the resources a system relies upon are suddenly heavily constrained, for example as a result of a crisis. Current operating models are rendered untenable. Innovators have to find a new way to meet needs without the resources they normally rely on. The Covid-19 crisis created a sudden systemic challenge because physical, face to face work was largely suspended. The public sector is under constant pressure to use its (mostly human) resources more efficiently to keep pace with the private sector, a phenomenon known as

the Baumol effect, which as the limits to optimisation are reached will play a large part in the drive to shift to radically different operating models. All future systems will operate within tighter constraints imposed by the need to tackle climate change.

On the other hand, a new system can be made possible when resources of a new kind – such as digital technologies - become available at low cost which allow a system to be reconfigured. Uber, Airbnb, Amazon and Netflix have all created digital platforms which allow traditional services to be reconfigured. Michael Bloomberg revolutionised financial markets by making available dedicated digital desktop terminals which allowed information to flow more freely and quickly to many more people. As a result a closed industry in which insiders often had privileged information was opened up to much greater competition but also to reach greater scale.

The resources available to a system include not just money and technologies but knowledge and reputation. Systems innovators find new ways to unlock and mobilise resources, inside and outside the system to create better outcomes. Karyn McCluskey found a more effective solution to the challenge of violence in Glasgow by pulling together community resources existing outside the traditional boundaries of the police force to work with the police in new ways. One unusual example is the collaboration with veterinary practices who can often spot signs of domestic violence when it is also inflicted on household pets. Individual budgets for people with disabilities not only changed how resources were distributed but also how they could be combined for greater value, allowing families to find new ways to marry publicly funded services with their own voluntary efforts.

## Relationships

A system is a collection of parts which come together repeatedly to achieve an outcome, a constellation rather than individual points of light. Each part on its own has limited significance; it is when they are brought together that they form a system. The way they are brought together - the pattern to the relationships - gives the system its character. All systems are fundamentally relational in this sense but this is especially true of social systems which are formed around a key relationship: landlord to tenant, doctor to patient, case worker to client, teacher to pupil, employee to employer.

One sign that a systemic challenge is building up is growing strain within the system as frustration mounts with how it is working. That can affect the quality of relationships within a system. One example of that is the way that efforts at public service reform driven by the centre have provoked a combination of resistance, demoralisation and apathy among front-line staff.

A system shifting venture usually forms new patterns to these relationships: new systems are usually new social models. The M Pesa mobile payments system in Kenya, for example, allows for direct, peer-to-peer money transfers without going through the intermediaries of a banking system. It achieves this by turning local shops and kiosks into the local delivery point of a payments system. Millions of Kenyans use a service which reconfigures existing physical and social resources - the local shop - by incorporating them into a digital service - mobile money transfers - to allow borrowers and lenders to interact in ways that were not possible before. Low-cost airlines took away many of the traditional relational aspects of booking and taking a flight to create their model.

Buurtzorg, the inspirational Dutch care collective is a good example of how a different model of social care can emerge from a reorganisation of relationships. As Buurtzorg is a cooperative, staff are invested with considerable autonomy to make decisions about where to invest their time and effort with clients according to their needs.

System innovators do not just create services that extend and elaborate the current system model. Their solutions facilitate a fundamental change in the constellation of actors that enables a system to generate new value.

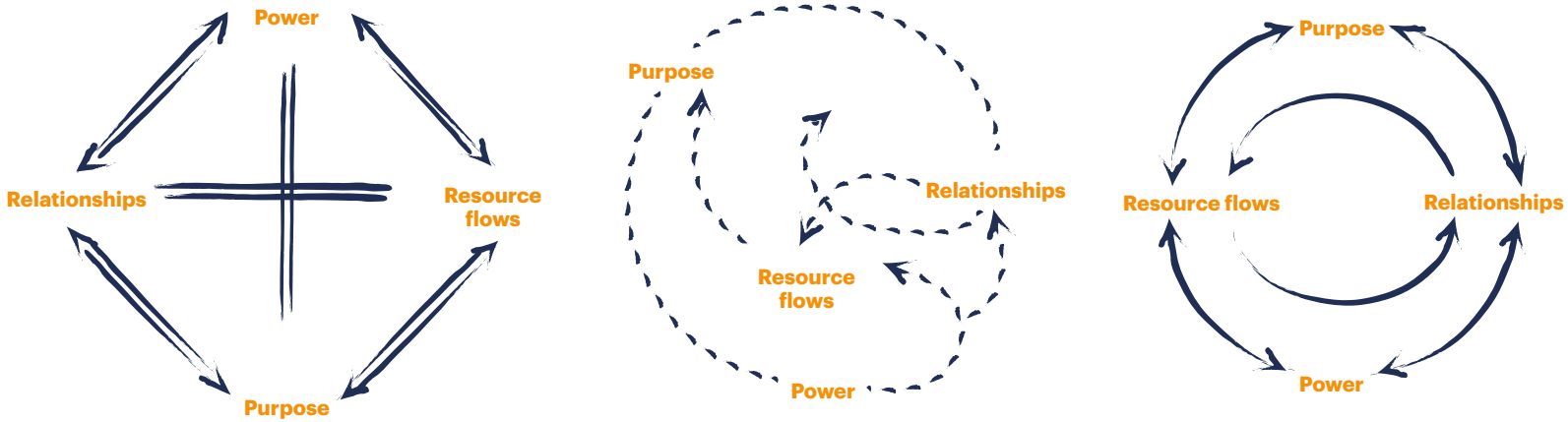
New systems emerge when actors are brought together in new patterns of relationships: centralised might become decentralised; indirect becomes direct; consumers become participants and producers as well; systems with rigid hierarchical structures become more fluid, networked and cooperative.

## A Set of Keys

These four keys make up a set. Systems are often hard to change because power, relationships, and resources are locked together in a reinforcing pattern according to the current purpose. Systems start to change when this pattern is disrupted and opened up. Then a new configuration can emerge.

Take care services for young adults with learning disabilities once more. The shift to individual budgets (a resource shift) allowed the young people to commission their own care packages and so create new relationships with their carers (who became employees of the client rather than professionals in charge of them.) That change in the relationships and resources flowing through the care system only came about however with a shift in power, from social workers to clients and their families, which stemmed from a challenge to the purpose of the system: how it promoted the dignity and rights of the young people involved. A new purpose (independent living) led to a shift in power, resources and relationships.

### Unlocking system shifts




Purpose is the master key especially in public systems. We think innovation in systems for public good should realign resources, relationships and power around a new conception of what a system should be for, the outcomes it seeks to create for society. A good example is the debate over the future of healthcare. Modern health care systems were created to cure people suffering from infectious diseases. The Covid-19 pandemic reminds us that curing the sick is still a vital goal. Yet increasingly the health challenge in contemporary society revolves around chronic conditions, like diabetes, and those that come with ageing. Tackling that challenge requires a more preventative, social and community-based system, to change people's lifestyles. At the same time many more people are now engaged in activities which promote physical and mental wellbeing, whether through fitness, diet or practices such as mindfulness, at home and at work. A health system designed to promote wellness would look quite different to one designed to cure illness.

A simple way to think of how these four keys work together is set out above. Often the systems involved in producing public good are held in place by power (the power of politicians, professionals, trade unions, regulations and laws). That creates the setting in which structured and often hierarchical relationships determine how resources are distributed to citizens. The way power, relationships and resources work together defines the purpose of the system. To put it crudely in many well developed public systems, purpose seems to follow power and resources.

The process of system innovation has to use these four keys to disrupt these settled, taken for granted relationships which embody conventional power. But out of that can emerge a new configuration in which a renewed sense of purpose can determine how resources flow, how relationships are structured and where power lies. Again, to put it crudely, power and resources should follow purpose.

**These four keys create a set of questions which systems innovators can ask:**

How and where is a new purpose emerging to guide the system?
How should power shift to embody this new purpose?

How do resources and relationships need to change to make real these shifts in purpose and power?

These four keys can help to unlock both systemic challenge and opportunity.

| | Where do we see indications of a Systemic **Challenge?** | Where do we see indications of a Systemic **Opportunity?** |
|---|---|---|
| Purpose | | |
| Power | | |
| Relationships | | |
| Resource flows | | |



# 7

# Be Part of a Movement

Entrepreneurs

Inside-outsiders

Convenors

Commissioners

Historians

Visionaries

**The impetus for successful system** innovation does not rely on a single organisation nor individual. The basic unit for systems change has to be larger even than a team: it has to be a creative community animated by a cause to bring about change.

System innovation involves a much wider cast of more diverse characters than the more traditional innovation programmes run within organisations. New systems are made by a diverse constellation of people whether they are investors, politicians, innovators, regulators, suppliers or consumers, working inside or outside the system. System innovation poses continual challenges of orchestrating creative, collective action, over a prolonged period.

Leadership of a system transition is distributed, with people playing important roles across all levels of a system at different moments in time. Job titles are not necessarily a good guide to the roles that people might play in the process nor the contributions they can make regardless of where they sit in an organisational hierarchy.

As we set out at the beginning of this paper there are four roles we think are critical to the process:

**Entrepreneurs** who create transformative ventures which challenge the existing system and open the way to a new different system. They are the pioneers marking out the territory of the new system.

**Inside-outsiders** who recognise the challenge to the existing system they are part of and so open it up to new ideas, from outsiders, to help a new, different system emerge from within the shell of the old. These people who span the boundaries of the current system play a critical role.

**Convenors** who bring together insiders, outsiders and other collaborators to create a shared agenda for change. Organisations that seek to play this role must be committed to changing a system and also command the credibility to bring together actors from every level of the system, from the grassroots to senior politicians. Universities, foundations, public agencies such as the Danish Design Centre and intermediary bodies might play this role.

**Commissioners** who commission the system of the future, to bring it into being. People playing this role are where power and resources come together.

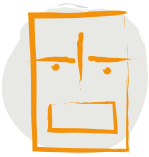
The decisions they take can redirect resources to create a new system and create the authorising environment in which it can grow to become legitimate. That power can be conventional and derived from traditional hierarchies yet directed to a new purpose: for example, when Paul Polman, the then chief executive of the Unilever group set it radical goals to reduce carbon usage while growing its businesses. Amsterdam council is working with the radical economist Kate Raworth to reimagine the city economy in the terms of her doughnut model of sustainable development. The power to shift a system can also come from outside these traditional hierarchies, from the new power of social movements which put governments and companies under pressure to respond to new demands. The sustainable energy, food and waste systems of the future will likely be created by a combination of old and new power working together as social movements, often led by young people, that put pressure on governments to respond to the climate emergency.

These are four leading roles in systems change. But they need a supporting cast to take on the challenge. These support roles include the following eight:

**Historians** open up the history of why the system takes the form it does. They show the system is not a fact of nature but the accumulation of a long chain of collective, creative, political and design decisions, taken in context, which shaped its formation and evolution. Opening up the history of the system allows people to see how it could have developed in different ways and so also helps to open up its future possibilities. Seeing oneself as part of this long lineage of people making change can both increase our sense of agency and our commitment to longer term outcomes. These historians might be academic researchers but they could also be people who have worked in the system for a long time who carry its institutional memory or people with long lived experience of being served by the system. There are many different ways to know the history of a system and so to see that it can be reconfigured.

**Visionaries** are the counterparts to historians. They articulate a picture of future possibility, one which could be radically different. They make it possible to imagine stepping into a quite different world, in which systems work in quite different ways. Often systemic innovation is initiated by people with a radical vision: Margaret Sanger envisioned the contraceptive pill and the social changes it would unleash decades before she managed to help make it a reality; Donald Watson started the Vegan society 60 years before veganism reached a mainstream audience; Greta Thunberg may be playing such a role in climate change now; Nicolas Colin, the venture investor, paints a compelling picture of the future social safety net for modern workers; Hilary Cottam, the social entrepreneur, has a bold vision for a more relational welfare system. Visionaries are easy to dismiss as utopian dreamers in part because they are. However, the task of providing the vision for a future system is something many people can contribute to if they are given the space, time and stimulation to do so. A system does not just need visionaries, it needs ways for a new vision to emerge which many people can contribute to. Between them historians and visionaries

Consumer



Framework Setter

Exiter

Investor

Evaluator

help to open up the identity of the system, both where it has come from and what it could become. They open up the possibility space into which innovators and entrepreneurs can move.

**Consumer** innovators play a vital role in making a vision a lived reality. They are the early adopters and adapters who show how an innovation can be made to work in practice and become an aspirational part of daily life. Michael Bloomberg's first prototypes for his new system for distributing financial information were developed with his first customer JP Morgan.

While consumer innovators may show the potential for change at the grassroots level, system-wide change depends on the creation of new frameworks for policy and regulations. The people and organisations who do this are **Framework Setters**. They might be civil servants and policy makers, but also think tanks and advocacy groups. They create the general frameworks that allow an innovation to spread and become widely adopted, for example the UK's shift to providing individual budgets to young adults with learning difficulties. The contraceptive pill was licensed for widespread use only as a result of innovations in Food and Drug Administration regulations which allowed the approval of a drug that was not designed to cure a disease. All system transition involves innovation in regulations, protocols and standards to allow new products and services to create a new market. The possibility space created by these new frameworks is only turned into widespread access to the products, services and general benefits of a new system through the work of Scalers who excel at simplifying and standardising a solution so it can reach a mass market. Scalers engage in the second and third waves of innovation needed to create a new system. They are the structural engineers of the new system. For example the company that turned the container into a mass product was not the container's original, iconoclastic inventor Malcolm McLean but a follow-on innovator, Matson, a company based in Hawaii.
Matson standardised the container's size, weight and fixings to allow it to be used at scale, as well as introducing many of the logistics tools that made the new system work effectively. Further waves of innovation came from companies such as Maersk which entered the industry later. McLean invented the container; Matson and Maersk created containerisation, the system.

**Exiters** complement the scalers. They wind down outmoded systems to clear the way for a new system to emerge. Decommissioning existing systems is essential to free up resources and space in which new systems can grow. Just as natural systems go through cycles of creation and destruction, where resources are released again, well managed creative destruction is part and parcel of systems change.



This whole process, from the inception of a new idea through the testing of a system on a small scale through to its development at scale, of course needs investment to back it. Investment in system innovation poses special challenges: the timescale is often protracted, involving collaboration among many different players. **Investors** in systems change will rarely be part of the whole story all of the time. Different kinds of investors, philanthropic, public, venture capital and corporate, may play different roles at different times. The creation of the contraceptive pill, for example, started with small philanthropic research grants, before mobilising both commercial and public research funds before deploying private capital to make the pill available at scale.

Auditors and **Evaluators** play two roles. Because they help to hold the current system to account for its performance, the case for change often comes through the data that evaluators provide. They also create the new metrics needed to measure the impact of the new system. It is hard to create entirely new systems, aligned to a new purpose without creating new measures of value and impact. It is hard for those involved in systems change to know whether they are having an impact unless they have tools to help measure that impact. Evaluators are all those who help provide the data the system needs to adapt and reorient itself.

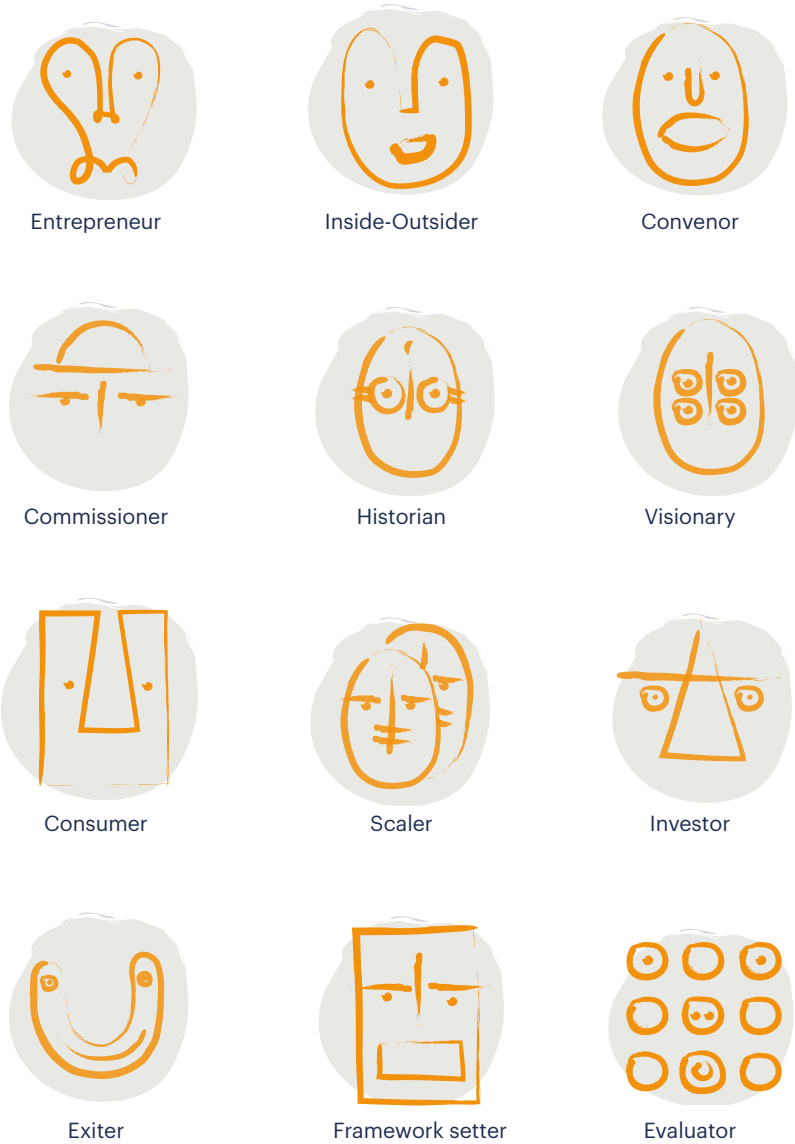
We think these twelve roles are central to system innovation because they together open up the possibility of system change and bring it to fruition. They are however uncommon bedfellows. The people who play these roles are unlikely to be immediately known to each other and come into play at different times. Making these roles recognisable may make it possible for new connections between otherwise distant players to form and in the process generate new energy for change.

Many others might contribute to systems change, for example researchers who introduce new knowledge into systems and critics who challenge the existing system's performance without having a clear idea of how to replace it.

System innovation is a cumulative, collaborative process which gathers its momentum from the degree of cooperation between many different players across all three levels of the system set out in section four, over an extended period. One of the key challenges is how this cooperation can be made more effective, more quickly, to accelerate deliberate systems transition.

That work is the leadership of system innovation. One of our priorities is to show many more people that they can make a contribution to systems change from any one of these different positions.

**Twelve roles**

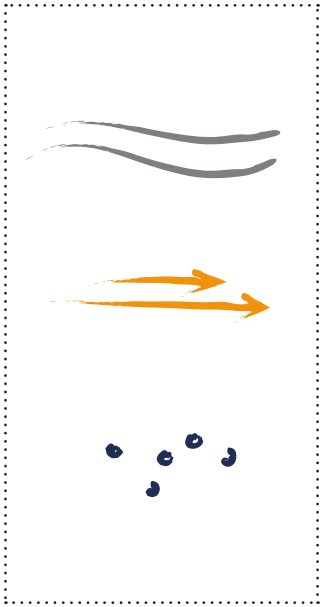





# 8

# Closing the System Innovation Gap

3 Levels



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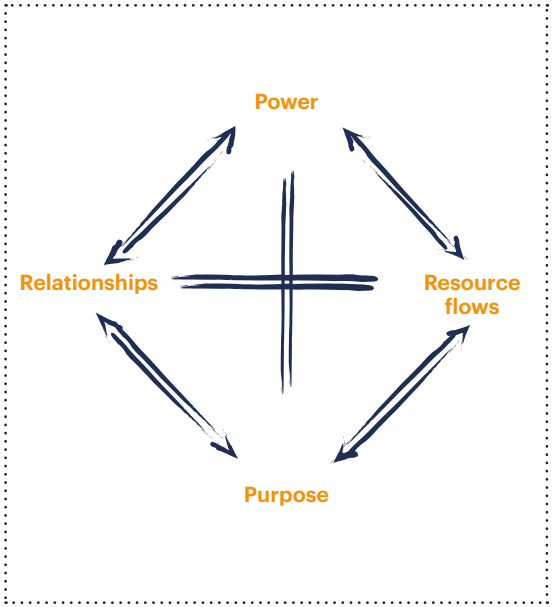
4 Keys

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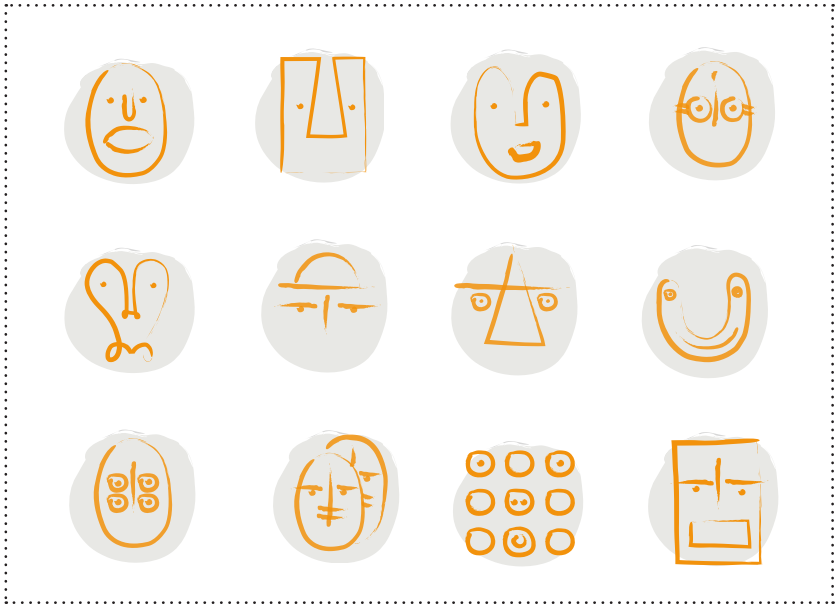
12 Roles



**Society needs system innovation to** tackle deep seated social challenges, meet emerging, growing needs and to open up systemic opportunities to support new ways of life. While a lot of innovation is going on in public and social fields, it usually falls short of innovating new systems. That means there is a huge gap between the kind of innovation society needs and the kind that is produced.

To act more deliberately and effectively to change systems the people involved need to see and think about systems in different ways: to understand both the depth of the challenge and the scale of the opportunity; as well as the dynamic, collaborative processes of system innovation.

One simple way to sum this up as a rule of thumb is to remember that 3 x 4 = 12.

• System innovation involves work across **three levels**, the macro, meso and micro;

• Change is unlocked using the **four keys:** purpose, power resources and relationships;

• System innovation involves people playing **twelve roles**, with different vantage points, knowledge and contributions.

**The 3 x 4 = 12 rule** helps to keep the focus on changing the system rather than merely adapting within it.

This paper marks the start of our effort to create practical frameworks, methods and tools for system innovation. We want to establish a firm knowledge base for the application of these tools in practice. In the process we are keen to share what we learn and to learn from others in turn.

As we set out at the start, we want to focus our contribution on these three areas: practice, possibility and people:

• To turn knowledge about how systems have changed into practical knowledge of how to make systems change on purpose.

• To create new, better and different systems not just to improve existing systems.

• To show how people can shape systems, not just be shaped by them.

There is still too big a gap between the theoretical knowledge embodied in systems thinking, the historical knowledge of how actual systems have changed in the past and the practical knowledge needed to make systems change happen in the real world. We hope to contribute to bridging that gap by developing the frameworks set out in this paper. However, closing the system innovation gap will require solutions to other challenges this paper has touched on, such as how to:

• **Make the case** for system innovation, with tools that assess systemic opportunity.

- **Support entrepreneurs** to design ventures and interventions with greater system shifting potential.

- **Invest in whole systems** rather than in single solutions or organisations.

- **Evaluate system change** so the people involved can know they are having an impact.

- **Lead system innovation** from different positions across the three levels of a system.

- **Connect to other practices** that can contribute to system innovation (for example place-based innovation, collective impact and service design).

- **Define the characteristics** of future systems, in the context of the Covid-19 aftermath, and likely further impacts of technological advances, climate change and migration.

- **Create the programmes and vehicles** needed to enable deliberate system innovation.

### We end with two invitations:

The first is to you, the reader, to use the ideas, models and frameworks in this paper in your own work. We hope this will help you to see how you can step into systems change, through one of the twelve critical roles we identify; by using the keys of purpose and power, resources and relationships; working with all three levels of a system.

The second is to contribute by bringing your expertise and experience to help close these gaps, to add to the material here and to link to others to make system innovation a more practical undertaking. We want to help people make the changes that will bring into being the better, different systems of the future. You are very welcome to join us in this effort and to show us how we can contribute to your own efforts in this field.



# Further reading

This is not a bibliography but a collection of some of the books, papers and resources we have drawn on in developing this initiative which we recommend for those interested in further research and reading. This collection will evolve as the project progresses.

### On how systems change

We have been heavily influenced by the work of Frank Geels, Professor of System Innovation at the University of Manchester and in particular his multi-level perspective on systems transitions.

A wide array of his papers are available through:
https://www.research.manchester.ac.uk/portal/en/researchers/frank-geels(1125eeac-f45f-4c21-9ea9-4de886cf5fbf)/publications.html

We have drawn on the foundational thinking in this field done by Donella Meadows, in:

Meadows, Donella (1997), 'Places to Intervene in a System', *Whole Earth Review*, Winter 1997

Meadows, Donella (1999), 'Leverage Points: Places to Intervene in a System', The Sustainability Institute. Available at: http://donellameadows.org/wp-content/userfiles/Leverage_Points.pdf

Meadows, Donella (2008), *Thinking in Systems*: A Primer, Chelsea Green Publishing

Meadows' work is continued by the Academy for Systems Change at http://donellameadows.org

We have also been influenced over a long period by Carlota Perez, Honorary Professor, Institute of Innovation and Public Purpose, University College London. A wide range of her works on the dynamics of technological and social change are available through:
http://www.carlotaperez.org
pubs?s=tf&l=en&a=technologicalrevolutionsandfinancialcapital

On the role of entrepreneurship and system change we have found invaluable our discussions and practical collaborations with Marc Ventresca, Associate Professor of Strategic Management at the Saïd Business School, Oxford University. A range of his papers on how entrepreneurs shape markets and systems can be found here:
https://www.sbs.ox.ac.uk/about-us/people/marc-ventresca
Some of the themes of Marc Ventresca's work are echoed in:

Santos, Filipe and Eisenhardt, Filipe M. (2009), 'Constructing Markets and Shaping Boundaries: Entrepreneurial Power in Nascent Fields', AMJ, 52, 643-671, https://doi.org/10.5465/amj.2009.43669892

Hussein, Taz; Plummer, Matt and Breen, Bill (2018), 'How Field Catalysts Galvanize Social Change' *Stanford Social Innovation Review*, Winter 2018

This paper builds on earlier work we have done in this field including:

Mulgan, Geoff and Leadbeater, Charles (2013), 'Systems Innovation Discussion Paper', NESTA. Available at: https://www.nesta.org.uk/report/systems-innovation-discussion-paper/

Other good primers are :

Chapman, Jake (2004), *System Failure*: *Why Governments Must Learn to Think Differently*, Demos

Homer Dixon, Thomas (2008), *The Upside of Down: Catastrophe, Creativity and the Renewal of Civilisation*, Island Press - explores the role of crisis in spurring systemic change.

Stroh, David Peter (2015) Systems *Thinking for Social Change*, Chelsea Green Publishing

### On systems innovation as an innovation strategy we have drawn upon:

Adner, Ron (2012), *The Wide Lens: A New Strategy for Innovation*, Portfolio Penguin.

Baldwin, Carliss and Clark, Kim B. (2000) *Design Rules: The Power of Modularity*, The MIT Press

Gawer, Annabella and Cusumano, Michael (2002) *Platform Leadership: How Intel, Microsoft and Cisco Drive Industry Innovation*, Harvard Business School Press

Hargrave, Timothy and Van de Ven, Andrew (2005) 'A Collective Action Model of Institutional Innovation', *Academy of Management Review* Vol. 31, No 4

Reynolds, Martin and Holwell, Sue (2010), 'Introducing systems approaches', in: Reynolds, M. and Holwell,S. Eds, *Systems Approaches to Managing Change*: *A Practical Guide*, Springer, Pp. 1-23.

**For case studies of industries going through systemic change see:**

Davies, Andrew; Gann, David and Douglas, Tony (2009), 'Innovation in Megaprojects: Systems Integration at London Heathrow Terminal 5', *California Management* Review, Vol. 51, No.2.

Dobbie, Will & Fryer, Jr. (2009), 'Are High-Quality Schools Enough to Close the Achievement Gap? Evidence from a Bold Social Experiment in Harlem', National Bureau of Economic Research, Inc, NBER *Working Papers*

Eig, Jonathan (2014), *The Birth of the Pill*, WW Norton

France, David (2017), *How to Survive a Plague*, Penguin Random House

Henkin, David (2007), *The Postal Age: The Emergence of Modern Communications in Nineteenth Century America*, University of Chicago Press

Hughes, Thomas, P (1983), *Networks of Power: Electrification in Western Society*, 1880-1930, Johns Hopkins University Press

Levinson, Marc (2008), *The Box: How the Shipping Container Made the World Smaller and The World Economic Bigger*, Princeton University Press

Pacheco, Desirée; York, Jeffrey and Hargrave, Timothy (2014), 'The Coevolution of Industries, Social Movements, and Institutions: Wind Power in the United States', *Organization Science*. 25. 1609-1632

Tuomi, Ilka (2002), *Networks of Innovation: Change and Meaning in the Age of the Internet*, Oxford University Press

**Social Innovation and System Innovation**

On the links between social innovation and system innovation we have learned a lot from the work of Canadian scholar Frances Westley, J.W. McConnell Professor of Social Innovation at the University of Waterloo; in particular:

Westley, Frances (2013), 'Social Innovation and Resilience: How One Enhances the Other', *Stanford Social Innovation Review*

Westley, Frances & Tjornbo, Ola & Schultz, Lisen & Olsson, Per & Folke, Carl & Crona, Beatrice & Bodin, Örjan. 2013. 'A Theory of Transformative Agency in Linked Social-Ecological Systems', *Ecology and Society*. 18. art27.

Westley, Frances; McGowan, Katharine; Tjornbo, Ola (eds), (2017), *The Evolution of Social Innovation: Building Resilience Through Transitions*, Edward Elgar Publishing



Also full of useful material are:

Cahill, Geraldine and Spitz, Keely (2017) 'Social Innovation Generation: fostering a Canadian ecosystem for systems change', Social Innovation Generation. Available from: https://static1.squarespace.com/static/5a0ef016cd39c3446456ab56/t/5e45b48281c87071298f6348/1581626520462/SocialInnovationGeneration_DigitalBook.pdf

An archive of the knowledge produced by the Social Innovation Generation initiative can be found at:
http://sigknowledgehub.com
https://uwaterloo.ca/waterloo-institute-for-social-innovation-and-resilience/education/learning-modules/social-innovation-and-system-entrepreneurship

Mulgan, Geoff and Murray, Robin (2010) on Systemic Innovation in The Open Book of Social Innovation, NESTA and the Young Foundation, which explores the role of social innovation in systems change.

Schwab Foundation for Social Entrepreneurship (2017), 'Beyond Organizational Scale: How Social Entrepreneurs Create Systems Change', available at: http://reports.weforum.org/schwab-foundation-beyond-organizational-scale/?doing_wp_cron=1595241970.7173180580139160156250

**Leading**

On learning to lead systems change in practice we recommend taking a look at the work of Anna Birney and The School for Systems Change at Forum for the Future:

Birney, Anna (2014), *Cultivating System Change*, DoSustainability, 2014

See also:

Senge, Peter; Hamilton, Hal; Kania, John (2015), 'The Dawn of System Leadership', *Stanford Social Innovation* Review Winter 2015

Leicester, Graham and O'Hara, Maureen (2016), *Transformative Innovation: A Guide to Practice and Policy for System Transition*, Triarchy Press

These two academic papers provide useful frameworks for thinking about the challenges of leading systems change:

Foster-Fishman, Pennie; Nowell, Branda & Yang, Huilan (2007) 'Putting the system back into systems change: a framework for understanding and changing organizational and community systems', *Am J Community Psychol*. 39, 197-215

Ferraro, Fabrizio; Etzion, Dror, & Gehman, Joel (2015), 'Tackling Grand Challenges Pragmatically: Robust Action Revisited', *Organization Studies*, 36(3), 363-390.

### Philanthropy

The Australian Centre for Social Innovation has reviewed philanthropic engagement with systems change in:
TACSI (2019), 'Philanthropy, Systems and Change'. Available at: https://www.tacsi.org.au/wp-content/uploads/2019/10/Philanthropy-systems-and-change.pdf

The Lankelly Chase Foundation has been at the forefront of developing foundation funded initiatives for systems change:
https://lankellychase.org.uk/our-approach/system-behaviours/

The Omidyar Group has published practical guides to applying system thinking to social challenges:
The Omidyar Group, 'Systems Practice Workbook', available at:
https://docs.kumu.io/content/Workbook-012617.pdf

On investing in impact networks to address systemic challenges:
Muoio, A. and Flower, N.R., (2016), 'The power of involving business in social impact networks', Rockefeller Foundation, available at:
https://www.rockefellerfoundation.org/wp-content/uploads/Participate.pdf

### Innovation in urban systems:

Here we have drawn on:

Gehl, Jan (2010), *Cities for People*, Island Press

Leadbeater, Charles (2014), 'The London Recipe: How systems and empathy make the city', Centre for London. Available at:
https://www.centreforlondon.org/publication/london-recipe/

Hall, Peter, ed (2013), *Good Cities Better Lives*, Routledge

Hill, Dan (2012), *Dark Matter & Trojan Horses: A Strategic Design Vocabulary,* Strelka Press.

### On sustainability and systems change:

Raworth, Kate (2018), *Doughnut Economics: seven ways to think like a 21st century economist*, Cornerstone



Also interesting are:

Cundill, Georgina; Cumming, Graeme S. et al. (2011), 'Soft Systems Thinking and Social Learning for Adaptive Management', *Conservation Biology* 26(1): 13-20.

Forum for the Future (2011), 'Six Steps to Significant Change.' Available at: http://www.forumforthefuture.org/blog/introducing-forum%E2%80%99s-six-steps-significant-change

Forum for the Future 2011 'What is system innovation.' Video, available at: http://www.forumforthefuture.org/blog/what-system-innovation

Ison, Ray. 2010 'Introduction and Rationale: Thinking and Acting Differently.' Chapter 1 in *Systems Practice: How to Act in a Climate-Change World*, Springer

On the links between design and systems change:

Banathy, B.H. (1996), *Designing Social Systems in a Changing World*, Springer US

The Systemic Design Association publishes proceedings from its annual conference, including links to a range of articles in peer-reviewed journals by its members, at:
https://systemic-design.net/publications/

The forthcoming Transition Design Institute will build on Terry's Irwin's work at Carnegie Mellon:

Irwin, Terry (2015), 'Transition Design: A Proposal for a New Area of Design Practice, Study, and Research', Design and Culture, 7. 229-246.

The School of Design at Carnegie Mellon University, Schumacher College and the New Weather Institute (2016), 'Can Design Catalyse the Great Transition? Papers from the Transition Design Symposium 2016', available at:
https://www.schumachercollege.org.uk/sites/default/files//dissertations/Transition_Papers.pdf

Bason, Christian (2017), *Leading Public Design* - Discovering Human-Centred Governance, Policy Press

Conway, Rowan, et al (2017) 'From Design Thinking to Systems Change', Royal Society of Arts, available at:
https://www.thersa.org/globalassets/pdfs/reports/rsa_from-design-thinking-to-system-change-report.pdf