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Designing missions

Mission-oriented innovation in Sweden— A practice guide by Vinnova

Written by Dan Hill, and featuring contributions from Brian Eno, Pernilla Glaser, Afton Halloran, Mariana Mazzucato, Darja Isaksson, Anja Melander, Marco Steinberg, Jakob Trollbäck and Amanda Wood.

VINNOVA
Sweden's Innovation Agency

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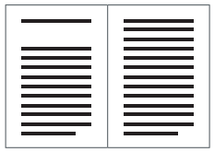
How to read this book

Chapter pages
A summary and indication of the phase in the process.



Process pages
Unpacking the mission design process in detail.

Technique pages
A high-level summary of key methods and tools.

Perspective pages
External contributions reflecting on missions.

Mission pages
Describes the initial pilot missions that have emerged thus far.

Chapter summary pages
Describing the core concepts and activities in this phase.

Concept →
A → symbol appears after a key concept. These can be found described on a Technique page.

This book was produced by Vinnova—the Swedish government's innovation agency.

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What this book *is*

This book describes how Vinnova devised and tested an approach to mission-oriented innovation, from 2019 to 2022. It describes the background to the work, in terms of innovation policy, strategic design, and the local context in Sweden, and it outlines the design process developed by Vinnova in detail. It is a form of **playbook**, comprising short technical guides to practice as well as critical reflection on the nature of the work. It provides an account of the work done, as well as reflections on what the work was about, in terms of theory and practice. This is in the spirit of sharing **legible practice**—enabling discussion and critique, learning and adaptation.

What this book *is not*

This book does not attempt to be the definitive guide to mission-oriented innovation in practice, as some ideal process. Instead, it is only a story of how Vinnova developed pilot missions and mission practices for Sweden. Although broader perspectives are discussed, and the techniques may be useful outside Sweden, this playbook's emphasis on context rejects the idea that such processes can simply be copy-pasted elsewhere. Equally, the story pauses at the prototyping stage, and so it deliberately stops short of initiating Demonstrators, though it does describe this next development of the Prototypes.

For further information

The work continues! Vinnova, along many other actors in innovation systems, are continually developing mission-oriented innovation practices. This book will be revised as missions develop and mature, with regular updates via the strategic design section of the Vinnova website—do get in touch.

What are you interested in?

If you want to understand the context of the work, with a discussion of the thinking and practice behind the action, including resourcing and setting the scene, start here with the background.

If you want to get straight into the practicalities, and explore the practices used on the ground, start here with the description and discussion of the techniques in play.

And if you want to jump straight to the outcomes, and understand the system prototypes produced by the process, start here with the two case studies of pilot missions.

Contents

Introduction 8

Designing missions 10

0 Preparing the ground 24

0–1 Missions in practice 28
0–2 Methods for missions 50
0–3 Resourcing the process 146
0–4 Analyse context 154

1 Discovering missions 168

1–1 Identifying angles 174

2 Developing missions 234

2–1 Locating the missions 240
2–2 Framing the missions 280
2–3 Design workshops 306

3 Developing prototypes 378

3–1 Designing prototypes 384
3–2 Delivering prototypes 412
Streets 414
School food 498

4 Designing demonstrators 566

4–1 Designing demonstrators 572
4–2 Making networks 580

5 Related activities 600

5–1 A missions movement 604

6 References 612

6–1 References 614
6–2 Credits 624

Introduction

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Designing missions

We now have only a handful of years to achieve the Sustainable Development Goals, alongside other commitments, and it is clear that we remain a long way off. We must increase the scale, speed, impact and meaning of our collective actions. Mission-oriented innovation attempts to produce *transformational systemic change*, by defining ambitious 'North Stars' to motivate change, and building diverse fleets for navigating and sailing towards them.

Supercharging the fossil-free welfare state

It's with great pleasure that we at Vinnova share this 'playbook' for mission-oriented innovation. As the Swedish government's innovation agency, our remit includes not only funding, but understanding, collaborating and communicating new innovation policies and practices. So we've spent the last few years testing missions on the ground, via a series of 'pilots' and related activities.

We offer up our learning not as some kind of 'silver bullet' nor as any kind of perfect process. The teams behind these activities know how hard it has sometimes been to pursue this work. But we are lifting the lid on the way we've interpreted missions in the spirit of 'showing our workings', so that others might adopt and adapt the principles and practices described here. All we ask in return is that you share your learning with us! We have much to gain from working on this together.

Indeed, collaboration is at the core of all this. Through our approach to missions, it quickly became clear that participative, multidisciplinary approaches to finding angles and shared agendas on complex everyday systems would enable us to start working in new ways.

For example, the 'systems canvases' from these early workshops contain sketches of both the Streets mission, oriented around people, places, and personal mobility, as well as also the seeds of our large-scale Reel demonstrator, electrifying the nation's heavy transportation systems. Both take different approaches, but they can now be systemically connected in a portfolio.

Similarly, the mission-oriented work helped put Food on the table at Vinnova, forging a whole new strategic area. The working methods also helped frame a Swedish approach to the EU's New European Bauhaus programme, with an initial focus on our rapidly growing northern cities. Indeed, the ambitious 'climate contracts' that we have signed with multiple agencies and cities in Sweden, thanks to our Viable Cities strategic innovation programme, also have an agenda influenced by missions and the learning described here, as will the next generation of these programmes. We see missions being actively and creatively picked up across Sweden, by regions such as Blekinge for example. It feels like a critical mass of missions-related awareness and activity is now happening, which is immensely gratifying after this development work.

But while we have gained a lot, as an agency, in terms of tangible insights into what a next generation innovation agency might be, the real value of this work can be glimpsed here in the photos of the places already hosting these missions. The systemic approach to their prototypes means that these green shoots can begin to flower in parallel, up and down the country. Drawing from Brian Eno's design principles here, we are now ready to 'think like a gardener' and start cultivating for the next crop of missions.

Darja Isaksson is the General Director of Vinnova, the Swedish government's innovation agency.

Steering via the North Star

I've been developing theory and practice around mission-oriented innovation since 2013, and so it's particularly heartening to see the kind of detailed, engaging and tangible outcomes of that thinking described in this incredibly useful 'playbook'. This work joins an increasingly diverse array of meaningful mission-oriented approaches being tested globally.

But it took a while! There was huge interest in the possibility of mission-oriented innovation methods from the start, yet for all that attention, only a few places have been able to demonstrate practice on the ground. The teams I lead at UCL Institute for Innovation and Public Purpose have been involved in many of those, with our work initiating the mission-oriented Scottish National Investment Bank, forging the EU's approach to missions, and devising and delivering place-based approaches to missions with cities globally.

We've also been close to the projects described in this playbook, via our strategic relationship with Vinnova. Sweden's innovation capacity is well-known, yet there are exciting new approaches here, which moves the country's innovation toolkit and culture forwards, not least by exploring various forms of 'entrepreneurial state' capacity and capability. We should dig deep into the lessons learned.

Not every country has 'a Vinnova', however. And Sweden has a very particular history. Everyday life here is imbued with living memories of the Million Programme and Vision Zero—missions *avant la lettre*, perhaps—as well as its many decades of progressive and equitable societal action. As this book explains, that has directly informed the possible 'plays'.

A critical eye is needed to assess what works well in the North, and what cannot be translated at all.

Equally, there is much for Sweden to learn from elsewhere. As Sweden's population diversifies, our missions with Camden Council, for instance, provide useful insights for participation within highly diverse environments. Our work on harnessing new forms of value, diversified patient finance, and 'crowded-in' investment could bolster the conceptual frameworks behind the value models emerging here.

For now, however, let's pay careful attention to these dispatches from Vinnova's explorations. As we always say, innovation has a direction, and when describing this work in my book Mission Economy I noted the promise of its highly participative, place-based approach to missions in particular. It may be that this aspect is the brightest north star in the broad constellation of ideas sketched out here. Let's fix the compass on that.

Professor Mariana Mazzucato is the Founding Director of the UCL Institute for Innovation & Public Purpose, and one of the most influential economists of our time. She has led the thinking and practice behind mission-oriented innovation, via numerous publications, projects and partnerships since 2013.

Designing the new practice of government

Generations of people over the last three centuries have collectively witnessed the transformative power of our linear, industrial logics of socio-economic development. The unprecedented change that it has delivered has profoundly shaped our sense of progress and the institutions that guard it.

But what seemed like such a clear and empowering proposition has revealed deep shortcomings, with potentially catastrophic outcomes looming fast ahead. We now have decades rather than centuries to change course. But by what logic do we transition to deliver a different outcome?

While we've stood on the shoulders of giants, there are no known solutions as to how we can make such a transition, at the scale and speed needed. To succeed we will need to discover what works while we deliver change itself.

And because this is as much a cultural challenge as it is a technical one, we will need to do so by building shared experiences across people and knowledge. This is, first and foremost, about mobilising large scale discovery and action.

Missions are a strategic mechanism to help set the right ambition, acceleration, and integrative framework for the change ahead. But delivering on that promise also means knowing how to do so. If missions are the "what", then this playbook is about the "how".

Discovery is a highly creative endeavour. But most institutions are counter-creative by design. Can our institutions and governments be repurposed with a creative capacity to unlock and learn on the questions that really matter?

Yes, if there is political will, clarity of mind, and resourcing to succeed. And crucially, we need a clear articulation of "how", to help us connect our ambition to our future. This is about a new logic of work that can help us unlock new realities.

I've had the privilege to participate in early conversations with the Vinnova team. From the sidelines I've been mesmerised by the new road that they have begun to pave. This playbook is a clear and inspiring roadmap to what work looks like within a mission, both for practitioners and the institutional innovation needed. It does so beautifully, artfully and openly, true to the spirit of discovery.

Marco Steinberg is a consultant, architect, and former Associate Professor at the Harvard Design School. He was the Strategic Design Director at Sitra, the Finnish Innovation Fund, and has led and influenced the practice of strategic design globally.

Until one is committed, there is hesitancy, the chance to draw back. The moment one definitely commits oneself, then Providence moves too. All sorts of things occur that would never otherwise have occurred. A whole stream of events issues from the decision, raising in one's favor all manner of unforeseen incidents and meetings and material assistance, which nobody could have dreamed of. I learned a deep respect for one of Goethe's couplets:

Whatever you can do, or dream you can do, begin it.

Boldness has genius, power, and magic in it!

William Murray Henderson, The Scottish Himalayan Expedition (1951)

From mid-2019, Vinnova has been designing and testing a mission-oriented innovation process around two core mission themes: Healthy Sustainable Mobility and Healthy Sustainable Food.

The process moved from intensive collaboration sessions through to co-design workshops featuring both stakeholders and citizens, from which several missions emerged. These were articulated as systems of interventions, aligned around portfolios, and framed in a way that would enable rapid movement towards action on the ground. As they tend to, the co-design process also built a network of participants for doing so.

Some of these missions were driven forward into prototypes, designed for systemic change and deployed onto the ground. In turn, these prototypes help inform the design and delivery of Systems Demonstrators.

So the action on the ground had moved relatively quickly, particularly given the challenging circumstances created by the Covid-19 pandemic, with the prototyping stages taking a few months to design and deliver, immediately delivering promising results.

This is certainly not the only way of conducting mission-oriented innovation processes, and it may not even be the best way. But it is *one* way at least, tested against reality, and the approach shows great promise.

Yet there is still much to figure out. This book aims to unpack both the theory and practice in detail, partly as a way of reflecting on the process, but also as a way of articulating and sharing a process in order for others to assess and critique, adopt and adapt, so that we might learn from variations elsewhere.

Please do so, and share your insights and outcomes with us at Vinnova, as well as the increasing numbers of others working in the field in this way.

INTERGENERATIONAL
MAKER SPACE + FAB LAB
PLANTING + AMENITY
Painted Street
LOCAL Energy generation
SCHOOL BUILDING AS LOGISTICS HUB
SALUHA

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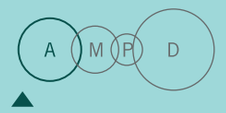
Preparing the ground



In which the backdrop to mission-oriented innovation and design for systemic change is explored, whilst the resources for developing missions are created and cultivated.

0 Preparing the ground

Everything has a Step Zero. The assumptions and ideologies, baggage and legacy, are drawn into an innovation or creative process, just as they are into any relationships, personal or political. Equally, they constitute much of soil from which new processes grow. In his recent Capital and Ideology, Thomas Piketty explains, *"I use "ideology' in a positive and constructive sense to refer to a set of a priori plausible ideas and discourses describing how society should be structured.*" This exploration of innovation policy on the ground is rather more humble in ambition, and must be understood in the context of the somewhat independent Swedish *myndighet*, or government agency. Yet we must not only assemble resources, sketch processes, train for practices, build anticipation around planned events and intended outcomes, but also examine the *"a priori plausible"* ideas that swirl around innovation policy and practice. We must understand where missions have come from, and why, and thus what they might be good for—and not so good for. Step zero, or even -1, is perhaps the most important of all.

0–1

Missions in practice

Missions are bold, inspirational, with wide societal relevance. They indicate a clear direction, ideally targeted and measurable, with ambitious innovation actions. They are delivered through multiple top-down and bottom-up activities, and co-created via cross-disciplinary, cross-sectoral and multi-level relationships.

Background

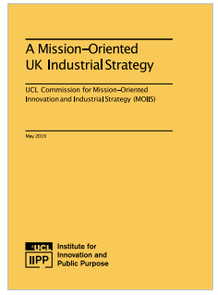
The OECD has produced a thorough review of the many contemporary approaches to mission-oriented innovation currently being explored: *The design, governance and implementation of mission-oriented innovation policies to address societal challenges, OECD* (OECD Publishing, 2021)

Mission-oriented innovation is currently being explored by many countries worldwide. The technique is being used in the UK to drive their industrial strategy, whilst the European Commission is framing a significant part of Horizon Europe around five broad thematic missions. Missions, or related initiatives such as 'moonshots', are beginning to be used to drive innovation policy in other countries, such as Finland, Japan, Netherlands, Canada, and Spain, and aspects of the mission-led approach relate to both the proposed Green New Deal in the USA and the emerging Green Deal in Europe.

The theory behind missions builds on many different sources, but in recent years has drawn primarily on Professor Mariana Mazzucato's work at University College London Institute for Innovation and Public Purpose (IIPP), and in particular her influential reports for Commissioner Moedas at the European Commission and IIPP's work with the UK's industrial strategy.

Mission-oriented Research & Innovation in the European Union, Mariana Mazzucato (2018)

Governing Missions in the European Union, Mariana Mazzucato (2019)



A Mission-Oriented UK Industrial Strategy, UCL Commission for Mission-Oriented Innovation and Industrial Strategy (MOIIS)

Missions: A Beginner's Guide, Mariana Mazzucato and George Dibb (2019)

Sketching a good mission theme

Vinnova is prototyping a mission-oriented innovation process in Sweden in two key systemic challenge areas: mobility and food, with each framed in terms of sustainability and health. Vinnova's annual work plan for 2019 set a specific agenda for exploring mission-oriented innovation, placing greater emphasis on a systemic approach.

These mission themes were drawn from a broader set, sketched out at Vinnova in February 2019, derived from the United Nations Sustainable Development Goals, which set an overall strategic agenda for Sweden, as with other countries. But the process also included national priorities and strategies, capturing important Swedish sectors and ambitions. Many of these are within the overall governmental direction of Sweden, which aims to become the world's first 'fossil-free welfare state'.

Mariana Mazzucato's book *Mission Economy* (Allen Lane, 2021) covers much of the backdrop and practice of missions in depth, including references to the Swedish mission pilots described here.

From this broader set of nine potential mission themes—including areas like Carbon Positive Consumption (rethinking consumer goods with new or old materials and business models), *Health At-Hand* (an increased focus on preventative health), *Affordable Sustainable Neighbourhoods* (retrofitting the places we live, work and play, via a just transition), and so on. These were loosely organised in terms of three different types of mission: 'touchpoints', unlocking outcomes which have highly tangible, daily interaction with citizens; 'conditions', those environments that citizens live, work, play and learn within; and 'keystones', which map onto core foundations which need to be in place (health systems, buildings, logistics, cultures and so on), with which people interact daily.

Each of these has significant economic development opportunities within them, yet each can also be framed in terms of clear societal outcomes, and is primarily driven by that motivation. As Mazzucato et al indicate, significant economic value can be framed in terms of positive spillovers from these missions oriented around societal value. This focus on *the point* is one of the key differences with mission-oriented innovation.

The biggest sign of failure is if we're not changing what we're doing, we're just calling what we were doing before 'missions'.
—Mariana Mazzucato

The basic structure of mission-oriented innovation, as proposed in Mazzucato 2018, 2019. Grand challenges are addressed by missions. Missions combine multiple sectors, and portfolios of projects, which work together to produce systemic change, achieving the mission's target outcomes.

Alongside those nine, a series of enabling themes was sketched out. These do not have such clear societal outcomes in themselves, but are instead key enablers, or infrastructures, that can systematically combine to help achieve the first set of goals.

This is a crucial detail we wanted to address with missions. Often, governments will describe something like artificial intelligence (AI) as if a goal in itself, when actually it is only an enabler. This is exactly what the UK government did when selecting its industrial strategy categories for UCL Commission for Mission-Oriented Innovation and Industrial Strategy (MOIIS) to address. Whilst AI is no doubt important to UK industry, it is an enabling 'General Purpose Technology'. AI could be highly negative or positive tool, depending on how it is deployed. It is a means to an end, but not the end in itself. We do not build society in order to build AI. It is the other way around.

The UCL Commission for Mission-Oriented Innovation and Industrial Strategy (MOIIS) was made up of key UCL academics and world-leading industry experts from cross-disciplinary institutions, and was co-chaired by Professor Mariana Mazzucato and Lord David Willetts.

So whilst these enabling infrastructures are fundamentally important, they are a different type of activity to the missions alongside. Simplifying, the enablers exist to deliver the missions. They are the bedrock with which we can build, but they are not the point. In other words, we don't make cities in order to make buildings. We don't make streets in order to make cars. We don't produce society in order to make industry. We must ensure we are focused on broad societal benefits, and then address the question of the necessary enablers. This not only ensures a meaningful, engaging, and resilient direction, but opens up a much richer canvas of possibility, in terms of actions.

It also means that systems are being addressed as a more coherent whole, putting everything on the table. There is an emerging understanding that shared, diverse and thriving cultures and identities are not only as important as choices about carbon, broader environmental and public health, or material and technology, but that these aspects are intrinsically linked, each a potential answer to the other. These things are indivisible and interdependent. They cannot be addressed as mutually exclusive zero-sum games or neatly placed in priority order. Rather they are essential aspects of a whole.

Candidate mission themes

Candidate enablers

				Capabilities	Infrastructures	Foundations
Touchpoints	01 Health at-hand	02 Healthy sustainable food	03 Carbon positive consumption	Innovative public sector, exploratory regulation, and resilient governance	Digital services, and product and service design capability	Circular and zero carbon material sources and processes
Conditions	04 Affordable sustainable neighborhoods	05 21stC learning systems	06 Active mobility at-hand	Thriving social innovation cultures, networksand structures	Trusted data services, platformsand architectures	Human and machine learning models and systems
Keystones	07 Zero carbon health system	08 Healthy zero carbon buildings	09 Safe and clean logistics	Agile, open, entrepreneur-ial, global, and resilient private sector	Connected industry, energy, services and infrastructure	21stC Swedish and Nordic values, culture, identity and models

Health-at-hand example

High quality 'at hand' health services, both physical and digital			New models for distributed healthcare drop-in centres	New 'total value' models for healthcare budgeting	Strategic design and policy innovation for civil servants	
Trusted shared data platforms for health- related data	Policy Lab for clinical trials via shared trusted data + finance	Better data for better planning of services and environments	Radical increase in at- hand healthy environments	Healthy food in all public schools, kindergartens and colleges		
		04 Resilient neighborhoods	08 Healthy zero carbon buildings	01 Health-at-hand	06 Active mobility at hand	
				02 Healthy sustainable food	Strategic design and policy innovation for civil servants	

Healthy sustainable food example

Dietary information and advice produced equitably	Understanding behaviour change around diet and food habits	Sustainable packaging innovation	New models for local retail and café, incl waste and agriculture	Policy Lab on food safety regulation with Livsmedels-verket	Sustainable recycling of nitrogen and phosphorous fertiliser	
Trusted shared data platforms for food and waste tracing and tracking	Pan-Nordic knowledge exchange with Japanese regions	Better data for better health-oriented planning	Soil remediation, healthy local waters and Baltic Sea	Healthy food in all public schools, kindergartens and colleges	Strategic design and policy innovation for civil servants	
			New models for distributed agriculture in towns and cities			

Equally, we can look at how various missions might begin to relate to each other—what are the possible relationships between, say, a mission theme like preventative health like Health-at-hand and a mission theme like Healthy Sustainable Food?

Clearly, there will be various strong connections points. Shared initiatives begin to emerge, such as a healthy sustainable school food for example, which would deliver against both mission themes simultaneously. This kind of early analysis almost begins to suggest potential missions already. (Note: to guard against uninformed snap decisions, or decisions which may not have a groundswell of shared opinions and interests required for delivery, the mission design process here ensures that actual missions emerge collaboratively, later).

In terms of enabling projects or initiatives, we can also see the diagrams suggest shared capability-building activities e.g. *'Strategic design and policy innovation for civil servants'*, appearing as sketched initiatives in both mission themes. Again, this early stage gives a clue about the types of enabling activities required.

Technology is culture, mental models, beliefs

In that respect, such enabling activities include elements of culture, mental model, and paradigm. Such 'messy' areas are not usually addressed directly in the often overly-technocratic world of innovation policy.

Yet given a holistic approach to missions, informed by strategic design, and an understanding that our complex challenges are behavioural and cultural as much as they are technical and legal—or rather, technology and law are expressions of culture—we cannot shirk from these grey areas. This is particularly the case as we engage with the infrastructures that shape everyday life, in place-based environments like cities, towns and villages. But it is also the case for forests, circular packaging, e-commerce.

So the relationship with diverse readings of Swedish and Nordic 21st century values, culture and identities, and their

associated mental models, could be as crucial to addressing these missions as any advance in technology and infrastructure. This was sketched out in these early models of outcomes and enablers, but also frames the way that missions subsequently developed.

This basic model recognises that technology and infrastructure is culture and politics. The bedrock of our regional and national culture is a fundamental enabling condition. It could be a powerfully positive form of latent capability. It could also be a hindrance. It shapes which mental models are seen as 'common sense', as well as some specific capabilities within society. The model also recognises that these things shifts over time; sometimes at the speed of the Storglaciären in northern Sweden, and sometimes at the speed of e-scooters, food tastes, or streaming media platforms.

With this model of mission-oriented innovation, these sometimes 'messy' questions are on the table too. In fact, as we will see, missions can be vehicles for exploring this kind of uncertainty, ambiguity and cultural diversity.

Jumping ahead a little, the questions of streets and school food that our missions ended up addressing are cultural questions as much as they are technical: they concern things like responses to private car ownership and public space (and thus individual freedom and social status as much as convenience) or plant-based diets and health (and thus freedom to choose what to eat, and whether we are individually or collectively responsible for the impacts produced by those decisions).

So in a sense, when these pilot missions ended up addressing streets and school food they also ended up addressing politically-complex societal areas, albeit indirectly, carefully, and hopefully constructively. We might characterise these street and school food missions, somewhat misleadingly, as concerning 'cars and cows' and what they mean to us. Nonetheless, these forms of mission—again, perhaps unlike Apollo—address core paradigms and mindsets, as well as power structures.

We are taking 21st century challenges, evaluating them with 20th century ideas and responding with 19th century tools.
—Madeleine Albright, former US Secretary of State

The need for efficiency comes into conflict constantly with the desire for sociability. The quest for efficiency aims at balance and harmony. Sociability in cities involves complex mixtures of people with diverging interests; they have to negotiate their relationships day by day, and the results are messy.
—Richard Sennett

This approach may present a challenge within the Swedish model of governance. As in some other countries, in Sweden ministries are political entities within government, whereas government agencies like Vinnova and others (myndigheter in Swedish) are politically-neutral, so-called 'expert agencies'. This structure is mirrored somewhat at municipal and regional level, separating long-term civil servants from political teams. Whilst this attempted separation of politics from delivery is well-meaning, it can allow civil servants to deny the notion that their choices are political. Yet as Mariana Mazzucato points out, all innovation is political, just as designers such as Mike Monteiro and Jorge Camacho argue that all design is political.

This responsibility is not to be taken lightly, clearly, and so such missions are designed to be platforms for producing meaningful public dialogue about these symbols, and what they stand for. In fact, these symbols are almost lazy caricatures of Sweden: cars (Volvo); cows (IKEA meatballs). That the many Swedens (and versions of Volvo and IKEA) that exist are, of course, far more complex than these caricatures does not make it any less contentious to approach the areas of schools and streets.

Yet that is the point. Missions put entire systems on the canvas. That must include cultural elements as well as technical, recognising that these are but two sides of the same thing. Donella Meadows made clear, with her prioritised 12-point list concerning leverage points, that the most effective points to intervene within systems are:

— *The mindset or paradigm out of which the system—its goals, structure, rules, delays, parameters—arises.*

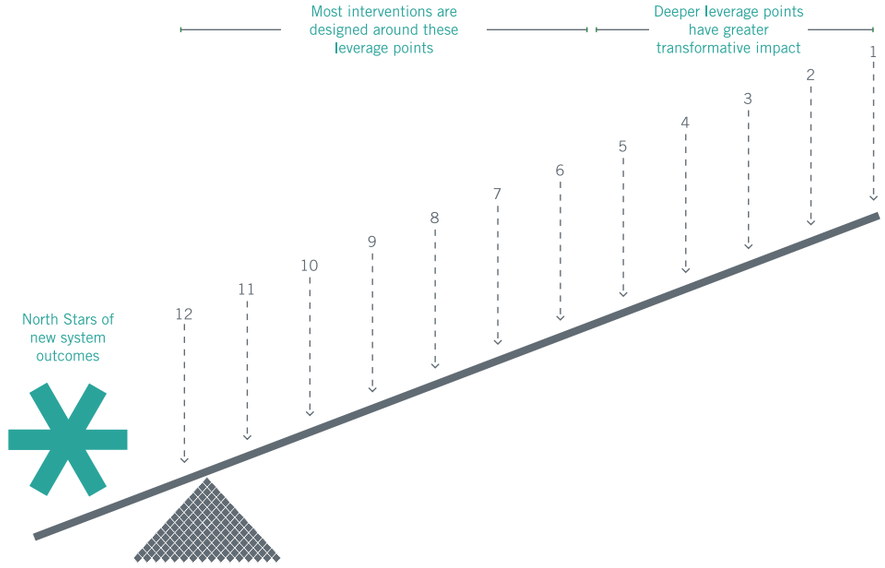
— *The power to transcend paradigms.*

It is in this space of mastery over paradigms that people throw off addictions, live in constant joy, bring down empires, get locked up or burned at the stake or crucified or shot, and have impacts that last for millennia.
—Donella Meadows

Mission-oriented innovation, following both the logic of systems thinking and the practice of design, which concerns precisely these goals and mindsets, must be able to address these levels, even if, as Meadows points out:

Societies resist challenges to their paradigm harder than they resist anything else.

Again, this means a holistic response, covering both outcomes and enablers, and within enablers, sweeping across public, private and third sector, technologies and infrastructures, and cultural identities, histories and futures. This form of mission-oriented innovation denies the assumptions that 'innovation' concerns business and not governance, that it concerns the lab and not the street, or that it concerns technology and infrastructure but not belief systems and mental models. *All* are in play, just as they are in the practices of everyday life.



A key challenge, perhaps, is how to approach these environments with deep participation in mind, understanding diversity of context and question as well as diversity of solution. Can we create systemic approaches which start with the more instrumental leverage points on Meadows' 12-point scale above, yet in their participative approach and societal agenda, reveal, question and re-frame the deeper leverage points, concerning paradigms. By carefully selecting the right **Lever→** for such transformation, designing approaches which put the paradigms 'on the table', it may be that we can engender genuine systemic change from everyday environments.

Donella Meadows defined a set of 12 leverage points in her essay 'Leverage Points: Places to Intervene in a System', comprising the typical aspects of systems analysis (information flows, buffers, delays, loops) with the more transformational leverage points, concerning structures, mindsets, goals and paradigms, which are ultimately more powerful. These can be visualised on a scale, acting as a form of lever, exerted to produce systemic change.

Start by starting

Despite all these considerations, and these early models, the term 'sketching' is used in this section in order to note that these were not rigorously analysed areas, as the real learning, and need for a more detailed process would emerge in the next stage: that of action. There was no magical algorithm we could

force ‘Sweden’ into, from which would emerge a perfect and fully-formed mission theme, guaranteeing a fossil-free welfare state with a just transition to good life for all—or equivalent.

We felt we had to pick two complex-enough areas and start learning by doing. These areas should be strategically important, and in order to transform them, would require all sectors to work together as well as many different forms of research, innovation, governance, decision-making and activity.

Although these themes will be familiar from other strategic processes, they are only a starting point. In reality, they will be revised heavily by the subsequent design process. In itself, this is a minor innovation point, reinforcing key public sector innovation practices, such as collapsing policymaking and delivery into a symbiotic process, rather than linear, or waterfall, method.

From this stew of requirements, Healthy Sustainable Mobility and Healthy Sustainable Food emerged. The former as transport is a key strategic sector for Sweden, and Vinnova; and yet radical new approaches to mobility were emerging, including but also beyond transport.

The latter as food was not traditionally seen as a priority Swedish research and innovation area, including for Vinnova, despite the fact that the food sector is one of the largest industrial sectors in the country, as well as being responsible for more carbon emissions than almost all other sectors and at the core of contemporary public health crises, Yet food can also be framed in terms of culture, place, technology, identity, equality, landscape, cutting across numerous sectors and policy aspects.

Adding health as well as sustainability to both mission themes would not only produce highly meaningful societal outcomes—the core element of mission-oriented innovation—but also require techniques a multidisciplinary approach, and equally would likely reveal synergies in terms of integrated approaches, solving for health and sustainability simultaneously, as well as exploring the interfaces and overlaps between food and mobility systems themselves.

Prototyping two mission areas

The Healthy Sustainable Mobility and Healthy Sustainable Food missions have been running since April 2019, and are now at the end of the second phase, emerging in public as tangible prototypes around which to drive meaningful participation, discussion, learning, and definition of subsequent demonstrators.

The first phase was a large co-design process, involving many diverse ‘system actors’ across a series of formats. These activities produced insights as to a set of key Angles, which are akin to ‘leverage points’ on systems.

These Angles must be assessed and transformed, as they are often not actions as such, but usually a rich stew of perspectives, lenses, issues and only sometimes clear activities. Nonetheless, they are a highly useful description of both issues in existing systems and hints as to how to unlock the next systems we must enable.

These Angles are then worked upon, with the coordinating strategic design team unpacking workshop conversations, auditing existing projects and practices, and speculating as to the new actions that these leverage points might be better articulated through.

Augmenting this process with further strategic dialogues with system actors, a more coherent set of Missions can be derived. These comprise more tangible interventions oriented towards those Angles, and can begin to suggest a portfolio of various different innovation activities. This portfolio can begin to indicate how a systemic approach requires a rich set of experiments firing in parallel, and balanced across both the ‘push’ of traditional technology-led innovation processes with the ‘pull’ of societal, behavioural, cultural, political, and social movement-led dynamics.

The second phase is a focused design process, with continuing engagement activities, oriented towards testing this portfolio in action. It uses systemic design principles to mould these initiatives into Prototypes.

Prototypes are essentially discrete projects, which can be commissioned activities from a network of research and innovation actors, in collaboration with 'front line' of agencies, municipalities, regions, and businesses.

They are agile, focused and highly tangible actions, generating as much learning as possible, as rapidly as possible. They are the first stage of any meaningful contemporary policy, product or service design process, working as a kind of 'minimum viable product' or 'design probe'. In this way, as with a strategic design process, they are a working sketch of new interventions, organisations, cultures, policies and so on.

Particular design principles, such as the levers and layers explained later, can ensure the prototypes contain the DNA for subsequent systemic change. Particular processes within these prototypes, such as Policy Labs, can reveal any regulatory or policy-related blockages or opportunities.

As such, these Prototypes can help flesh out, shape and define the content of System Demonstrators. These Demonstrators are larger-scale, longer-term interventions that not only deliver systemic change but also demonstrate and describe how systems at the scale of cities and regions can be transformed (we share the concept of 'Deep Demonstrators' with EIT Climate-KIC and others).

A design process for national missions

This overall methodology follows a modified form of design process. Design processes are typically characterised as a series of opening and closing arcs, with wide-ranging activities exploring relevant terrain.

These generate various forms of analysis and knowledge through interaction and dialogue, before synthesis closes in on tangible concepts that can embody the most meaningful characteristics discovered in the prior phase.

These concepts are tested and refined as prototypes, with insights shaping subsequent design and delivery. And then

repeat. Crucially, the process continues, with active learning from delivery in order to inform the next iteration.

So the design process flows from Angles to Missions to Prototypes, starting from a broad exploration of the terrain and reducing down, through a series of steps, to prototypes on the ground. That process sheds light on what to do—we know where to invest, where to transform, what the governance looks like, and so on.

From there, we can scale into Demonstrators.

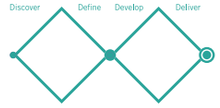
Each stage is co-designed with system actors, from public, private and civic sectors, supported by academic and design expertise, and with increasing citizen participation as the process progresses. All of these actors work together simultaneously where possible, and thus the process forms new networks for action along the way.

In a reversal of some consider the mission-oriented innovation process to be, the Vinnova method has explored how to build consensus about what missions should be through collaboration, via co-design processes for networks of stakeholders, users, and citizens. The learning from these activities forms missions with purpose, legitimacy, and momentum, and builds a sense of what can be achieved within systems. These are then lifted to a national political level, such as via the Swedish *'strategiska samverkansprogram'*, national collaboration programmes led by the government.

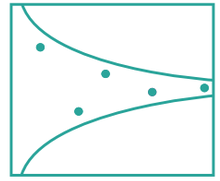
The process puts participation first, and then heads towards politics. Of course, in reality, politics—in our context, the practice of shared decision-making about shared concerns—is inherent in every stage. In essence, however, we want to learn from action in order to approach our layers of formal governance with the best possible insights. Rather than ask for a mission before we understand what it is, or what it can be, we work to frame the mission, co-design it and test in collaboration, and build political capital, of all kinds, as we go.

We call this approach the snowball, in which we progressively build a sharper framing of the possibility, a realistic sense of capabilities, a broader set of engagement, diverse forms of

The UK Design Council's 'double diamond' is perhaps the best well-known example of this form of process—and diagram—but there are numerous variations.



An alternative 'diverging and converging' process is captured in the so-called Steinberg Funnel, which asks questions as to how insights move backwards and forwards through a design and decision-making process, from tangible to abstract, closed to open.



Hugh Dubberley's diagram—a variation below—is perhaps a more accurate portrayal of how the design process feels, and works, in action.

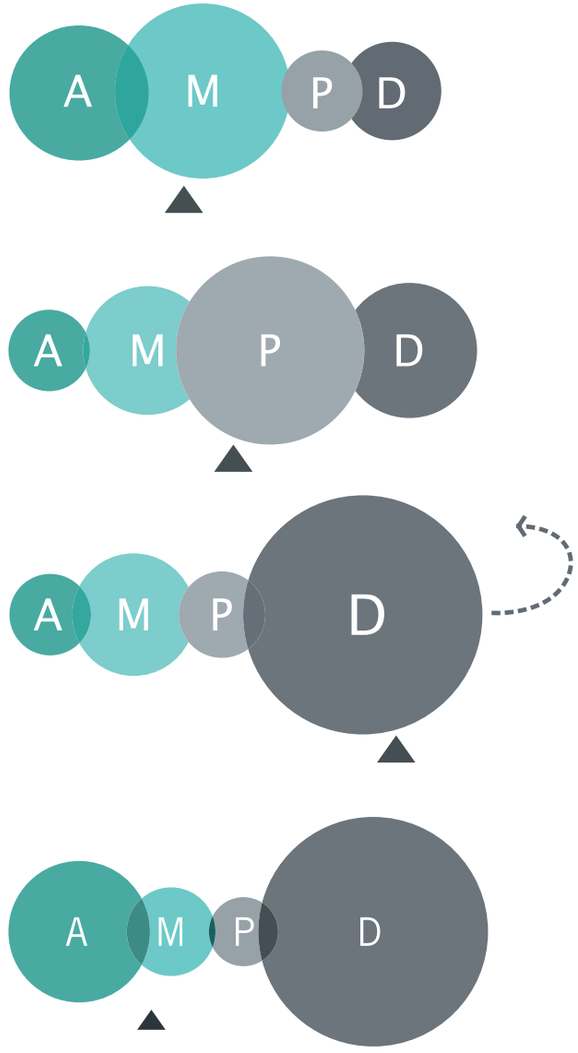
knowledge, tangible outcomes earlier as we go. We think this might even enable a more ambitious direction and timeline. It flushes out assumptions and builds coalitions for action from the start. This approach to missions looks to co-design the agenda, build a network for change, produce action on the ground, and then create a set of stories based on insights from these ongoing activities. Having built up that body of work, then we can approach national politics in a more meaningful discussion about the many ways that a Great! could add value to this work. It is perhaps a reversal of a traditional process, but it is certainly in line with contemporary thinking and practice about policymaking.

This is an alternative approach to the European Commission Horizon Europe mission process, which has tended to start at the national political level, with expert groups informing member state representatives, and then moves towards engagement. The details of what a mission might mean 'on the ground' emerge in a second phase, after a first year of discussion and deliberation.

The Vinnova method is in contrast on purpose—as a constructive counterpoint, and to help build out some of those processes on behalf of the broader European missions. Neither is necessarily right or wrong; learning from the contrast may be the most important act. The approach described here forges a process and culture in order to produce as much learning as possible. It shares all the basic characteristics of mission-oriented innovation, and attempts to produce insights by testing them on the ground. We are documenting this process for sharing and critique.

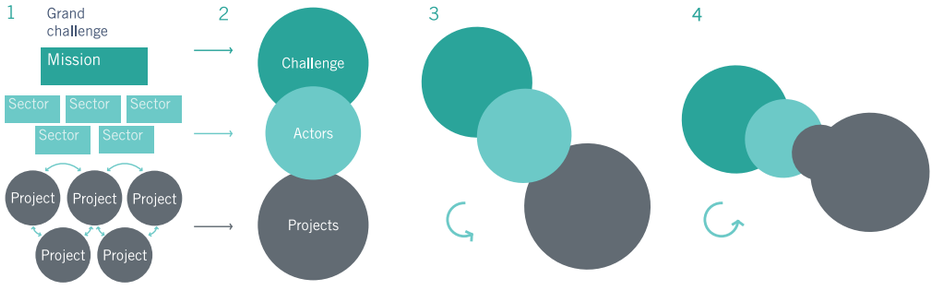
This project aims to create a method that helps both in finding and defining this direction. Vinnova wants to make it easier to decipher complex systems in society and suggest how we can trigger mission oriented innovation that results in systemic change, from a genuinely meaningful people- and place-based perspective.

The appendix has examples of aligning methods for EU Horizon Europe mission development specifically, and the Vinnova team has been in constant productive dialogue with the European Commission teams working on Horizon Europe missions).



The design process is drawn as if overlapping bubbles of activity to indicate that different stages will pull focus, on the immediate and next. Yet the first activities, like Angles, can be 're-inflated' with learning from the last.

Throughout the playbook, a small arrow will highlight the phase being described at that point.

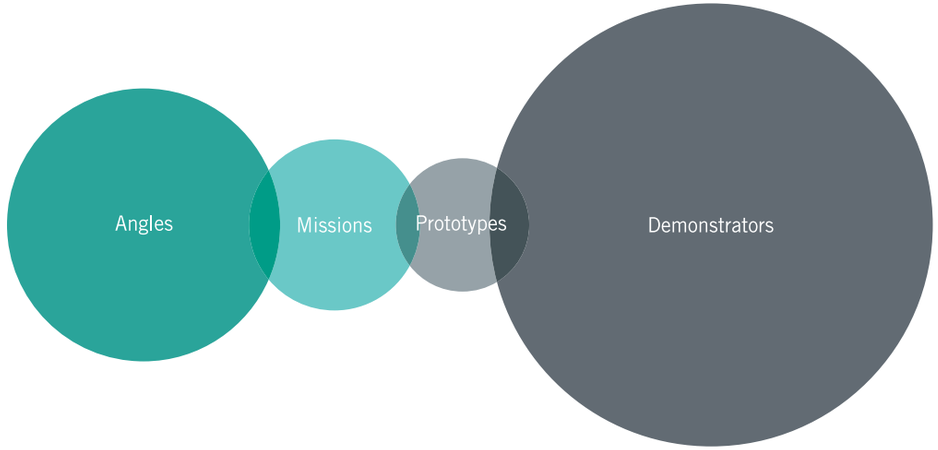


The ‘Mazzucato model’ is structural, describing how core elements relate to each other. A grand challenge is framed, which is addressed by a mission, which in turn brings together sectors working together to deliver projects for the mission.

Translating the structure into a participative learning process, the actors are crucial to defining and understanding the challenge and mission, and initially shaping the possible projects.

A participative process over time means we can imagine rotating the structural diagram through 90 degrees, suggesting the movement from framing the challenge, to missions, to designing and delivering projects ‘on the ground’.

In reality, these stages overlap, with actors framing the mission, before many of those actors are also involved in delivering projects. These projects split into prototypes and demonstrators, describing their evolution.



The diagram describes the overall process, with different stages and activities annotated. The process moves from defining Angles to Missions, which are articulated via Prototypes, which can inform Systems Demonstrators.

Although it can be read as a linear process, moving from left to right over time—which is hard to avoid in reality, after all—it is also drawn to suggest repeats, loops, overlaps, moving backwards and forwards, with the outputs framing the next iteration. Any good design process is a continual learning process.

If a factory is torn down but the rationality which produced it is left standing, then that rationality will simply produce another factory. If a revolution destroys a government, but the systematic patterns of thought that produced that government are left intact, then those patterns will repeat themselves ... There's so much talk about the system. And so little understanding.

Robert Pirsig, *Zen and the Art of Motorcycle Maintenance* (1974)

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Methods for missions

There is always a design phase; the issue is whether it is done consciously or not. An unconscious design phase is likely to be full of assumptions, missed opportunities and limited engagement. It will tend to reinforce business-as-usual rather than transformation, and negative outcomes rather than positive co-benefits. We must instead define and engage an active and participative design process for missions.

Background

The idea of practice for missions emerges laden with both promise and baggage. Drawing from allusions to the impressive achievements of the Apollo missions, there is a sense—perhaps even a fervent hope—that setting clear political goals, aligning technological innovation, industrial investment and public policy, and guided by scientifically-informed rational analysis, could achieve similarly impressive outcomes. If only we could point such a machine at the planetary scale challenges of our age. This heady brew tends to prove irresistible to politicians and policymakers, as well as corporations.

Technological and economic solutions are good at fixing technological and economic problems. While the planetary crisis will require intervention and legislation, it is a far broader kind of problem — it is an environmental problem — that involves social challenges like overpopulation, the disempowerment of women, income inequality and consumption habits. It reaches not only into our future but our past.
—Jonathan Safran Foer, *We are the weather* (2019)

Yet Mariana Mazzucato, who has been the driving force behind the broad interest in mission-oriented innovation today, frequently counterpoints her call for contemporary missions with references to Richard Nelson's 1977 essay *The Moon and the Ghetto*. Written from 1971 onwards, and so still in the orbit of the Apollo missions' halcyon days, Nelson's essay described how solving public policy problems are simply *much harder than getting to the moon*.

Nelson wrote:

> *It may be enormously more difficult to design policies to equalize educational achievement or to eliminate prejudices, than to design spacecraft to go to the moon. For truly intractable problems the most we can expect from rational analysis is understanding which deters us from trying costly remedies that cannot work.*

The spirit of Apollo may capture the national-scale motivation we need to address today's challenges. Its alignment of multiple disparate activities, unified by a coherent and tangible outcome, is also clearly powerful; particularly for a Swedish innovation agency which tends to generate thousands of projects per year.

No horseman of the apocalypse rides alone: plagues do not appear in the singular.
—Andreas Malm, Lund Universiteit

Yet following Nelson, the Apollo moonshot was clearly a technological mission primarily, and framed within the quite different, arguably simpler, political complex of the Cold War. Indeed, in her key report for the European Commission, Mazzucato

specifically notes Nelson's essay. The complex problems of the ghetto will not line up neatly in linear fashion, as if simply complicated technical nuts to crack:

> *The real problem was that a purely scientific and technological solution could not solve such problems. There is a greater need to combine understandings of sociology, politics, economics and technology to solve these problems, as well as to make the conscious decision to point innovation towards them.*

Mariana Mazzucato, 'Mission-oriented Research & Innovation in the European Union', (European Commission 2018)

So if the moonshot was not the right analogy then, it is not the right analogy now. For innovation agencies and related functions, whose DNA is traditionally soaked in scientific innovation, this can be a bitter pill to swallow.

Sometimes the pill is resisted. The analogy retains its allure, despite Mazzucato and Nelson. In 2019, the President of the European Union, Ursula von der Leyen, described the Green Deal as Europe's *"man on the moon moment"*. In 2020, announcing the UK's efforts to deliver same-day mass testing for Covid-19, the Prime Minister Boris Johnson announced *"the Moonshot approach"*. The resulting programme was titled Operation Moonshot.

Richard Nelson, The Moon and The Ghetto (W. W. Norton & Company, 1977)

This bitter pill can also lead to science and innovation separating itself from the messy and complex social contexts for which Nelson used the shorthand *'ghetto'*. Writing in the journal *Nature* in 2016, just prior to the election of President Trump, Colin Macilwain powerfully described the careless and ultimately destructive distancing of scientific research and innovation from the everyday social and political contexts it is embedded within.

> *We like to talk about 'engaging the public', but many scientists really just want to talk at them. And too many ordinary scientists hold politicians in utter intellectual contempt — even though it is the scientists who have chosen a career that allows them to pursue relatively simple problems (such*

'The elephant in the room we can't ignore', Colin Macilwain, Nature 531, 277 (17 March 2016)

as building a machine to detect gravitational waves) rather than genuinely difficult ones (such as running a social-care programme in a small town).

Moving on from the moonshots that Nelson critiqued, or a broader withdrawal of science from the genuinely more challenging arenas that Macilwain describes, Mazzucato concludes that the notion of missions, if incorporating the broader perspectives she describes alongside clear direction, could indeed address these more challenging public policy questions. A thoroughly systemic approach, led by the integrative practice of design, could force science, innovation and politics together.

She writes, *"This is exactly what a well-designed mission can achieve"*. The caveat of *"well-designed"* is important, clearly. With that in mind, what might we learn from the practice of alternative missions to Apollo?

Previous Swedish missions?

There are many versions of these Nordic transition stories. Mary Hilson's *The Nordic Model* provides a good overview. For a history of Denmark, Norway and Sweden's transformation with specific reference to Folkbildung and societal transformation, read Lene Rachel Andersen and Tomas Björkman's book *The Nordic Secret*. For Finland, Annika Koljonen and Danny Dorling's *Finntopia* provides a good overview of its socio-political cultures.

Sweden has its own rich history in terms of societal transformation, not least in its remarkable transition from one of Europe's poorest nations in the late-1800s to one of its wealthiest by the 1930s. This is a story well-told.

Yet in more recent Swedish history, there are two initiatives, of a similar vintage to Apollo, that are perhaps more constructive reference points to draw from.

Learning from the Million Programme

Running from 1965, the Million Programme (*Miljonprogrammet in Swedish*) public housing programme set a 'mission' of building one million affordable new dwellings within a decade. The mission was broadly successful, with 1,006,000 dwellings being built by 1974. 'Affordable' was defined in understandable terms, relating to the wage packets of average workers. Miljonprogrammet produced a rich diversity of dwellings, with the majority being small houses despite the popular allusion with larger housing blocks typical of the age.

By way of comparison, the New Zealand government recently shelved an attempt to build 100,000 new dwellings within a decade, proclaiming their 'KiwiBuild' programme "overly ambitious". (New Zealand's population is ~5 million, compared with Sweden's ~8 million at the time of Miljonprogrammet).

At such scale, the quality of Miljonprogrammet housing varied, perhaps predictably. It comprised some of the finest European public housing of its time, and many of its housing blocks now lend themselves perfectly to contemporary retrofit programmes, according to KTH housing expert Erik Stenberg.

Stenberg notes that the blocks are often "well-built and today provide good homes and communities for many", and also well-situated, already supported by infrastructure and amenities. He "champions careful, community-engaged renovation rather than demolition." According to Stenberg:

Sustainability is about managing with and for the assets you already have (requiring) an incremental approach to renovation. It's a more gradual approach, based on apartment-by-apartment renovations that adapts to specific circumstances and evolves over time. Hence, it's more sustainable — in economic, social and environmental terms.

Yet other housing, and associated neighbourhood design, delivered by the Million Programme proved to be more problematic, with some poor-quality construction and insufficient focus on community-building and participation as well as the environment, in many senses of the word. If run today, an equivalent venture could be expected to take a more human-centred and environmental approach, supported by contemporary technologies. Theoretically, this would enable it to address a few of those missteps, which were typical of the time.

Yet Miljonprogrammet's results arguably deserve to be seen in the same light as Apollo. The public policy terrain of housing policy is just as complex as that of space travel.

Miljonprogrammet housing in Hallunda, Stockholm.

Vision Zero emerges from a culture of road safety in Sweden, not least the invention of the revolutionary three-point seatbelt by Volvo, in the 1950s.

Learning from Vision Zero

Another example. The **Vision Zero** *(Nollvision in Swedish)* programme was devised by the Swedish transport agency Trafikverket in 1995, and was approved by parliament in October 1997. Vision Zero is based on an underlying ethical principle that it can never be acceptable that people are killed or seriously physically injured in accidents on the road transport system.

Generally speaking, Vision Zero has proved successful. Whilst it is worth noting that Sweden's road death toll was declining prior to 1997, it has continued to do so under Vision Zero, despite an increase in the volume of passenger road transport (though the number of deaths has not improved markedly since 2013, however, suggesting a plateau of sorts may have been reached).

Just as powerfully, perhaps, Vision Zero has spread to numerous countries, regions and cities, with Trafikverket recently starting a Vision Zero Academy to help share and develop its approach. In 2019, Oslo saw just one road death, whereas Helsinki achieved zero pedestrian fatalities in road traffic. Both are Vision Zero cities.

It is particularly interesting, given its origins within a strong traffic engineering culture, that Vision Zero is based on ethical foundations:

> *Vision Zero is based on the ethical standpoint that no one should be killed or seriously injured for life in road traffic. The acceptable figure for the number of fatalities and serious injuries in traffic is zero.*

The balancing act underneath the policy usefully recognises a shared responsibility for this outcome between individual and state, yet with an emphasis on the designers and operators of roads to produce an environment which is safe by default. It also recognises the fundamental importance of a systemic approach, emphasising "that all elements in the system are interrelated and affect one another."

Finally, the ethical foundation means that cost-benefit

analysis ought to be no longer recognised as a meaningful calculus for policy, suggesting that *"life and health can never be exchanged for other benefits within the society".*

Vision Zero also shows that mission targets must adapt over time. The original 1997 goal was to reduce traffic deaths to zero by 2020, with a 50% reduction for 2007. The actual reduction by 2007 was 13%, and so the target was revised to 50% by 2020, with the number of seriously injured reduced by a quarter, and to zero deaths by 2050. In 2009 the reduction from 1997 totals was 34.5%, down to 355 deaths, and by 2019, a total of 223 people died on Swedish roads, according to preliminary statistics.

As with Miljonprogrammet, there are issues with Vision Zero which may be framed differently were it to emerge today. Even leaving aside the significant environmental impacts of motor vehicle-based mobility systems, Vision Zero's emphasis on physical injury largely excludes mental health and wellbeing, as well as the significant secondary health impacts of lifestyle-r elated diseases (though some of these are addressed by other areas of Swedish law and policy).

Equally, whilst the ethical underpinning was perhaps unusual to emerge from a traffic planning authority, most of the measures designed and implemented were not, largely consisting of technical road safety measures in the form of built infrastructure changes, as well as recommendations for car design. The actions taken are largely those of an engineering culture: a focus on efficient problem-solving rather than creative question-asking.

Clearly, a more holistic approach would put many more options on the table, questioning how much 21st century mobility need be based upon 20th century transport models like private car ownership. There are alternatives. Put simply, the fastest and most effective way to prevent motor vehicles killing people—through accidents and air quality—would be to reduce the number of motor vehicles on the road in the first place. This traffic reduction option is not explored by Vision

Improvements in traffic safety made during the Vision Zero era have almost exclusively benefited motorists. Cars equipped with better active and passive safety measures allow motor vehicle occupants to escape even fairly serious crashes unscathed while vulnerable road users—the elderly, children, cyclists—continue, to a large extent, to die or get in collisions with motor vehicles at the same rate as before.
—Lars Strömgren and Hans Stoops

Zero, as currently understood. In fact, critics of the programme suggest that its actions have merely benefited car drivers, leading to reductions in safer, healthier active transport alternatives, such as cycling and walking (which also happen to have lower environmental impacts).

The Netherlands also witnessed an increase in road traffic accidents in the 1960s and 1970s. Yet public protests under the banner *Stop de Kindermoord ("Stop the child murder")* led to a more fundamental mobility transformation. These social movements triggered Dutch government policy at all levels, reversing a decline in cycling such that the Netherlands now possesses ~36,000 kilometres of cycle paths, with more than a quarter of all trips in the country made by bicycle.

Indeed, it's worth noting that in the Nordic context, Oslo achieved a form of Vision Zero outcome in 2019—with no cyclist or pedestrian fatalities due to traffic accidents—but only after significantly removing car traffic from its inner city (alongside many other measures).

Although Vision Zero usefully moves us beyond cost-benefit analysis, it is worth noting that Dutch cycling culture saves their healthcare systems around €19 billion per year (~3% of GDP), for only €0.5 billion of investment in cycling infrastructure. This fundamental shift in mode is not part of the agenda for Vision Zero.

Nonetheless, Vision Zero's theory and practice provide valuable insights for contemporary mission design, arguably more useful than those that we can draw from Apollo. They include:

— a meaningful and communicable societal outcome pinned on ethical values;

— a shared responsibility between citizens and state, with the state as the most active player;

— a statement of intent about a systemic approach;

— a value proposition that moves beyond simplistic cost-benefit analysis;

— a global outlook sharing and spreading innovation, and actively learning in return;

— and an active stewardship that adjusts targets based on progress and conditions, whilst holding steady towards a 'North Star'.

And finally, we can also learn from the stones unturned by Vision Zero, by focusing on uncovering the assumptions and mental models that Lakoff and Johnson suggest *"govern our everyday functioning"*.

The concepts that govern our thought (also) govern our everyday functioning … In the area of politics and economics, metaphors matter more, because they constrain our lives.
—Lakoff and Johnson, *Metaphors We Live By* (1980).

By 1955, Sweden had become Europe's most car-dense nation. Contemporary traffic planning and urban planning emerges and consolidates around the same time, which is perhaps not a coincidence. What residue is left from this time? How does it affect the way that cities run today, but also how citizens and professionals think about mobility?

In our research for the Street mission, we discover that the parking space regulation still in place across Sweden dates back to 1958. This kind of dark matter is, to some extent, shaping what happens some six decades later. We have 'policy lab' processes to address the implicit questions asked by such elements, but in order to do so, we need to recognise, after Nelson, that missions must encompass these social, cultural, political and behavioural aspects, and not simply see innovation as concerning only technologies.

Learning from mid-20th century urban planning cultures would be instructive, as they tended to be largely technology-focused, and problematically so. That approach has unfortunate echoes in much of the smart city movement today. See work by Bianca Wylie, Adam Greenfield, Shannon Mattern, Dan Hill, Rebecca Williams, and Anthony Townsend for more on this.

These mental models, communities of practice, organisations, and traces of regulation need to be put on the drawing board too, alongside new and old technologies. A strategic design approach to missions draws all these elements together.

Any organization that designs a system (defined broadly) will produce a design whose structure is a copy of the organization's communication structure.
—Melvin Conway (1967)

Such an approach explores richer, more diverse arrays of possible futures, shaping our cultures of decision-making as well as our technologies.

Beyond science

Instead of seeking—or feigning—certainty, we should be open about uncertainty, and transparent in the ways in which we acknowledge the limitations of the imperfect data we have no choice but to use. Teams should be encouraged to admit ignorance, explore paradoxes and reflect collectively.*
—Harry Rutter, Miranda Wolpert and Trisha Greenhalgh, 'Managing uncertainty in the covid-19 era', British Medical Journal, 22 July, 2020

Fundamentally, the DNA of our innovation agencies, and thus our behaviours, must be modified to fit the form of today's and tomorrow's challenges. Our contemporary missions, requiring integrated approaches to climate crisis, public health and social justice simultaneously, cannot be led by science any more than Nelson's 'ghetto problem' could be solved by the immensely capable scientists and experts at NASA or ARPA.

Sadly perhaps, as many have pointed out, the answers to our complex problems cannot be achieved by simply 'following the science'. The critiques of such expert-led processes and cultures are well-known (see Gadamer 1967; Tetlock 2005; Grundmann 2016; Reiss 2019). More obviously, assessing the often differing responses to the complexity of the COVID-19 pandemic, even across State Epidemiologists in the relatively unified context of the Nordic nations, reveals that "the science itself is political ... (as it involves) the science of human behaviour" (Runciman 2020). In this context, Venki Ramakrishnan, President of the Royal Society said:

> *We must recognise both the potential and the limits of science ... there is often no such thing as following 'the' science.*

Yet when faced with uncertainty, ambiguity or the challenges of systemic change, many innovation policies and agencies still retread these same paths towards the 'government investigation', or the 'investigatory committee', or the academic-led process.

The world is inherently uncertain and to pretend otherwise is to create risk, not to minimise it.
—Mervyn King and John Kay, *Radical Uncertainty* (Hachette, 2020)

These presuppose that the solutions to complex adaptive systems can be simply produced by experts thinking hard about the problem and drawing up a roadmap. Generalising, these can result in a set of non-diverse 'business as usual' actors sitting in a withdrawn room in order to write a Microsoft Word document together.

Such a culture does little to address misrepresentation, assumptions and even bias. It cannot address transdisciplinary or interdisciplinary combinatorial innovation. It cannot process

or generate the many different forms and formats of knowledge or action necessary for contemporary challenges. It is rarely comfortable with the ambiguity and cross-disciplinary complexity than characterise the challenges of our age. It often struggles to escape the gravitational pull of existing efficiency logics. It cannot motivate the power of social movements, which have been involved in every major societal shift in our past, from eradicating polio to the Swedish home-building programmes of the 1930s and 1960s, and are now clearly emerging around the crises of climate change and social justice, on the streets outside that committee room window.

Policymaking at the Commission happens in the 'Track Changes' function of a Word doc.
—Unnamed European Commission official

Embracing uncertainty and Not Knowing

As a result, numerous public sector innovation programmes of the last decade have forged entirely different approaches (in a Nordic context alone, see *In Studio: Recipes for Systemic Change* by SITRA's Helsinki Design Lab, or Christian Bason's *Leading Public Design: Discovering human-centred governance*, and many more), just as agile, prototype-led, transdisciplinary, and user-centred innovation and design processes are now firmly ensconced in the private and third sector, leading directly to the often innovative products and services that surround us. These design practices actively head towards uncertainty and ambiguity, and make sense of that complexity via the interplay between making and reflection.

In the context of policymaking and research given conditions of uncertainty, there is a solid literature emerging. This includes the 'hybrid forums' model documented in *Acting in an uncertain world*, by Michel Callon, Pierre Lascoumes and Yannick Barthe, which centres on productively flattening hierarchies between experts, non-experts, ordinary citizens, and politicians which define contemporary participation practices. Founding member of the European Research Council Helga Nowotny's *The Cunning of Uncertainty* provides another input, noting that a science aware of uncertainty rarely takes the straight line, preferring the oblique route, and producing results that are always provisional

Context is always important, and we must adapt our methods to the problem at hand ... Nothing works except in context.
—Angus Deaton

and essentially uncertain. Bruno Latour's *Down to Earth* places these dynamics in the context of the climate crisis, making the case for place-based approaches which can 'hold' complexity yet remain firmly grounded. A different example, though on the same subject, is John Kay's recent book *Radical Uncertainty: Decision-Making Beyond the Numbers*, written with Mervyn King, former governor of the Bank of England.

We've had 30 years of pep-talking and selling positive ideas. And I'm sorry but it doesn't work, because if it would have, the emissions would have gone down by now. They haven't. And yes, we do need hope. Of course, we do. But the one thing we need more than hope is action. Once we start to act, hope is everywhere. So instead of looking for hope, look for action. Then and only then will the hope come.
—Greta Thunberg, *Next Generation* (2019)

The leading systems thinkers Donella Meadows put this well a long time ago. Perhaps her words should be taken a prescient warning to an analytical culture that will build models and 'digital twins', produce forecasts and roadmaps, or even try to construct algorithms that explicitly reveal the value of accessing certain leverage points beforehand. It is not that those tools are fully useless; more that they are not the only answer. Meadows recognised that 'knowing what to do before you do it' can't be done. Only through trying to deliver do you learn what to do. Meadows called this *"the humility of Not Knowing."*

Our job is to move forwards, with this humility fully on-board, reckoning with uncertainty as we go. In this way, we are able to observe, engage, learn, pivot, adapt, refocus, reframe. This engaged approach is quite distinctly different to the distanced, theoretically objective, evidence-based model of policymaking. In practice at Vinnova, we have been struck by how the simple humility of getting on the road and asking people for their perspective—*"What are your ambitions? What are you trying t o get done? What's blocking you? Tell us about your world?"* —has been met with such a positive response.

Political questions are not mere technical issues to be solved by experts. Proper political questions always involve decisions that require making a choice between conflicting alternatives.
—Chantal Mouffe

Equally, moving beyond that early stage of discussion and alignment, we have framed missions deliberately around vehicles that can explore uncertainty continually, yet productively. They must handle conflict as well as consensus, not attempting to suppress the former by flattening difference into the latter. In this, we draw from Milica Begovic's thinking for UNDP's Innovation Facility. The prototypes and demonstrators are designed such that new questions can be asked of them. They can absorb and align existing and new projects as they are

discovered. They are adaptive, such that they can adapt to new contexts and unforeseen circumstances. They are concrete, tangible, and located in public, such that they reveal diverse attitudes, reactions and, just as active stewardship surrounds prototypes and demonstrators with diverse governance, and a culture of ongoing learning and reflection. This ensures they remain open to a wider set of entry points, ideas, and possible solutions.

We have attempted to design a process and culture that strives to maintain this sense of humility that Meadows so powerfully argued for, asking questions and checking assumptions whilst moving forward.

Embracing expertise

Mariana Mazzucato, *Governing Missions* (European Commission, 2018)

Mission-oriented innovation provides a way of challenging an expert-led 'committee model' in the context of policy and practice. *Governing Missions* makes clear the importance of citizen engagement in particular, as well as moving across silos and existing structures of knowledge. Our challenge is to explore these practices. What does this mean? What forms of evidence or knowledge come into play, and when and how?

The critique does not undercut expertise. It means the opposite: working hard to find the most productive framing for deep expertise. Doing so would be respectful rather than tokenistic, drawing from the immense value in scientific expertise whilst connecting across discrete bodies of knowledge in new ways —including forms of knowledge held and cultivated by citizens—in order to forge transdisciplinary understanding. In turn, the diverse contexts of people and place enrich the scientific process, as well as connecting it to a practice of change.

From that richer perspective, we can expose and re-assess the mental models embedded within our challenges, prising open the Overton Window that otherwise constrains policymaking and innovation practice.

So this positioning is not a rejection of expertise at all; in fact, the goal is a more powerful, generative way to engage and

Any feminist politics depends on the belief that things can change, that we need not repeat a history that has tended to exclude and oppress women, people of color, queer subjects, and the working class. Feminism is the vision that things can be otherwise, that the future holds unprecedented opportunities and the potential for changes.
—Fanny Söderbäck, *Revolutionary Time: Revolt as Temporal Return* (2012)

develop expertise through placing its insights and capabilities in diverse and grounded contexts.

This implies we are building many different forms of knowledge, created through structured interactions with complex systems, which cannot be understood or in some cases even imagined a priori.

This is not business-as-usual. Mazzucato suggests that mission-oriented innovation will "*require a revolution in most governments to make it work.*"

Design is not a silver bullet at all. By itself, it is of little use. Yet in practice—moving beyond the lazy rhetoric of design thinking—it provides clear starting points, a focus on action, a way of building momentum, and the necessary glue to incorporate multiple perspectives.

As a result, we must engage in an active co-design process for programmes and activities, particularly given a systemic approach, working in the gaps between problems, embracing uncertainty, ambiguity, and complexity. This is not planning, design as a form of control, but instead a design culture best delivered through active research and prototyping, in deep collaboration processes with people and place. This is what design processes, when framed correctly, are intrinsically built for.

Avoiding climate breakdown will require cathedral thinking. We must lay the foundations whilst we may not know how exactly to build the ceiling.
—Greta Thunberg, speech to British parliament, 23 April 2019

Equally, design is essentially about decision-making—do we do this, or that, and how and why, to what end?—and given the context of missions, which are societal challenges or crises of both immense scale and a loudly ticking clock, we are aware that we need to foreground decision-making and delivery.

In fact, this is the nature of a crisis. As the writer Jonathan Safran Foer points out, every time we say "crisis", we are also saying "decision". The word crisis essentially means decision-making: from the Latin *crisis*, from Ancient Greek κρίσις *(krísis, "a separating, power of distinguishing, decision, choice, election, judgment, dispute")*, from κρίνω *(krínō, "pick out, choose, decide, judge").*

Embracing people and place

This co-design process, embracing both uncertainty and traditional expertise, is at the core of any contemporary innovation process. This is a profound shift in the sense of agency, in expertise, and in terms of whose knowledge is considered valuable.

In some design disciplines—most notably, interaction and service design, generally in the context of tech—user-centred design has become so thoroughly deployed, and sophisticated, that the necessary critique concerns *what's next?* Indeed, "what's next" is a good question: the individualising approach of the user has not solved broader issues of community or society, non-human life or environment. These are the biggest challenges to orthodox design disciplines now, both of which move it closer to the policy-and-practice context of mission-oriented innovation.

Yet it must be recognised how ubiquitous and well-honed user-centred design has become in the context of tech, and tech's application in the context of public services, even if it is yet to make a similarly necessary dent in other design disciplines like architecture and urban planning. Participation here is used at both 'ends' of the process: user research surfaces ideas for products and services based on deep observation and contextual research, whilst user testing and usage metrics endlessly hone products.

It has taken a long time to get to this point. Nigel Cross, writing in 1972, pointed out then that:

> *professional designers in every field have failed in their assumed responsibility to predict and to design-out the adverse effects of their projects. These harmful side effects can no longer be tolerated and regarded as inevitable if we are to survive the future....There is certainly a need for new approaches to design if we are to arrest the escalating problems of the man-made world and citizen participation in decision making could possibly provide a necessary reorientation.*

Equally, however, user participation also has a history in the context of research and systems development. In the Scandinavian context it dates back to the 1970s, where the Collective Resource Approach was established across Norway, Sweden and Denmark. The goal may have been to increase the value of industrial production, rather than anything more systemic, yet it still placed great emphasis on engaging workers in the development of new systems for the workplace. This included combining the discipline-based expertise of systems researchers with the situated expertise of participants i.e. the workers who would be impacted.

'Open-sourcing the neighbourhood', Saskia Sassen, *Forbes*, Nov10, 2013

Citizen participation is also increasingly embedded in urban planning contexts. It is still usually deployed at the more consultative end of the process—*"How do you like this plan (we've already formed)?"*—rather than upstream at the idea generation phase. It is not yet the case that plans are routinely derived from the articulated or otherwise understood needs of people and place. For Saskia Sassen, local people are the deep experts in their own places—*"While none of them is an urban expert, each has specific knowledge about their place"*—yet this repositioning is still rarely recognised by professional urban planning and design disciplines.

These challenges indicate the next arena for participation: the move beyond human-centred design to the less anthropocentric perspective of place; the move beyond product development into policy development.

In both of these areas, there is a long way to go. Even those government contexts that have absorbed tech-inspired user-centred design practices the most thoroughly, such as the UK's Government Digital Services, a fairly bleak picture can be painted vis-á-vis policy.

> *Policymakers recognise the value of listening to users when developing policy options. This is often done through charities and representative bodies or using the formal public consultation process. And it is usually done once ideas have been formed and evaluated internally. Very few policymakers engage directly with the public. They worry about things like reputational risks, policy sensitivities, and establishing a 'representative sample' of views. In particular, policymakers worry about raising users' expectations that significant change might happen as a result of their engagement.*

'Don't break your silos down – master them', James Johnson, UK Government 'Services in Government' blog, 16 January 2020

Mission-oriented innovation, alongside new imperatives such as the New Bauhaus project for the European Green Deal, provide an opportunity to place far greater emphasis on citizen participation in the context of policy making, particularly those arena that concern the infrastructures of everyday life. This sees participation as a core strategic design capability to be applied fundamentally, deeply and coherently.

Design's contribution

Strategic design, at least according to SITRA's Helsinki Design Lab a decade ago, can be defined like this:

> *Strategic design applies some of the principles of traditional design to "big picture" systemic challenges like health care, education, and climate change. It redefines how problems are approached, identifies opportunities for action, and helps deliver more complete and resilient solutions. Strategic design is about crafting decision-making.*

Helsinki Design Lab, alongside MindLab in Denmark, Laboratorio para la Ciudad in Mexico City, and several other design-led teams emerged around 2010, perhaps in response to both user-centred design- and tech-led innovation practices becoming 'adjacent enough' to government and the public sector more broadly. They immediately helped stretch out the canvas of techniques and cultures around innovation and public purpose. Alongside this, design-led approaches to service delivery within the public sector helped prove its value on the frontline.

Given that backdrop, and this later context of mission-oriented innovation, design brings some key principles and practices to

the table. Although far from a silver bullet, design is increasingly recognised as a key tool in the toolkit. Whilst it still feels as if design is still sitting at 'Base Camp One' in an Everest's worth of organisational and cultural change required in governance, it has taken significant strides, not least least by building on the practices of service design at the front line of public, private and social sectors. The challenge remains how to make design useful 'upstream', alongside other disciplines or types of knowledge that normally occupy, and protectively guard, those heights.

Nonetheless, it's clear that there are some core characteristics of design that are useful in this context, summarised in the adjacent sidebar. Although there are numerous variations on design's particular capabilities, each of these picked out could help drive mission-oriented innovation by shaping and delivering the processes, and their outputs. Taken as a whole, they can be a core component of the engine to discover, design and develop missions.

These core aspects, or capabilities are different to design principles, however. Principles are a more specific set of heuristics that help define precisely how to design activities. Over the following pages, a more in-depth and bespoke set of design principles for mission-oriented innovation is detailed, drawn from Vinnova's experience devising these missions in Sweden alongside existing and emerging design practices elsewhere.

What design does

Integration

Design's diverse research methods discovers and describes the needs and desires of people and place in systemic and synthetic fashion, fusing technology and culture, politics and budget, human and non-human life.

Invention

Design is a practice of cultural imagination. It embraces uncertainty, ambiguity and complexity in order to sketch alternative trajectories, each articulating broader values and ethics, dynamics and aesthetics.

Prototyping

Building models and prototypes to test in public unlocks design as an ongoing social process, managing risk whilst generating insights, and opening up a participative, responsive and iterative approach.

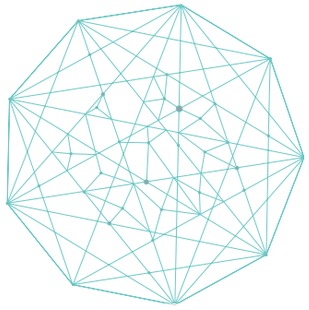
Stewardship

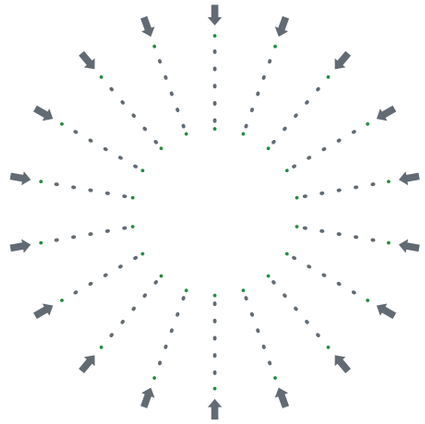
Design as an ongoing process ensures that key ideas maintain their integrity and evolve through learning, as projects emerge in context, positively buffeted by reality.

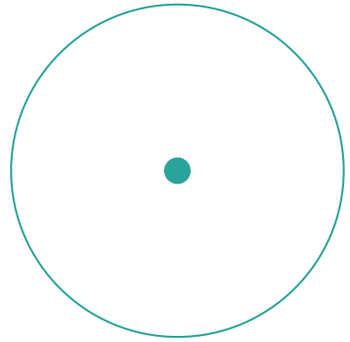
In this optic, a development intervention that wants to bring about change, say, in agricultural systems is better seen as a mechanism that gradually resolves/ explores uncertainties about system dynamics through learning and adaptation and ongoing sense-making, rather than a series of "fixes" to a well identified set of problems. This might reveal that an agricultural system is a symptom of a larger set of dynamics playing out in the economic system thereby opening up a wider set of entry points and policy options to 'play' with.

Milica Begovic, UNDP

Global goals → local action







1

The Global Goals has 169 targets that helps us to identify the problems we need to focus on, organised into 17 higher-level goals. From the very beginning, the UN has clearly communicated that the 17 Global Goals form a fully interconnected agenda. Each affects the other, as all systems are interconnected.

All of the 169 targets interact, directly or indirectly, and form dependencies that cross-over to other goals. This means that we can only reach the Goals with systematic solutions and an interconnected approach. We need to find ways of repeatedly forcing this interconnection onto the agenda, to prevent them falling back into silos of their own.

A draft of this visual narrative was produced for Vinnova by the New Division, the Stockholm-based strategic communication group. It conveys initial thinking about the communication of mission-oriented innovation in Sweden.

2

The interconnectedness means that every issue has an impact on the system of systems as a whole, and that in turn, these systems are influencing every single issue. Irrespective of the way that we happen to be organised, this realisation must guide the way we look at all our challenges: assuming that there are connections everywhere. Finding the connections and understanding their impact is the first step in pursuing mission-oriented innovation.

This implies that there is a translation task to do, in terms of taking Sustainable Development Goals and understanding how their connections are best addressed and realised. The best organising principles for missions may be within the web of connections between the Global Goals, rather than the Goals themselves.

3

An essential part of this process of identification is to involve as many viewpoints as possible. This means a wide array of disciplines and perspectives, with an emphasis on producing not only a diverse outlook with which to analyse and invent, but also a diverse group of actors and participants for addressing mission-oriented innovation, and the goals beyond. These can be thought of as providing different lenses onto→ the challenge.

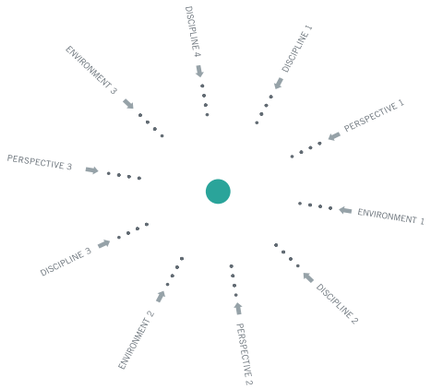
Given this sense of interconnectedness, it is fundamentally important to state that no one discipline ‘owns’ a subject-area, and that disciplines must therefore be brought together into composites, or transdisciplinary approaches. This does not negate the importance of disciplines and expertise; rather, it simply asks how to deploy them properly.

4

This approach enables us to better frame our challenges. By involving diverse perspectives and people, and asking different sets of questions as a result, we can embrace complexity rather than suppress it.

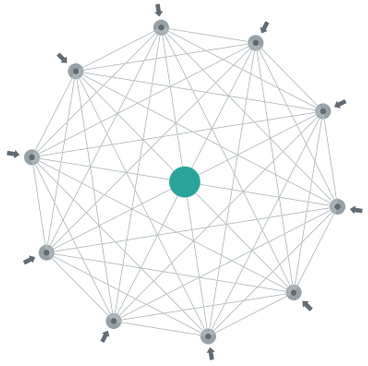
Mission-oriented innovation is organised around ambitious targets. In other words, each mission has a North Star. This provides a clear sense of direction, enabling us to continually align multiple innovation activities via regular compass readings.

For example, a North Star for many missions could be to create the conditions for Healthy sustainable mobility. Another example might be Healthy, sustainable food systems and cultures for all, as part of broader challenges for climate neutral, resilient and just cities, for instance. These example North Stars provide a magnetic ‘pull’ for missions, and their diverse activities.



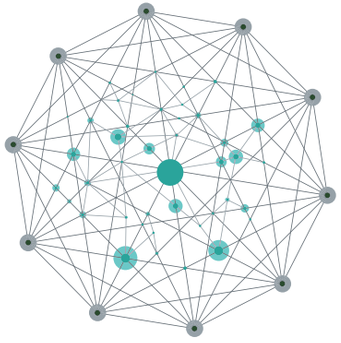
5

Adding multiple perspectives and inviting people from a wide range of disciplines will give us a fuller understanding of systematic context. Equally, assessing systems by locating activities across a range of environments will also reveal points of difference and commonality. A place-based approach reveals context, which is fundamental to framing activity.



6

Activities built on these various perspectives can reveal networks of interactions, common interests, conflicts and opportunities for collaboration. A system of systems starts to reveal itself, around the North Star, with intersections beginning to suggest intervention and connection points, or particular angles on the mission theme.

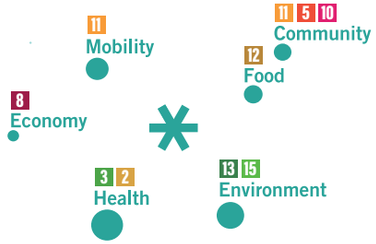


7

In collaboration, we uncover, map and discuss these connections. These are based on synergies, opportunities, and demonstrations of interest and energy from participants, as well as critical infrastructures and institutional relationships. This process of deep collaboration for identifying angles demonstrates an understanding that we can only move the whole system in a desired direction by working together.

8

The interconnection between these issues and opportunities gives us a better picture of the gains to the whole system—as well as some of the crucial dependencies, or possibly negative feedback loops. We understand that the North Star for the mission theme—in this case, *Healthy sustainable mobility*—requires approaching from many angles. Yet equally, that means there are potentially many more benefits in return, which can be mapped back to the Global Goals.

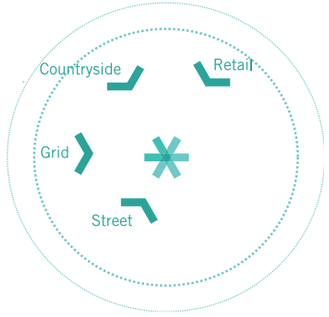


9

These relationships emerge from collaborative work with system actors. They begin to suggest focal points, or angles, onto the challenge at hand. Importantly, they recognise that a systemic approach can produce systemic outcomes. It is worth noting that this may challenge many existing relationships, institutional or otherwise. After all, if this work was straightforward, without resistance, it would have been done already. Yet framing the discussion in terms of shared and positive societal outcomes can help form and nurture these implied relationships.

10

These outcome-oriented angles on the North Star are not innovation activities, however. They suggest some of the systemic outcomes possible given the challenge, and they have been derived from collaborative processes which *embody* systems. Yet they are not systemic portfolios of activities. Contemporary innovation policy looks to produce co-benefits, via integrated activities, developed and delivered systemically. For that, we must translate these possibilities into action. As *places* embody distinct everyday infrastructures and systems, constructed from types and patterns that exist elsewhere too, they can help locate a systemic approach on the ground, in action.

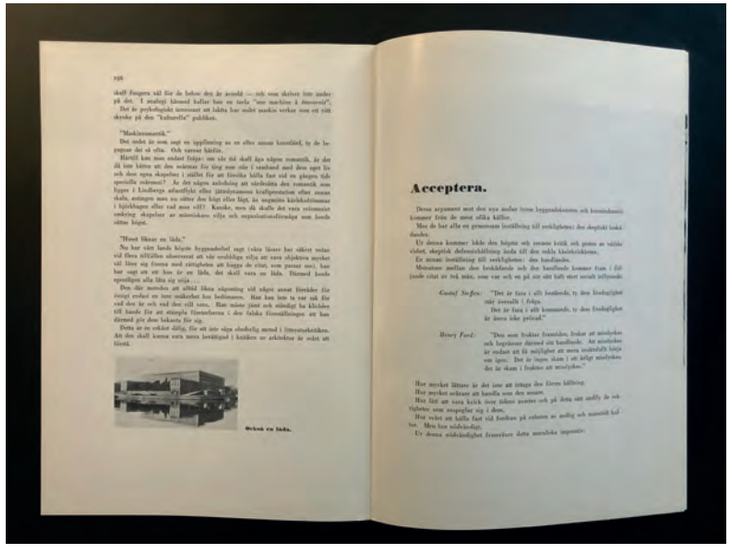


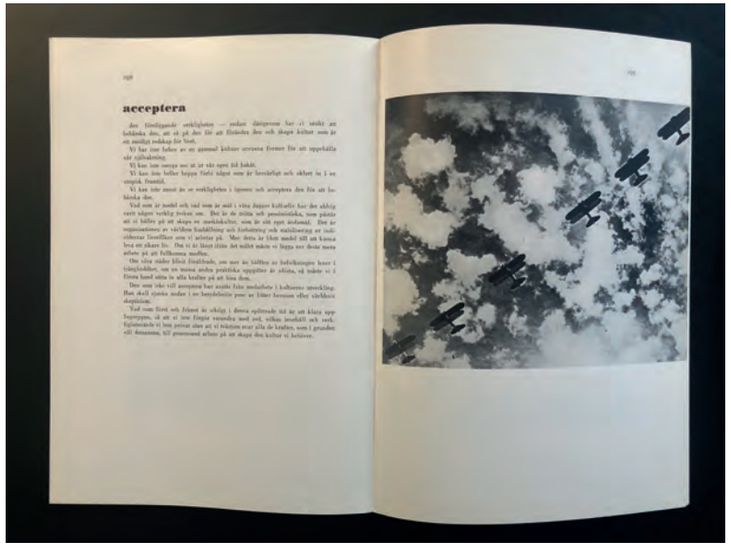
11

A place-based lens makes it possible to locate systemic innovation activities around a North Star. The advantage of these environments is that they each encompass systemic approaches and outcomes. As they are connected, they are not silos; they comprise of everyday systems of systems. This means we drive towards the North Star not via disparate Global Goals, but instead via systemic missions. These deliver multiple outcomes for Global Goals in an integrated way, connected by these place-based typologies.

12

The mission theme's high-level North Star is addressed by a series of more grounded missions, often located around place-based systems of systems. These have been derived from a collaborative design process, comprising multiple perspectives and building networks for delivery. This emphasis on grounding means a rapid route to prototyping, to demonstrators, to participation, to action. Each mission has its own North Star, yet collectively, they cover the territory to address the overall mission theme and grand challenge.





Acceptera (1931) is arguably the founding document of Swedish modernist architecture and urbanism. Accompanying the influential 1930 Stockholm Exhibition (Stockholmsutställningen), *Acceptera* served as a form of manifesto, laying much of the groundwork for the enormous changes in Sweden's patterns of habitation, urbanisation and industrialisation throughout the 20th century.

Very much of its time, its text and imagery captured the progressive spirit of modernity sweeping through Europe. As the name suggests, *Acceptera* urges Sweden to accept this reality, rather than resist it. In doing so, it leads ultimately to Swedish 'missions' *avant-la-lettre*, such as the Miljonprogrammet housing programme of the 1960–70s.

Although 2020's economic and cultural dynamics, technologies and infrastructures, are clearly quite different to those of 1930, we face a similar moment of transformation, perhaps even a more fundamental restructuring, requiring a similar acceptance of an emerging reality. Given this, it is worth recalling the bold spirit of previous political and societal transformations that forged a new Sweden, a century ago.

Acceptera calls upon its readers to accept modernity, as the present and coming reality. It was a direct rejoinder to a risk-averse approach also present in Swedish society. Rather, it exhorts its readers to not shrink back, but to *"Accept the reality at hand—only then do we have the prospect of mastering it, of getting the better of it in order to change it, and of creating a culture that would be a flexible tool for life. We have no need for the out-grown forms of an old culture in order to uphold our self-esteem. We cannot sneak out of our own time from the rear. Neither can we jump over that which is troublesome and unclear into a utopian future. We can do nothing other than look reality in the eyes and accept it in order to master it."*

In this implied synthesis of old and new, *Acceptera* was distinctly different to many other contemporaneous modernist manifestos. Critics Helena Mattsson and Sven-Olov Wallenstein write that, within *Acceptera*, *"modernism was not portrayed to the same extent as a break with tradition, as was the case with the European avant-garde, but rather, as a program to re-connect traditional values to the contemporary development."* As such, there is the precedent of a considered analysis of existing and required capabilities, traditional and emergent cultures. Our new Swedish missions would benefit from a similarly bold and forward-looking sense of ambition and invention, allied to a clear-eyed pragmatism and sensitive reflection on Sweden's existing and possible strengths and capabilities.

Mattsson and Wallenstein assert that *Acceptera's* use of deliberately contradictory standpoints creates an explicit bridge between past and present, as part of an *"overarching political strategy that has become predominant in the whole of Swedish modernity"*. They suggest that this strategy ultimately lies behind Sweden's embrace of modernity.

"If there is an obvious stress on social utility, one should pay just as much attention to the considerable energy spent on making individuals identify with the project of modernization, and, in this sense, the 'compromise' is only a tactical move within a larger strategy. The Swedish model is undoubtedly 'softer' than the European avant-garde, with its more or less utopian visions (as in the case of Hilberseimer)—more pragmatic, as it were—but also much more efficient in the way that it 'gently' intervenes in everyday life and restructures social relations."

Today's approaches must be more participative and inclusive than those implied in *Acceptera*, drawing from a broader, richer toolkit, recognising the hugely increased diversity within contemporary Sweden, and a set of far greater challenges. Yet as our humble mission prototypes also emerge as interventions in everyday life, there may much to draw from this careful and *"gentle"* approach: making clear their social relevance, within a balance of individual and collective.

Design principles

A design-led process incorporates elements from many other perspectives and disciplines, yet it still implies a particular set of practices and dynamics, mixed in a certain way. These are described over the following pages, as a set of guiding systemic design principles and practices. They could provide much of the ‘ground game’ which sits underneath the overall mission-oriented innovation framework. They describe some of the ways that we can devise and develop our North Stars and purposefully move towards them.

As with everything in this playbook, they are presented here in beta mode, and are constantly being refined.

Those are my principles, and if you don't like them... well, I have others.
—Groucho Marx

1 **Grounded**
Use the reality of systems converging in place to hone ideas and interventions, enabling local ownership, adaptation and care.

2 **Tangible**
Locate public-facing interventions in everyday infrastructures, for meaningful shared futures learning from real things in real places.

3 **Upstream**
Address fundamental conditions behind symptoms and sticking plasters in order to unlock richer approaches for holistic value.

4 **Integrated**
As everything is connected, act like it. Develop integrated environments through deep collaboration and diverse synthesis.

5 **Iterative**
Innovation never sleeps. Nothing is ever done. Systems grow like gardens. Enable ongoing iteration, adaptation and learning.

6 **Participative**
Work with people and place, benefiting from rich participation cultures and enabling shared design, ownership, and operation.

7 **Adaptive**
Work with existing infrastructures, whilst continually building new systems to meaningfully adapt to changing circumstances.

8 **Scalable**
Develop platforms, infrastructures and ideas that can replicate and translate to produce systemic change, scaling in diverse fashion.

1 Grounded

Use the reality of systems converging in place to hone ideas and interventions, enabling local ownership, adaptation and care—and keep things complex enough.

As is increasingly well-understood, an emphasis on people-centred development enables technologies to be designed and delivered effectively. This insight is drawn from the last two decades of the tech industry's 'user-centred' appproaches to deploying technology at scale, successful to the extent that these techniques—alongside others—have produced the world's most financially-valued companies.

In 2019, Sweden ranked bottom of the OECD Digital Government Index 2019, whose framework assesses standard aspects like 'digital by design', 'open by default', 'user-driven' and 'proactive'.

Yet although standard practice in tech, and service sectors, these practices are still not well-practiced in government, industry, or the academy. Whilst the value of a strong user-centred approach is driving most of the public sector innovation processes globally, including in Sweden, we cannot say that the balance has shifted appropriately at all. Conway's Law, the adage that an organisation is doomed to design systems that mirror their own structure, is well suited to describing government, which tends not to truly revise its fundamental organisation boundaries and cultures that readily (for sometimes good and obvious reasons; for other times, not). This should change, if we are to face the challenges of the 21st century on their own terms.

Every system is perfectly designed to get the results it gets.
—W. Edwards Deming

But equally, the tech industry's relentless focus on the user has often meant a focus on the individual, a sensibility entirely out of step with both the tradition, and structure, of the Nordic model. A strictly user-centred approach, as generally framed within technology and innovation, has little appreciation for the apparently nebulous space beyond the individual. It does not reflect the Scandinavian balance of both individual self-reliance and simultaneously belonging to wider concepts like community, society, and nation. In *The Nordic Secret*, Lene Rachel Andersen and Tomas Björkman describe this as *Folk-Bildung*:

> *Folk-Bildung as it was developed in the Nordic countries ... has its roots in Romanticism and Idealism, it serves an emancipatory and ego-developing purpose at the the personal level aiming to raise consciousness and conscience, and it has the purpose of shaping a shared consciousness as a people at the collective level.*

Influential within the development of the Nordic nations, *Bildung* is a German term that does not have a direct English translation. As a concept, it refers variously to knowledge acquired through education, transformative civic education, mental development and open-mindedness towards new information, balancing a sense of self-cultivation and literacy within a wider civilisation and culture.

Even with this 'consciousness of collective' on-board, recent commentary notes that even *Folk-Bildung* may need its rather people-centred perspective expanding, towards a form of eco-social or ecological *Bildung*, as SITRA's Vesa-Matti Lahti explains:

> *Eco-social, ecological or post-material values-based Bildung seem like potent antidotes against both the global sustainability crisis and the crisis of democracy, as they highlight ecological sustainability, the meaningfulness of life and the need to expand the spheres of fairness. Noteworthy aspects include future generations, other species and global interdependency.*

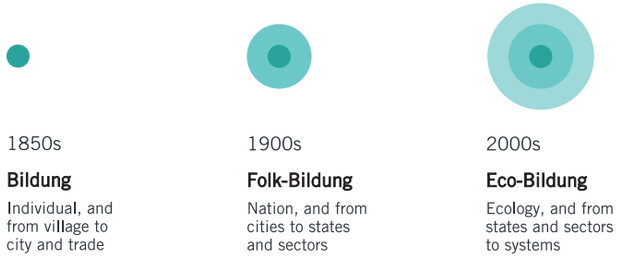
Bildung is what is left when we have forgotten everything that we have learned.
—Ellen Key

Grounding mission-oriented innovation in the Nordic context provides an opportunity to develop this thinking, building on local histories and cultures yet explicitly using a recognition of ecologically-oriented systems thinking to extend that into a global context. This sidesteps the old critiques of nationalism and individualism sometimes associated with *Bildung*.

Such a systems thinking approach can also ensure that problems are not simply exported or displaced, a critique that can be levelled at the Nordic Region as much as anywhere, as per the concept of 'shadow places' by the feminist geographer Val Plumwood.

This reckoning with an advanced Nordic Model, by developing *Folk-Bildung* into an ecological Bildung, also avoids a lazy adoption of even narrower conceptions of user-centred practices, imported from overseas. Similarly, as many have pointed out, the simplistic solutionism of tech may seem attractive to

policymakers looking for a ‘quick fix’, yet is often entirely inappropriate and can be highly damaging. Critics such as Shoshanna Zuboff and Evgeny Morozov have made this abundantly clear.



The evolution of *Bildung* may provide a useful context for necessary changes in perspective. It suggests a way of thinking about systems larger than the individual that are rooted in local history and culture.

Yet these issues are clearly broader than technology and innovation. The uncertainty and ambiguity involved in genuinely addressing complex adaptive systems challenges much orthodoxy about policy-making, innovation practice, and scientific research. Many researchers and practitioners alike are beginning to seriously question the general wisdom in pursuing linear, ‘evidence-based’, a priori models based around randomised control trials (RCTs) or copy-pasted ‘what works’ models, beloved of mainstream economics, research, and policy-making generally.

In the context of decision-making and innovation in public health, with their seams of practice exposed by the COVID-19 pandemic, Trisha Greenhalgh firmly questions whether *”evidence-based medicine’s linear, cause-and-effect reasoning and uncompromising hierarchy of evidence deserve to remain on the pedestal they have enjoyed for the past twenty-five years.”*

The economist Angus Deaton is similarly clear on the limits of orthodox approaches, particularly those drawn from the most branches of economics and development practice most influential in recent decades. He states,

> *Context is always important, and we must adapt our methods to the problem at hand. … ’Finding out what works’ is another common rhetorical slogan that, at least judged by its repetition, is effective among the public. Nothing works except in context, and finding out what works where and under what circumstances is a real scientific endeavour. What works also depends on for whom and for what purpose; what works involves values as well as facts.*

So this focus on people must remain, yet be countered with a firmly place-centred perspective. This forces context. It enables aspects broader than the individual to come into play, whether community or society, shared culture or environment. This opens up a broader question of value, well beyond the self-optimising individual, as well as a way of addressing externalities usually left as ‘somebody else’s problem’ by a user-centred approach. It foregrounds the importance of designing with, and around, humans and nonhumans simultaneously.

This wider, more diverse, richer exploratory approach to places would be a powerful step forward. It would not only go beyond the individualistic user-centred approach but would enable missions to be located firmly in place—in culture, provenance, local identity—whilst also working across multiple places, for aspects of systems that are common. It would locate missions in complex ecosystems, landscapes and natural environments. (It might also enable a richer way of thinking about, or beyond, complex adaptive systems, even addressing critiques of the systems science, such as those of Tega Brain and Anna Lowenhaupt Tsing).

Nothing is real that does not end on the streets.
—Timothy Snyder

Hence the strong focus in the mission design process on ‘front-line actors’, such as local government, small and large businesses, and community-oriented third sector groups, and the environments they are situated within. Unlike much of the typical rhetoric about innovation systems and innovation policy, this means that local government, like municipalities, is far more relevant than national government.

The nation is a visceral experience only when a country is at war; everyday, in peace-time, the city is the reality people feel.
—Job Cohen, ex-mayor of Amsterdam

Little of this is news to designers. Design is at its most effective when wrestling with the reality of real people in real places. Simon Guy's essay in the book *Atlas of the Copenhagens* precisely describes this value, presaging the critique of Greenhalgh and Deaton though in the field of sustainable cities and green buildings rather than healthcare. Guy describes well the context of policymakers desiring *"standardised assessment methods and models" linked to a standardisation of process, outoome and architecture,* meaning that *"particular local conditions and competing forms of local knowledge tend to be ignored."*

In this context, the value of design in working within a far more complex and heterogenous idea of sustainable futures and cultural identity than simplistic, abstract roadmaps and standardised efficiency-oriented models tend to allow for. In Sweden, the desire for the latter may in some part be derived from a historical understanding of the value of consensus. With a diversifying cultural context and a proliferation of possible futures, however, consensus can remain a powerful tool but its process of construction may be quite different.

No theory survives its first contact with reality.
—Graham Harman, Object-oriented Ontology: A new theory of everything (2018)

Producing multiple forms of value from within a tangled web of competing pathways, derived from the rich context of place, can be done by working on the ground. This goes beyond the simple phrase 'bottom-up', often used in disparaging terms within policy-making circles, or simply an empty worthy promise elsewhere. Instead, it recognises a different form of leadership inherited partly from what Guy calls the *"fluidity of design"*, moving through a diverse flexibility of technology, an open awareness of posssibilities, a pragmatic emphasis on particular challenges, and a participative approach to *"building with the community you are building for."*

Guy writes:

> *These local attributes may vary hugely ... For designers this may mean reducing dependency on prepackaged, universalized design solutions and beginning each project with a process of identifying and prioritizing the key challenges to be tackled for the specific time and place.*

Finally, this kind of engagement with the complexities and ambiguities of culture, place, identity and desire can help shift the logic of challenges and strategies, away from the limited framework of efficiency.

This is particularly relevant in the Nordic Region. For all the nation-building capability and effort driving the creation of the modern Nordic countries, and the Nordic Model they stand for, there is no doubt that it has sedimented in place a decision-making culture oriented around efficiency as a goal.

As discussed earlier, regarding Vision Zero and Miljonprogrammet, the ultimately limited range of tools and ideas framing those challenges is based largely on this engineering-mentality focused on efficiency and optimisation under agreed goals. (Most economics could also be framed thus; that the 'goal' of markets is to necessarily produce an efficient optimisation. Hence the interest in *alternatives* to this, whether that of Mazzucato, or of Stephanie Kelton, Kate Raworth, Jayati Ghosh…).

This efficiency drive can of course be productive, in a limited sense. It may produce cost savings but it does not tend to produce resilience, for example. A more holistic approach necessarily requires an equal and opposite force constantly producing questions, ideas, and experiments, explicitly addressing the values underpinning such interventions and mechanisms. This question of values would instantly reveal that there is 'good efficiency' and 'bad efficiency', and that picking them apart requires sophisticated judgement. This is highly situated.

At their best, a meal, or a street, is highly inefficient, and in many ways. And yet in many so-called developed countries, both are primarily operated, managed and governed under efficiency logics. The results can often be witnessed on the plate, or in their streets.

Other disciplines—and design is one of them—have ways of

It is the everyday situations that are important and that shape the major part of our lives and our cities.

dealing with other logics: of desire, identity, invention, cultural production, of values. This is generally addressed best by grounding them in places, ensuring that the richness of their local identities counterbalances the efficiency logics usually framed elsewhere. By wrestling with the reality of a place, we discover when to be efficient, and where to open up to diverse invention.

Problem versus solution versus place

The Mission-oriented Innovation Policy Observatory (MIPO) is an initiative by Copernicus Institute for Sustainable Development, Utrecht University. Assessing Vinnova's approach to mission-oriented innovation, alongside others, they described the possibilty of place-based missions, versus the more traditional formulation of problem-led or solution-led missions:

> *Problem-led missions first focus on understanding the wicked societal problem, making it actionable and getting the different stakeholders to align on the problem definition and mission formulation, before pursuing the development and use of innovative solutions. Many would consider this to be the only 'real' type of missions as they center around a specific societal challenge. Solution-led missions, however, center around a particularly promising solution that has the potential to contribute to overcoming different societal and/or economic problems. Third, place-based missions focus on a specific place, like school food/cafeteria or streets where a range of both problems and solutions come together. By narrowing down the place-based scope, it is possible to maintain the full complexity in terms of problems and solutions.*

This captures the sense of possibility well. By locating missions in places—literally, in specific towns and regions, as well as in place-based archetypes like streets, schools, ports, forests—we can keep things complex; or at least complex enough. It relegates sectors to a supporting role. Whilst sectors really only exist in the imagination of governments, they become manifest in

their organisations and cultures, sliding into silo-based approaches.

Yet these organisations and cultures can be woven together in a place. The place-based approach brings together problems and solutions, yet within a particular context, the true reality of the 'front line'. This maintains, rather than simplifies, genuine complexity. Complex value chains, diverse cultures, assemblages and ecosystems: all can be unpicked from their touchpoints with places, and all can be woven together through prototypes and demonstrators which become tangible and meaningful in places. Even digital systems ultimately happen in places.

The place-based approach collides and collapses all these aspects together productively, as the pull of a real place—with real human and non-human actors—means there can be no hiding in abstract models, white papers and spreadsheets, or distanced funding regimes. This begins to truly augment and develop the role of the innovation agency, as a more engaged actor increasingly focused on collaboration within and between systems, acting as *'the cement between the bricks'*, built together on the ground.

2 Tangible

Locate public-facing interventions in everyday infrastructures, for meaningful shared futures learning from real things in real places.

So this 'front line' in place-based missions is where the complexity of complex systems is both revealed and experienced. A street is a complex system, as is a fresh food market, a school, a housing block. These objects—really, increasingly diverse socio-technical clusters—defy simplistic approaches to organisation, which is partly why our existing governance structures no longer seem to fit them.

Remember, always, that everything you know, and everything everyone knows, is only a model. Get your model out there where it can be viewed. Invite others to challenge your assumptions and add their own.
—Donella Meadows

Put simply, the department for traffic cannot manage streets, as streets are far more than just traffic, just as the department for education cannot solely manage schools, as schools increasingly extend their 'offer' and positioning by acting as broader community assets for things like food waste, sports and leisure, skills sharing and cultural exchange, workshops and studios, life-long learning, civic hubs, or act as key nodes in networks for external services like food or logistics.

Imagine walking through a street, or food market, or local forest, or school playground, and beginning to try to describe what's going on from a systems perspective, revealing all the interactions and connections, from the microbial level up to the level of national governance and international cultural or economic exchange.

It is both impossibly complex, and yet entirely everyday. As citizens, we revel in such environments, and understand them implicitly, yet as governments, we struggle to exert their potential as innovation environments, as agents of systemic change. Equally, particular cultures of refined expertise, such as much scientific academic expertise, can often be too far removed from the complexity of this front line. Yet such experiments at the front line are exactly where such expertise is needed, in terms of enabling delivery.

Such expertise can be honed by engaging with the complexity of such realities. It ought to be a 'win-win' for expertise (this need for experiments is embedded within the meaning of the word).

The word expert has its root in the Latin verb *experiri*, to try. An *expertus* is someone who is experienced, has risked and endured something, is proven and tested. Closely related is the word *experimentum*.
—Robert Grundmann, *The Problem of Expertise in Knowledge Societies* (2017)

We have an opportunity to locate mission-oriented innovation in these everyday complex objects, like streets and schools, factories and forests, not only in order to exert people and place-based design more rigorously, but also to take advantage of the fact that these things already surround us.

By approaching them as a typology—they are everywhere—yet located within particular places and peoples—they are somewhere—we also have a theory of change around scalability. (There are principles for these types, which we call **Layers**→ and **Levers**→).

Making in public also creates a direct and meaningful engagement with culture, with people, enabling a critical mass of participation to be built over time. As tangible experiments grow from **Prototypes**→ to **Demonstrators**→, a positive buy-in to the ideas can also be developed. If it is not a positive set out outcomes, the constantly engaged prototype-led process can be tuned, learning from feedback loops. By making action tangible in this way, projects can move beyond airy ideas or vague hopes, and become vehicles with which to build momentum. With insights delivered from context, such projects are learning vehicles, constantly framed and reframed by outcomes.

Action must therefore be aimed at conducting experiments that are safe to fail and at learning about what works to create change. If the impact of the experiment is positive, we can safely amplify it. If not, we will need to forgo or adjust the experiment. An evolutionary approach would require multiple experiments of small interventions.
—Mieke van der Bijl-Brouwer, Bridget Malcolm, 'Systemic Design Principles in Social Innovation: A Study of Expert Practices and Design Rationales', She Ji: The Journal of Design, Economics, and Innovation, Volume 6, Issue 3, 2020

This mission-oriented innovation process dives directly into this front-line, looking for everyday complex objects—like streets, schools, neighbourhood blocks—in which to make missions tangible and meaningful, as well as suitably complex and scalable.

3 Upstream

Address fundamental conditions behind symptoms and sticking plasters in order to unlock richer approaches for holistic value.

In these sometimes unassuming 'everyday complex' places lies the potential for genuinely transfomative systemic change work. Each could drive a shift from reactive, problem-solving 'downstream' policy contexts to 'upstream' thinking and practice.

This means a shift of emphasis towards creating and nurturing places and communities that intrinsically reduce and avoid harm, rather than reacting when harm happens. This is akin to designing streets that intrinsically are healthy, sustainable, vibrant, open, and diverse in the first place, for example. Or seeing that school food can generate learning, health, culture, and social fabric, and reorienting its budget and practices accordingly. Reframing these systems in this way, we might see that spending money on a public school food is an investment, not a cost.

Dan Heath's book *Upstream* indicates the broader value of prevention rather than cure, in investing in preventing crimes and illnesses which subsequently cost vast amounts to society, in numerous ways.

Heath describes how the $3.5 trillion health care industry, almost a fifth of the North American economy. He writes that

> *"(It is) designed almost exclusively for reaction … It's hard to find someone in the system whose job it is to address the question 'How do we make you healthier?'" Just as, he points out "We spend billions to recover from hurricanes and earthquakes while disaster preparedness work is perpetually starved for resources."*

Globally, only 3-4% of today's health care budget is dedicated to preventive care. Yet 80% of today's health care costs are

used to treat chronic diseases, and Swedish government analysis indicates that 80% of chronic diseases are due to lifestyle and living conditions.

So whilst Sweden's healthcare context is rather different to the USA's in most fundamental respects, it is not so different in this respect. Most of a regional government budget in Sweden is allocated to largely preventable health issues.

More broadly, this funding of the reactive 'hospital end of things', rather a proactive addressing the root cause of why people might end up in hospitals, has been a debate for decades, clearly, and continues to be so. Ever since the American-Israeli medical sociologist Aaron Antonofsky articulated the notion of addressing what causes health and wellbeing (salutogenesis) as opposed to the reasons for disease (pathogenesis) in the 1980s, we have had a 'new way of seeing' at hand. Yet little has been done to truly absorb these principles into the multiple arena it would apply, and thus healthcare, for instance, is still pinned as a downstream practice, rather than upstream. This makes much healthcare inherently unsustainable, perhaps especially in welfare states with ageing populations.

These upstream dynamics include broader public health concerns often positioned outside of the formal healthcare sector, as well as within those sectors whose decisions and actions more obviously produce good or bad health. These include areas like transport, urban planning, employment legislation, architecture, education, food, social services, environment, and so on, yet there are very few areas of government or sectors of industry that have no impact on health.

Yet most of these areas are organised and managed as if this is not the case at all; thus, the traditional healthcare sector has to pick up the pieces 'downstream'. The principle does not simply apply to health—though health can be addressed alongside environment, social fabric, politics, economy, using principles of co-benefits (or even emerging approaches oriented around economies of care).

Essentially, we initiate a project that intends to limit the number of cars in the city – which is fully in line with our company's purpose … We want to be involved in creating the cities of the future and keep them livable.
—Håkan Samuelsson, chief executive of Volvo Cars, press release, January 2021

Vinnova-facilitated missions will explore upstream dynamics instead, wherever possible. Using a place-based prism, rather than a sectoral or traditional government department-led approach, can quickly shift the context towards create stimulating and generative environments that address our climate, health and social justice crises directly and fundamentally.

It is unlikely that upstream practices can be achieved by taking narrow 'silo-based' perspectives (a traffic department looking at traffic, a sustainability consultant counting only carbon emissions) and simplistic tools (like randomised control trials with limited variable sets, or traffic forecast models). In fact, Trisha Greenhalgh suggests that these perspectives are particularly problematic when attempting to address 'upstream' endeavours.

Instead, Greenhalgh describes the value of *"system-level efforts (that) are typically iterative, locally grown, and path-dependent, and they have an established methodology for rapid evaluation and adaptation."*

Upstream wellbeing is local

Stockholm Region is embarking on a mental health and wellbeing strategy, in collaboration with the mission-oriented innovation practices facilitated by Vinnova, that attempts this move upstream.

As we will see, working with a broader network of inputs, ably supported by strategic design work from Dark Matter Labs as well in collaboration with Vinnova, the Region has landed on a place-based approach to unlocking upstream outcomes, grounded and systemic. Section 5 of this Playbook briefly touches on their work, and in particular the delberate cross-overs around streets and schools.

Their analysis outlines why this is necessary.

Stockholm region is witnessing an increase of people with impaired mental well-being. (During 2020, Covid-19 has of course exacerbated this situtation). This pattern is repeated across Sweden, and so the national government is projecting

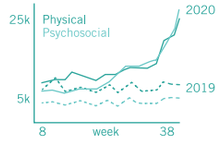
a continued increase in the healthcare budgets. (In fact, this is a continuation of the pattern of healthcare costs per person increasing since 2014). In a welfare state like Sweden, this is ultimately unsustainable.

Yet Swedish research indicates that a focus on a preventative care model, both enabling and investing, could solve this care crisis. This not only has an ethical dimension of ensuring people do not become sick simply due to their living environment—akin to Vision Zero, mentioned earlier—but it also has a strategic component. It shifts both financing and the form of engagement, and the balancing act of the welfare state.

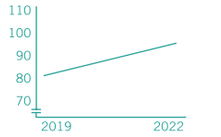
This sidesteps the practice of hand-wringing over health economics at the national Treasury level concerning fiscal policy—in other words, looking to endlessly-increase tax revenue from firms that generate externalities to partly pay for the damage due to those externalities. This would be the wrong form of circular economy.

Instead, a focus on prevention and promotion explicitly recognises that the largest investment is being exerted locally, and that therefore the largest savings—and value generated—must also be exerted locally. So this principle of moving upstream, in the contexts addressed here, are linked to the other principles; of tangible, engaged and grounded activity.

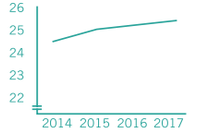
Percentage of Stockholm region inhabitants with impaired mental well-being, 2011-2018



Absence days per 100,000 co-workers due to physical disorders and psychosocial disorders, comparing 2019 and 2020



Health and social care expenses, projected to 2022 (billion SEK)



County healthcare costs per person (thousand SEK)

Percent of healthcare budget dedicated to preventative care

Percent of healthcare costs used to treat chronic diseases

Percent of chronic diseases due to lifestyle and living conditions

4 Integrated

As everything is connected, act like it. Develop integrated environments through deep collaboration and diverse synthesis.

Trisha Greenhalgh's 'upstream' suggestion seems particularly apposite when devising a methodology framed by design cultures. In particular, it enables a format with which we can 'work in the gaps' in-between existing areas of policy responsibility and expertise. Locating that format within place-based approaches forces the agenda further, places being archetypal complex adaptive systems, yet addressable. It necessitates actively engaging with and steering prototypes, and on the ground, or *"down to earth"*, as Bruno Latour would have it.

Greenhalgh uses public heath expert Harry Rutter's example of the walking school bus, in which children are escorted to school in a long 'crocodile', starting at the house of the farthest away and picking up the others on the way. Greenhalgh indicates that viewed narrowly, such potentially viable upstream solutions may rarely produce enough evidence for implementation, never mind scaling.

Yet by being directly involved in prototyping, taking in multi-disciplinary perspectives capable of working in and across gaps, multiple forms of value emerge.

Of course, the ripple effects of the walking bus would reveal further co-benefits, well beyond those derived directly by the children. To take just one angle, the displaced vehicle traffic, which is otherwise implicated in ferrying kids to and from school, reduces carbon emissions, improves air quality, reduces accidents, improves health amongst parents and carers, creates space for other activities, and soon. That displaced space means hat streets and school environments can be greener, climate resilient (more porous, reducing stormwater maintenance costs, and cooler in summer), as well as more open for community *activities such as growing food, physical exercise and recreation, culture, social interaction and politics, and so on.

Randomized controlled trials of ('walking school bus') schemes have rarely demonstrated statistically significant impacts on predefined health-related outcomes. But a more holistic evaluation demonstrates benefits in all kinds of areas: small improvements in body mass index and fitness, but also extended geographies (the children get to know their own neighbourhood better), more positive attitudes toward exercise from parents, parents commenting that children were less tired when they walked to and from school, and children reporting more enjoyment of exercise. Taken together, these marginal gains make the walking school bus an idea worth backing.
—Trisha Greenhalgh, 'Will Evidence-Based Medicine Survive COVID-19?', *Boston Review* (29 May 2020)

So in contrast to the 'evidence-based paradigm', we have a preference for 'down to earth' engagement with context, locality, culture, and complexity. This can only be pursued with care, with genuine engagement, with practice, and with agility and openness to unforeseen outcomes and uncertainty. A context of deep participation generates what muf architects call *"mutual knowledge"*. This is achieved by rolling up our sleeves and going to work in a place, with its people.

There are several dimensions to these integrative, engaged approaches in practice: vertical, horizontal and nested integration.

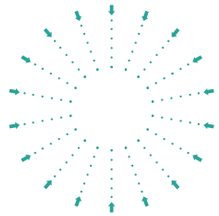
Vertical integration

There are often blunt distinctions between national, regional, and municipal organising levels, particularly within formal governance. The conceptual and behavioural gaps between these organisational entities can be as large as the physical regions they address. Whilst there are many good examples of people and processes working hard to address these gaps, or work within them, this tendency to separate out responsibilities vertically, unrelated to the collapsed realities on the ground, can mean entirely disjointed policies and actions. The value of a design-led grounded approach, articulated through prototypes as rapidly and vividly as possible, allows for vertical integration.

Standing in a street with a group of people, we can point to the fact that we are simultaneously under several levels of jurisdiction, regulation and policy (*"That parking space is governed nationally. That tree is the outcome of a municipal process, yet the tree is a kind of health worker, and the health benefits accrue to regional governments. The bus-stop is regionally governed, yet the bus moves on city roads. And so on ..."*)

There is nothing necessarily incorrect about separating responsibility like this; it just makes it harder to articulate a holistic, systemic approach. At this point, we can question whether the reward of making organisation easier is worth the pain of fragmentation for the environment and those within it.

The process is noisy and involves far more open-ended and contentious meetings than traditional production cycles—and far more dialogue between people versed in different disciplines, with all the translation difficulties that creates.
—Steven Johnson on Apple's parallel production process, in *Where Good Ideas Come From* (2013)



The earlier Global Goals - Local Action narrative unpacks why multiple perspectives are useful not merely to identify and frame the challenges, but also to co-design the interventions, and to understand the holistic value, and values, generated.

All systems are complex systems ... We all, in our attempts to make sense of complexity, draw boundaries around particular problems or areas of exploration to make them meaningful and actionable. But, we should always treat those boundaries with a healthy scepticism. The overemphasis on closure that comes with calling something simple or complicated always leads to an understanding of the problem that underplays the role of the environment.
—Luke Craven, Australian Tax Office

Government agencies tend to verticalize their work, as do many leading urban civic institutions. Bringing these bits of street and neighbourhood knowledge into standard knowledge systems would unsettle such organizations and open them up. Central city government agencies could learn things about the city they simply are not well positioned to access.
—Saskia Sassen, 'Open Sourcing the Neighborhood', *Techonomy* (2013)

These places, services, and experiences are holistic and systemic in essence. Integrating vertically, by drawing together these various layers simultaneously, enables us to address these gaps and disjuncts directly. Innovation thrives in these cracks, as with weeds in a pavement.

Vertical integration could be profoundly generative, in terms of being able to form high-level policy around insights derived from the ground.

Horizontal integration

A different form of integration looks to directly addresses the problem of discipline-based or organisational silos. This is both a well-known problem and a pervasive and fundamental structural and cultural weakness barely addressed by contemporary innovation practice.

It takes time and energy to make enough space to collide with the unexpected, roam around the world, and gain an insider-outsider perspective. Staying in a silo, or just accepting the boundaries we inherit, often appears a lot easier. After all, we live in a world where people are expected to streamline their careers and become specialists.
—Gillian Tett, (2016)

As many have pointed out, the problem of silos is particularly rife within governance and public sector, where a tendency towards ossifying structures around previous successes and power-bases leads to particularly well-constructed silos—just as with Swedish houses, the insulation is well-executed! Sectors are sharply defined with clear functional relationships articulated, as if simply components of a beautifully-made Swiss watch, locking together, each with their own *raison d'etre* and capability.

Yet, to put it simply, sectors do not exist in reality. They are fictions, constructs to make governance easier. Instead, everything is connected, quite fundamentally, as is increasingly clear.

Always design a thing by considering it in its next larger context—a chair in a room, a room in a house, a house in an environment, an environment in a city plan.
—Eliel Saarinen

Strategic design approaches to mission-oriented innovation repeatedly place emphasis on pulling together multiple perspectives, cutting across horizontal silos often defined around discipline, ambit or area of jurisdiction. Working within the Swedish governance model is a constant dance around questions of responsibility, resource and remit, dominated by conversations about which agencies are responsible for what.

The focus on 'system in the room' activities, as well as prototyping, provides a way of drawing together these multiple

threads into more systemic approaches. Ultimately, however, whilst it also has its clear limits, a place-based approach seems the most fruitful in terms of working with systems as they are, providing a powerful organising principle for collapsing silos and faux-sectors.

Nested integration

Finally, integration does not simply concern aligning vertical and horizontal elements, but fusing them together into new formats, new organisations—in effect, building approaches which can mirror desired system relationships rather than existing ones, glueing together system elements into order to produce systemic change.

In strategic design practice, this means producing integrated, synthesised interventions, which can generate multiple co-benefits in order to motivate system change. Inevitably, this can be thought of as 'nested' organisation of elements, recognising that system entities 'sit within' each other, at various levels simultaneously. The Finnish architect Eliel Saarinen's quote suggests the possibility, and the thought and practice required.

This approach to nested system elements, as a Matryoshka Doll-like metaphor, will be described in more detail later, when discussing **Portfolios**→.

1 Government

2 System

3 Sub-systems

Governance is typically organised into national, regional and local entities, each with their own separate remit (1). Mission-oriented innovation enables these entities to be glued together, noting that these are interconnected systems in reality (2). Particular missions are likely to focus on particular connections, prototyped in certain regions and cities (3). Missions, and innovation agencies, provide a platform for prototyping new governance arrangements; in effect, a acting as a 'new shape' of governance, mirroring the systems it concerns. It could be that this new shape provides clues as to better organisation of governance, more closely aligned to our realities.

Integrating ‘invasive species’ into existing systems to better build new systems

Understanding the value of ‘walking buses’

1

An innovation is often only viewed partially through an existing organisation’s lens. As Harry Rutter and Trisha Greenhalgh indicate, if a ‘walking bus’ is only seen through existing prisms, and thus metrics, it only maps onto a few outcomes, and is not understood, or managed, holistically. A walking bus is an intervention within a system built around school buses or cars. It is a kind of invasive species. If it is seen at all by policy, it is not really seen.

2

A systemic design-led, or mission-oriented approach, enables the Integration of multiple new elements alongside existing systems. This enables a more complete view of the true system at hand. The innovation agency’s activities work as a kind of ‘glue’, enabling the walking bus to be understood holistically across multiple silos, by bringing together disparate perspectives. A richer, more usefully complex picture emerges.

Designing for the potential of ‘walking buses’

3

By continuing integration activities, particularly by moving towards System Prototypes and System Demonstrators, ‘the picture’ begins to fill in, closing the gaps by working in-between silos as well as within them. A more complete understanding emerges, of activities, relationships, and outcomes. With a walking bus, its social impact, environmental outcomes and positive displacement on other systems can be tested, developed, and reinforced.

4

In effect, the mission is also a prototype of new governance structures, working in this new ‘shape’. Ultimately, the institutional structure can better mirror and address reality, essentially reforming in the shape of the new systems. We better understand how the walking bus fits alongside school timetable, community groups, buses, cars, vegetation and so on. The remaining coloured boxes denote that the innovation doesn’t stop—there are still questions within these images.

Understanding the impact of e-scooters

1

The e-scooter appeared en masse in Swedish cities in late 2018. It’s a good example of an innovative ‘invasive species’. It was soon highly popular but also caused numerous issues. With no parking protocols, they appeared to litter pavements. Their sustainability credentials were questionable in terms of durability, battery use and mode-switch. Yet they displaced car journeys and provided fun, active, and electric mobility in the city. But how should the formal governance and operational systems and cultures respond? Did they really see this new entrant? Technologies emerge continually; how can we understand their potential for societal outcomes?

2

In fact, these events provided stimulus for some of our mobility-related missions. At Vinnova, a ‘rapid policy lab’ discussion started, and quickly moved externally, engaging actors in the system: Stockholm municipality, Voi scooters, Volvo and Aimo car-sharing, the transport agency, and so on. These exploratory research discussions helped frame and populate **Actors Workshops**→ which could build up a richer picture of how these systems and places interweave, as well as possibilities for intervention. The innovation agency’s role is a kind of glue, filling gaps within the previous system, enabling a more holistic view of this new situation.

Designing for the potential of e-scooters

3

Bringing ‘the system into the room’, as a more diverse range of actors, creates a richer set of possibilities, and a more complete picture. As opposed to randomised control trials against a set of pre-defined outcomes, a portfolio of prototypes provides a more ‘down to earth’ engagement with context, locality, culture, and complexity, allowing open ideas to be tested in-situ. Stockholm-based Voi ran their own experiments which indicated that simple parking structures produce better parking habits; these could be tested in the Street Moves protoype alongside other amenities and everyday infrastructures.

4

The simple open parking solution provided by the Street Moves prototypes (described later) started ‘gathering’ scooters alongside other forms of mobility. But equally, and perhaps more importantly, the Swedish Transport Authority’s involvement in the mission, working with the innovation agency in ‘policy lab’ processes aligned to the prototypes, better informed its policy-making. In this way, these innovations are absorbed into the system, which can take on their integration in a holistic fashion. Innovation questions persist, within this new picture, and can continue to be addressed by the agency on these integrated platforms.

Richer understanding through engagement

Understanding the value of school food

1

A non-systemic view is not only put into sharp relief by ‘invasive species’ like new or emerging technologies. Equally, shifting habits—or habits that may need to shift—can present new challenges. A school in Stockholm moved to a non-meat-based diet due to student pressure. Yet how are the current regulations, from extractor fan procurement to menu design, predicated on previous dietary habits? Once we start researching new habits and perspectives, our views of the systems in reality appear incomplete.

2

A mission-led innovation approach enables the innovation agency to create activities that ‘glue together’ parts of this picture in new ways, enabling the existing system to discuss and develop experimental approaches. With school food, how do we better understand how to involve students in menu design, food growing, preparation and cooking? How might we redesign the school restaurant environment to foreground health and sustainability aspects of food? How might we safely test different forms of new food?

Designing for the potential of school food

3

Over time, as mission-led activities flourish and diversify, a richer portfolio of innovation activities emerges. This ‘fills in’ our understanding of the potential of systems on the ground, through **System Prototypes**→ and then **System Demonstrators**→. These prototypes enable the system actors to converge in new relationships, potentially unlocking a more complete understanding of systems, and what new outcomes they oculd produce if pointed at different **North Stars**→.

4

Ultimately, a new form of school food system emerges, with the potential that it can be governed in new ways by an evolved set of relationships, and that it will be supplied, serviced, and delivered by new or evolving actors, across public, private and third sectors. In that case, school food is seen as a system comprising not simply hygienic cost-effective and efficient delivery at scale, but also producing learning outcomes, mental and physical health outcomes, sustainable food systems, resilient social fabric and so on.

Understanding the value of street retrofits

1

As described later, the street does many things in contemporary Swedish cities, but equally, they have tended towards being oriented around private cars, trucks and municipal vehicles, as well as carrying communications infrastructure, sewers and other service systems. In short, in becoming well-operated engineering systems, they have lost many of the functions and possibilities that streets once produced, and can produce. And so in effect, it is an incomplete picture of what the street is about. As the street is the basic unit of cities, this is a fundamental oversight.

2

Simple interventions, produced in collaboration with care and skill, can begin to suggest different applications in these everyday infrastructures and spaces. Here, the Street Moves and Framtidsgator projects, as part of the Streets mission, produce opportunities for system actors to explore different participation techniques, new circular materials, different traffic flows, health and sustainability outcomes of increased vegetation, impact of convivial spaces, and so on. The picture fills in with new information, produced by new relationships forged through research and prototyping.

Designing for the potential of street retrofits

3

The Streets mission can draw from numerous forms of existing research indicating the potential of retrofitting these environments for new outcomes. Similarly, it can enable the in-situ, grounded design and testing of new technologies and practices, such as the aforementioned e-scooters, or Internet of Things civic sensor boxes, or ‘streets for bees’, or forms of urban meadowing requiring shared maintenance between citizens and city. Those things exist but were not previously being tested and refined in scalable fashion. Filling in the picture not only draws this research into place, pinned to interventions, but starts sketching out new forms of governance; from structures to value models to skillsets and organisational cultures.

4

These prototyping processes are ‘sketches’ emerging from shared processes; they are unlikely to be that threatening to an existing system. A different form of collaborative integrated governance can emerge, effectively forming a new ‘shape’ capable of understanding, capturing and developing a more complete sense of system. The complex system of the street is better mirrored by a more complex system of governance, and yet this complexity is embodied in tangible everyday experience rather than abstract systems models. It affords various forms of scaling, and new research and innovation questions can be deployed easily into these ‘grounded’ innovation platforms.

5 Iterative

Innovation never sleeps. Nothing is ever done. Systems grow like gardens. Enable ongoing iteration, adaptation and learning.

Mission-oriented innovation practices intrinsically concern unpredictable and complex systems, with distributed responsibility and agency. They must intrinsically resist what Marco Steinberg has described as the 'predict-and-plan' approach so out of step with the dynamics of our times. As previously described, long-term roadmaps or prediction or prognosis based policies are highly questionable, given the complex terrain of socio-technical challenges. (This, before 2020's events).

Everybody has a plan until they get punched in the mouth.
—Mike Tyson

So this necessitates quite different approaches to devising, describing and delivering against project direction, funding, duration and mode of delivery.

The balance of embracing unpredictability, whilst moving forward nonetheless, can be achieved by enabling a practice of ongoing engagement and learning, and by deliberately designing-in adaptation. In terms of the dynamic, this means an iterative mode, carefully and deliberately taking small steps which progressively improve prototypes in order to achieve large results over time. This iterative approach can be applied to design and development, to innovative procurement and policymaking, and to delivery and ongoing evolution.

Iterative development is not complex, yet it enables complexity. Precedents can be drawn from any prototyping/testing culture; in essence, iterative development is any ongoing process which is continually improving prototypes in response to testing and other feedback loops. To some extent, as an amateur or folk practice, almost any element of craft has these characteristics. Yet iterative development codifies and formalises the technique as a professional practice.

It is most obvious in digital design or software design methodologies, such as those driving the tech sector, where it is considered a crucial aspect of its success. Well-known

examples include agile methodologies and design sprints. While these methods are now predominantly associated with its software, they spread well outside. They are present in many other design cultures, in industry and commerce but also in more recent policymaking practices. With certain mission precedents in mind, however, it's worth noting its roots even in the space launch industry (NASA's Project Mercury in the 1960s is acknowledged as an early precedent; today, SpaceX have been explicit about their implementation of iterative development methods, drawn from software).

We weren't just going to sit there and analyze something for years and years and years and years to the nth degree. SpaceX was built on 'test, test, test, test, test.' We test as we fly. We always say that every day here, 'Test as you fly.
—David Giger, a SpaceX engineer, quoted in 'What it took for Elon Musk's SpaceX to disrupt Boeing, leapfrog NASA, and become a serious space company', Tim Fernholz, *Quartz*, October 21, 2014

In the context of Vinnova's approach to mission-oriented innovation, these iterative development approaches exemplify the shift from innovation funding agency to innovation agency.

The process of mission formation can be thought of as a series of steps, in response to feedback and testing across various groups. Prototypes are used as early as possible, framing the entire design and development culture. These prototypes are in public as early as possible, and are deliberately designed to enable iteration. In the context of the street mission, prototypes are co-developed with the public and then evaluated with follow-on research, whilst the interventions themselves are produced in materials (hardware and software) which can be adapted, and fine-tuned, based on the captured and evaluated responses.

See later sections for details of prototypes and demonstrators around the food and mobility mission themes.

Open to adjacent possibles

At each point in an iterative and adaptive strategy, alternative scenarios can be assessed. In Steven Johnson's book *Where Do Good Ideas Come From*, Johnson relates biologist Stuart Kauffman's idea of the adjacent possible, the realm of possibilities available at any given moment.

A North Star can hold the outcomes steady, whilst different technical and cultural ideas can come and go, tested against reality. This enables new technologies to be taken advantage of as they emerge and mature, as well as enabling rapid response to political or commercial opportunities. A lightweight and

The strange and beautiful truth about the adjacent possible is that its boundaries grow as you explore those boundaries. Each new combination ushers new combinations into the adjacent possible. Think of it as a house that magically expands with each door you open. You begin in a room with four doors, each leading to a new room that you haven't visited yet. Those four rooms are the adjacent possible. But once you open one of those doors and stroll into that room, three new doors appear, each leading to a brand-new room that you couldn't have reached from your original starting point. Keep opening new doors and eventually you'll have built a palace.
—Steven Johnson, *Where Do Good Ideas Come From: The Natural History of Innovation* (2011)

I make all my decisions on intuition. But then, I must know why I made that decision. I throw a spear into the darkness. That is intuition. Then I must send an army into the darkness to find the spear. That is intellect.
—Ingmar Bergman

If we stop questioning the paradigms, algorithms, and structures that shape our society, we are going to remain stuck with what we already have. We may add the occasional tool to our toolbox, but what we should really be doing is designing new toolboxes.
—Dominic Hofstetter

adaptive design strategy is required—see subsequent principle—but equally important is an engaged and agile ongoing process, which constantly learns in response to feedback. This can be thought of as an adaptive strategy, enabling a continual movement towards a North Star, yet able to flex and pivot based on results from prototypes.

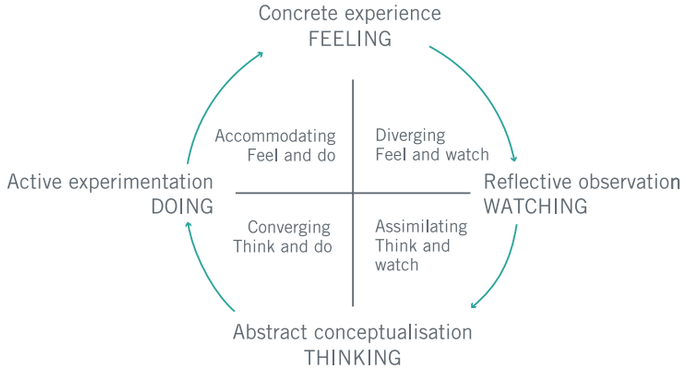
Agility requires a form of organisational fluidity, with teams flexing as required (forms of networked organisation or 'teaming' are relevant, which are relatively unusual in the public sector, even in innovation agencies). This ability to calibrate people to needs necessitates a culture of engaged in-depth learning.

Budgeting must be flexible, capable of moving in response to feedback, thus avoiding falling into a trap of attempting to predict unpredictable outcomes. This could save money as readily as spend it; it is not necessarily a recipe for overspend at all, and potentially quite the opposite, due to its highly engaged, outcome-driven focus.

Finally, learning requires diverse forms of data, constantly produced. This can be done through various evaluation processes, from real-time data gathering via IoT sensors through to qualitative forms of ethnographic assessment. The mission design processes are deliberately set up as learning environments, with ongoing engagement from Vinnova (as opposed to a relatively detached relationship typical of innovation agencies) and governance structures with multiple partners and multiple formats for feedback and discussion. An iterative approach, within an overall arc of activity, enables this balance of rich learning derived from rapid prototype-led activity on the ground with slower, more reflective processes addressing the wider system implications. Without the latter, the approach is too tactical. An iterative process enables both modes.

Exit strategies

Missions are directed by distant outcomes, rather than short-term resource planning. Instead of coordinating activity by specifying project duration or delimiting project funding, missions run until they their goals have been achieved, or been significantly reset or halted. Missions can be seen as ongoing programmes, with continual evaluation and revision alongside constant engagement to enable learning and iteration.



David Kolb's experiential learning cycle has much of the characteristics of an iterative design process constructed around experimentation, experience, engagement and learning. Based on Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development (Vol. 1).* Englewood Cliffs, NJ: Prentice-Hall

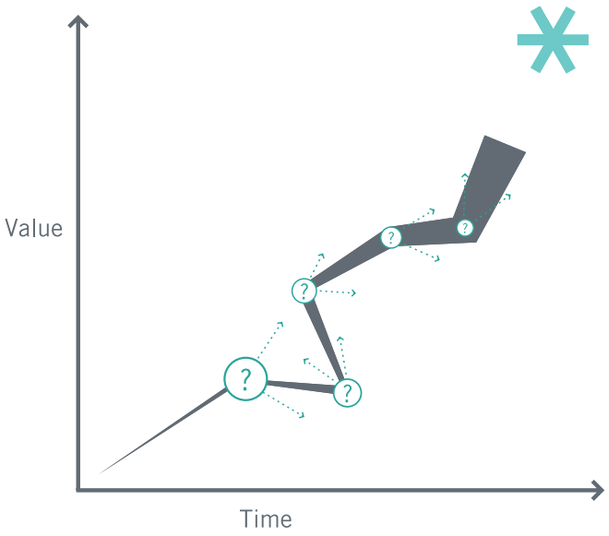
Given an emphasis on building capability and responsibility in existing systems, the innovation agency's engaged role can diminish once a broader system is capable of pursuing the mission outcomes on its own terms. If the agency disengages too early, the mission falls apart. An iterative process enables a continual assessment of system state and performance, and whether it has reconfigured around the form of the mission rather than its previous state. Only at this points should agencies withdraw from this collaboration role, as the 'glue', and shift into learning mode.

Constant attention by a good nurse may be just as important as a major operation by a surgeon.
—Dag Hammarskjöld

Iterative and adaptive together

Mission outcomes, which can be expressed as a clear set of linked statements, act as a steering mechanism or compass for pivot points in the diagram below.

This iterative approach solves a well-understood problem of planning cultures. Traditional planning and policy-making is too static a process for complex adaptive systems. Such an approach is is overly reliant on rational prediction as a belief system, rather than a more responsive approach derived from active engagement, agility and adaptation. The envisioning aspect of planning cultures remains important, particularly when allied with techniques like speculative design. Planning, in this sense, provides powerful visions of the future which help articulate, and motivate for, the outcomes comprising the mission theme North Stars.



An iterative and adaptive strategy moves towards a North Star framed around possible outcomes. An iterative approach enables a series of pivot points, which allows the mission to navigate through complex terrain, as well as taking advantage of new innovations as they occur, or responding to challenges as they happen. It enables different scenarios to be evaluated as the mission develops, at these pivot points, rather than trying to predict eventualities in advance. As the project progresses, and the mission theme's North Star is in sight, the decisions get easier, smaller. Conversely, while the start of the process is low-risk; as it develops, the value produced by the portfolios of projects increases.—Mike Tyson

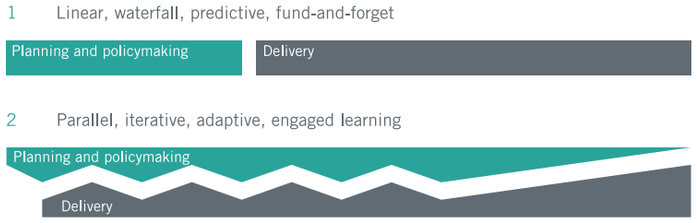
Yet the 'fire-and-forget' dynamic of planning, as usually implemented, can be replaced by the iterative and adaptive approach described above.

Outcomes provide a focus for the iterative steps. Such outcomes are possible to describe at the beginning, in the mission framing, even though they may be revised as learning increases from prototypes and demonstrators. In place-based innovation, out-

comes provide the basis for participation elements taking part in tangible iterations. Ultimately, as outcomes start emerging from tangible interventions, new forms of data-gathering, both qualitative and quantitative 'compass readings', must be developed in order to provide navigation—not as simplistic metrics (the aforementioned 'enpaperment') but feedback loops nonetheless.

Jennifer Pahlka of Code for America suggests that *"a delivery-driven policy process assumes policymakers will get things wrong the first time"*, not unreasonably, and describes the value of iterative, engaged development, aligning policy and delivery. This form of iteration collapses the traditional gap between policy and delivery into a more symbiotic development process, formulating policy positions around insights derived from delivery, a principle common to public sector innovation discussions globally, yet still rare in mainstream practice.

"A delivery-driven policy process ... requires multi-disciplinary teams that include digital and design professionals, with the skills to accurately understand and solve for user needs, alongside policymakers, subject matter experts, and other stakeholders like procurement and compliance professionals. In this model, teams start small and iterate progressively on both the policy and delivery together. They also build instrumented delivery systems that provide near-real-time feedback, creating mechanisms for experimentation that can inform policy development with the knowledge of what's actually working towards the original intent."
—*Delivery-Driven Policy,* Jennifer Pahlka (2019)



These two models provide very different modes of development. The first describes a typical linear model, in which delivery follows policy and planning. Learning, and adaptation, struggles to swim back upstream. The second model allows a more engaged interplay between delivery modes, with policy learning from regular feedback loops.

An iterative approach produces the rich feedback loops that bind together this parallel, rather than linear, production. Given complex systems produce unpredictable outcomes from interacting feedback loops, iterative development may be the only way to realistically structure mission design dynamics.

6 Participative

Work with people and place, benefiting from rich participation cultures and enabling shared design, ownership, and operation

This emphasis on people and place, and on finding the right objects within which to prototype and build, is also a core tenet of participative design, which underscores this mission-oriented innovation process. Just as with user-centred design, participative design has begun to make inroads into practice of government, thanks to decades of work by pioneers. Yet it has still only scratched the surface of the embedded cultures, thanks to many more decades of work moving in the other direction.

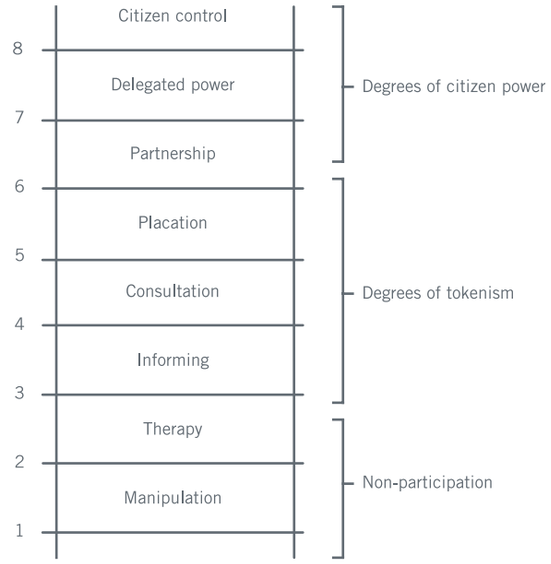
Picking up the specific challenge of Mazzucato's Governing Missions, as well as many innovation practices elsewhere, this mission-oriented innovation process is designed with participation as a core theme.

If democracies cannot build decentralised, distributed capacities for innovation with coordinated mutual learning and recognition of interdependence, then they will struggle to make the complex transitions necessitated by the challenges and opportunities that confront us.
—Indy Johar

Yet we have arranged that participation in a particular way. The process builds in two modes of participation.

Firstly, by co-designing the sketches, initial frames, and starting points of the mission with actors and stakeholders, we build on a Swedish tradition of stakeholder-led engagement and decision-making, which stretches back to the emergence of the contemporary nation, and Nordic model, at the turn of the last century. (See *The Nordic Secret : A European Story of Beauty and Freedom*, by Lene Rachel Andersen and Tomas Björkman, *The Nordic Model* by Mary Hilson, *Scandinavian Stakeholder Thinking*, by Robert Strand, or even *Sweden: The Middle Way*, by Marquis W. Childs, from 1936).

Building the first half of the process around these front-line actors, who are both citizens themselves, of course, and equally, often working as proxies for citizens through the design and delivery of services, means that the missions are co-designed from multiple informed and somewhat representative inputs from the start. This stage generates the initial Angles, the threads to unpick.



Sherry Arnstein's Ladder of Citizen Participation (1969)

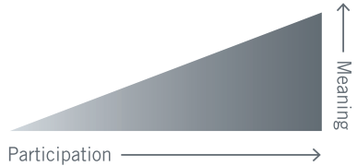
The second part of the design process, however, pushes this practice of participation much further, with the Prototypes stage. This are either tangible, concrete interventions in public, around which provide genuinely meaningful participation from citizens in all guises, or careful field research-led projects predicated on ethnography and other user research techniques.

The former, the public interventions, are articulated as prototypes which can stimulate discussion, debate, and feedback in genuinely meaningful ways. As they are clearly prototypes, they change in response to participation, being shaped over time by interaction with people and place. Ultimately, wherever possible, the mission prototypes are effectively owned by the people they impact upon, this being the deepest form of participation.

Field research runs alongside these practices, providing a deeper investigation of a system or situation led through dialogue, observation, and contextual research. This approach is usually a variation on ethnographic research and user research.

By foregrounding direct and tangible interaction with people and place—learning through doing, thinking through making—we can address many of the possible levels of participation latent within an innovation process.

As a design process progresses, meaningful participation increases, as open systems can be built, owned, cared-for, adapted and directed by citizens themselves.



In this way, the participation model moves from a typical focus on stakeholders and sectors towards a systemic, grounded, and holistic focus on people and place.

Stakeholders are immediately engaged in the mission design process. They collaborate in order to uncover and describe angles, or intervention points, which help frame the early thinking about the mission. Quite quickly, they also identify opportunities for prototypes, around which genuinely meaningful participation can occur.

Effectively the same participation tools can be used with both stakeholders and citizens. In this picture, the stakeholders are the Swedish Prime Minister and Health Minister, assessing a mission-oriented innovation workshop in Kalmar. The tools used—models, sketches, maps, narratives—are common to design processes. They help with the translation from insights and ideas, enablers and blockers into more tangible design work. The same techniques were used subsequently about real places.

Alongside formal municipal citizen feedback processes, informal video interviews can be conducted in-situ at prototypes.

Q. *"Do you like this experiment?"*
A. *"Of course! It's the best. It's the best thing that has happened here. I have lived in the next block for 31 years, and this is the best thing that has happened. I used to drive here, but that was not good. There must be more like this. It's the best."*

Given a place-based approach, genuine participation with citizens can be pursued, in terms of ownership of decision-making about what interventions are, and what they do. This form of participation is arguably the most meaningful, distributing ownership of decision-making to citizens themselves.

Simple tools for meaningful participation are used in the prototype design process. There are several such 'method kits' available, although the Vinnova team created bespoke sets—on paper, and on-screen—capable of being customised to particular contexts. As citizens become more involved in co-designing concrete interventions at prototyping stage, as with these schoolchildren planning the streets outside their schools, design professionals should be employed, but to help facilitate the process.

Prototyping offers a chance for deeper insights. These girls dancing on the stage at the Hälsingegatan prototype had very simple feedback when asked: *"We love it all, but more swings please!"* But the point of participation is also to reveal possible blockers to progress in very clear terms. The other picture shows the Vinnova team talking with a very unhappy local, who was apparently disappointed with any such sustainability measures emerging in the city—although when asked, he also admitted he appreciated the wooden seating in the 'boardwalk' prototype. The prototype offers a space for contestation—for dialogue—as well as technical innovation. It works to provoke discussion as well as behaviour.

Meaningful participation

Stakeholders and sectors → People and places

Stakeholder participation

The first parts of the understanding process are built around the involved participation of diverse groups of front-line ‘actors’. We are looking for people that are responsible for the ‘touchpoints’ that comprise the infrastructure of everyday life in Sweden: the design and delivery of services, products, systems, places.

In this, they work as proxies for end-users or citizens, as well as places—at least to some extent. They are also people too, of course! Their personal insights are also encouraged, and examined. They can be stakeholders, which builds on a long and powerful Swedish tradition of stakeholder engagement.

This focus brings in a people- and place-based perspective from the start. It means the discussion is immediately tangible. It builds an

understanding of systems, and lays the ground-work for further mission co-design. It includes public, private and third sector representatives, who are engaged across multiple formats. Citizens as such, outside of stakeholders, tend not to be involved directly at this stage, as systems can be vague, intangible, and abstract. They come next.

The task at this point is to identify ‘angles’ within a broad canvas of issues and activities regarding the mission theme. These are akin to leverage points or acupuncture points—but essentially they are ‘clues’ for further enquiry. They are initial threads to be pulled on, and potentially woven together, by the next stages of the design process.

Citizen participation

Citizens are directly involved as concepts become concrete enough to drive meaningful insights. At that point, participation includes purposefully creating systems and places with heavy involvement, direction, and even ownership by citizens.

Although citizens, rather than formal stakeholders per se, can join early actors sessions around Mission design, the Prototyping stage sees the most involved and valuable form of *participation during design. These prototypes are tangible interventions in public, attracting genuine participation from citizens in all guises. Public interventions stimulate discussion, debate, and feedback to directly shape what innovation happens and how, in ways which make clear the connection to everyday life.

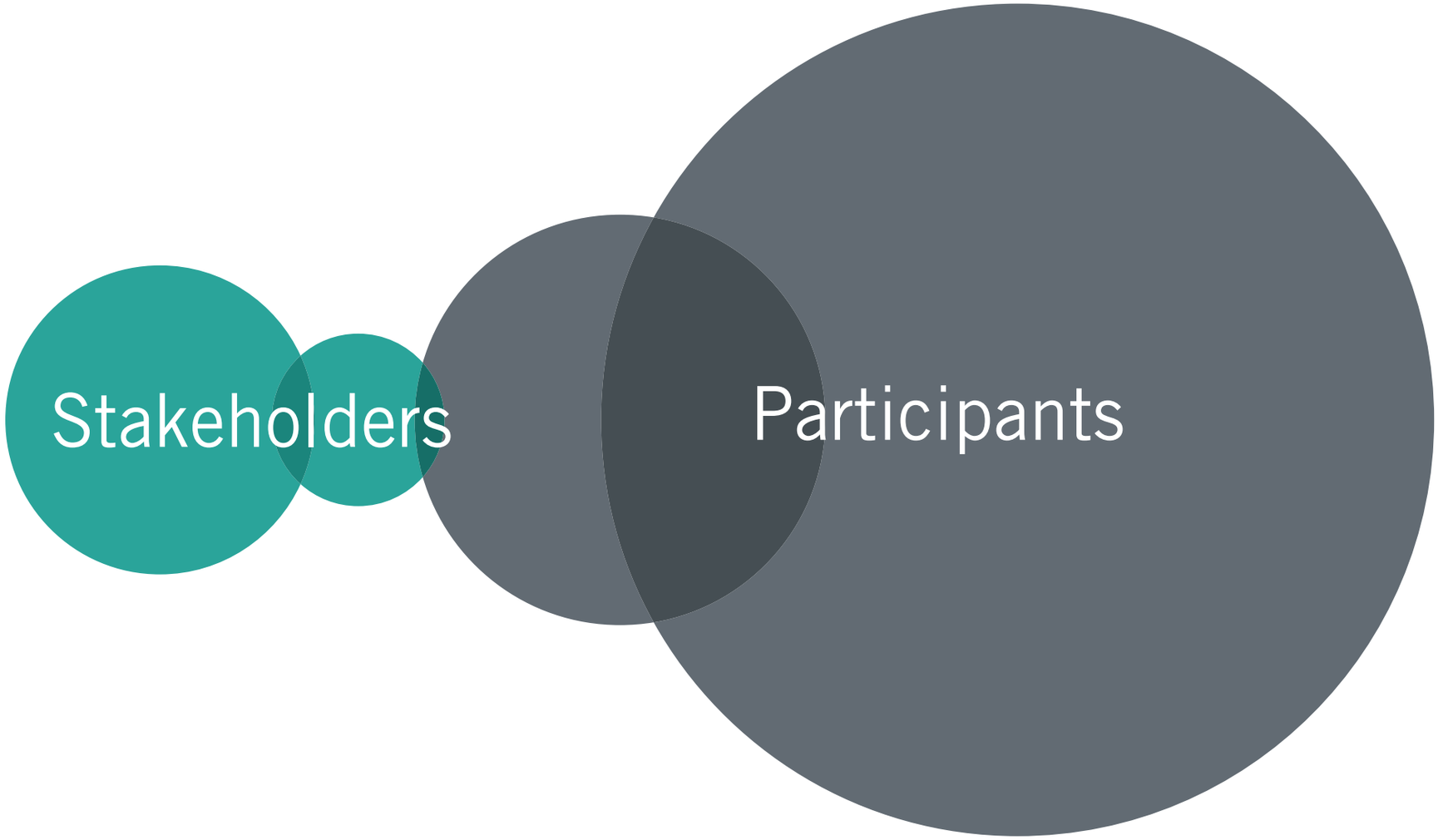
As these interventions are clearly prototypes they can demonstrate change in response to participation, in turn stimulating further engagement. They are shaped over time by interaction with people and place. A place-based approach allows decision-making to be owned by citizens, in conjunction with local institutions such as municipalities.

Design research, a deeper investigation of a system or situation led through dialogue, ethnography, and contextual research, sits alongside. By foregrounding direct and tangible interaction with people and place—learning through doing, thinking through making—we can address many of the possible levels of participation latent within an innovation process.

Angles → Action

Stakeholders → People

Sectors → Places



Dynamic shifts from stakeholders
to participants.

7 Adaptive

Work with existing infrastructures, whilst continually building new systems to meaningfully adapt to changing circumstances.

Follow the money—but spend it strategically

A strategic design approach places great emphasis on framing questions before assuming answers, or jumping to solutions. From the outside, this can look like weeks, and sometimes months, of work, comprising exhaustive collaborative processes, open-ended discussions, constant pin-ups and sketching of scenarios, contexts, relationships, systems maps.

And this is true! But one of design's values lies in spending time up-front in order to save it later, by producing more considered contexts and outcomes which can have the qualities of being resilient, cost-effective, engaged, organised, meaningful—and valuable in numerous ways.

In particular, with systemic change in mind, an engaged, participative and often place-based design process can identify significant existing resources within a particular, which could be adapted to produce system transformation. These are resources within the system, embedded in existing organisations and their practices.

'Free school meals cost: How much is 'free school meals' campaign worth?', *Daily Express*, 23 October 2020

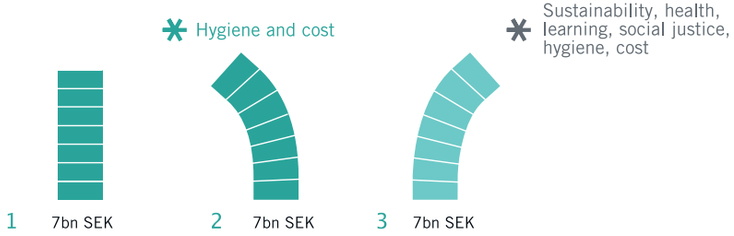
For example, in the context of school food, a Vinnova mission theme, Sweden spends approximately seven billion SEK per year on school food. Although rarely stated explicitly, this resource is 'pointed at' outcomes like hygiene and cost. Elsewhere, free school food might be described as a cost in the system; yet what if it was considered an investment in a system?

With some work, perhaps this existing investment could be 'pointed at' new outcomes—learning, sustainability, resilience, public health—in addition to hygiene? Given that achieving such outcomes could involve folding food into the curriculum, engaging kids in menu design, cooking and serving food differently, it could be a case of retrofitting new activities into an existing system. Sweden already has school cooks, chef training schools,

relatively well-equipped school kitchens and schools, and so on—fortunately, the country does not have to throw an existing system away and build a new one from scratch.

Beginning to produce system change could imply training chefs differently in those schools, devising a new curriculum, changing the timetable. Although new practices always cost something, this is not an expensive process (in fact, it may save money, though it is not necessarily wise to start system change with that objective). Again, 'the system' is already in place: what if it could be pointed at different North Stars?

Experts in development studies talk about 'bending the curve' of the nutrition transition, meaning changing its direction to a healthier pattern of eating. In an ideal world, we would be able to enjoy the convenience, variety and pleasure of modern food without the chronic illness that so often seems to be its corollary. Can the curve be bent away from junk food and towards vegetables?
—Bee Wilson, *The Way We Eat Now* (2019)



1 Sweden spends approximately seven billion Swedish crowns per year on school food. This investment has a direction, but what is it?

2 The impact of the school food mission is to move direction. Before, the school food system is pointed at outcomes like hygiene, cost and universal availability.

3 After the mission, the existing school food investment, and system, is pointed at outcomes like sustainability, health, learning, justice, as well as hygiene

The same principles, of course, applies to streets, another mission that emerged from the Vinnova-facilitated mission design process. Sweden already has 40,000 kilometres of streets in place; the goal can be to run new applications on the existing hardware, metaphorically speaking. It need not be to build all these streets all over again. An adaptive approach sees the street as a form of **Lever**→, which can be pulled in a different direction to produce different systemic outcomes.

In fact, adding 'new money' can often leave an existing system untouched yet still in place. There is a logic to building

new systems which circumvent existing ones—Buckminster Fuller famously said "You never change things by fighting the existing reality. To change something, build a new model that makes the existing model obsolete". This sensibility appears to drive much of the contemporary 'move fast and break things' tech start-up logic.

Yet clearly such an approach can also simply make things worse, by simply adding 'more' to a complex system without addressing its existing context and content. In taking the easy path around installed infrastructures, this dynamic misses the opportunity, and even responsibility, to work with existing cultures, existing resources, existing budgets. It can be highly destructive.

Throughout the 20th century, cities frequently laid waste to historic cores, orienting such spaces around transport—the centre of Stockholm around Sergels torg is a good example—just as their suburbs often had freeways driven through them. This produced value in the short-term, for some. Yet the sheer non-adaptive weight and sunk costs of these increasingly 'stranded assets', as well as their social and environmental impact, has proved hugely problematic in the longer term.

Such processes neglect to ask deeper questions about places and their needs and desires, just as they fail to build more lightweight adaptive processes which could more subtly change direction as cultures and technologies change.

Unlocking and adapting existing systems could enable core budgets within existing systems—such as school food or municipal budgets generally—to be seen as innovation budgets. Whilst challenging, this adaptation of existing systems, and their budgets, increases innovation funding by orders of magnitude.

Retrofit as an innovation principle

Much of Sweden has been built. The 20th century was a story of building anew, pouring concrete to conjure new towns and cities as a way out of poverty, creating a hugely effective welfare state model and an impressive array of institutional infrastructure to deliver it, or building hugely successful industries, albeit largely based on extraction and consumption.

Now, our towns and cities do not need building, but unbuilding, re-working. (For many European countries, 80 per cent of the buildings of 2050 have already been built, and

around 97 per cent of these existing European buildings will need to be renovated). We are surrounded by these buildings, systems, and infrastructures, home to both embodied carbon and embedded histories. Our public sector needs different capabilities, new dynamics of design, evaluation and delivery. It too needs a retrofit. And even given the recent shift to sustainable industry, in which Sweden is clearly recognised as a leader, our industries need taking apart for a zero carbon world, adapting them whilst the factories are still running.

A design dynamic attuned to these problems requires a quite different sensibility to building. It implies a refining in place, understanding repair and retrofit cultures, developing new logics predicated on care and maintenance, on participation with diverse cultures and behaviours, and on building anew only where necessary and desirable. It means circular practices that produce net positive social and environmental outcomes. It means deep, ongoing engagement from within communities and their civic and cultural context. It means new missions that 'crowd in' start-ups alongside community groups, industrial players and municipalities, the various pasts and futures of a place, culture and its economy combined.

And fundamentally, quite unlike the robust, inflexible structures of an earlier age, it means purposefully designing and building lightweight systems, physical and otherwise, that can adapt, evolving iteratively in response to rich insights from feedback loops.

Prototyping in design is therefore not just about testing ideas for interventions—it also helps reframe the problem. This integration of prototyping and framing practices in design offers opportunities for design to contribute to evolutionary practices ... the evolutionary approach asks for continuous in- novation, beyond individual projects, to align current activities continuously with a future vision; it requires working with a portfolio of problem frames and systemic interventions, rather than converging on a single problem.
—Mieke van der Bijl-Brouwer, Bridget Malcolm, 'Systemic Design Principles in Social Innovation: A Study of Expert Practices and Design Rationales', *She Ji: The Journal of Design, Economics, and Innovation*, Volume 6, Issue 3, 2020

8 Scalable

Develop platforms, infrastructures and ideas that can replicate and translate to produce systemic change, scaling in diverse fashion.

Forms of scaling

For example, *Blitzscaling*, Reid Hoffman and Chris Yeh (2020)

For such a fundamental concept and activity, scaling is often used rather casually. In fact, there are very particular forms of scaling that exert almost hegemonic power, often associated with the highly limited context of the tech sector. With mission-oriented innovation in mind, and its necessary focus on systemic and societal outcomes, we will need a more open discussion of scaling.

The EU Horizon 2020 research project REINVENT describe the phenomena of scale and scaling, particularly as they relate to decarbonisation transformations. Their work suggests a diverse 'toolbox for scaling', in which a range of tools provides a set of capabilities and forms of scaling. Following this, we use this backdrop for our thinking around scaling, rather than a rigid model.

Scaling as a concept in innovations—for decarbonisation, in this particular study, but plausibly also for transformations of other types—turns out to be far more contested than might be assumed at first. The use of multiple theoretical perspectives for the analysis of any one case study, and the taking of a hybrid 'toolbox' approach rather than the rigid dogmatism of "frameworks", offer the possibility of broadening understandings of transformation dynamics.
—*Scaling theories of change in REINVENT case studies*, Fredric Bauer, Harriet Bulkeley, Karin Ericsson et al, 2 July 2020

Platforms and protocols, stacks and systems

Whilst the combination of the principles described previously—*Iterative*, *Adaptive*, *Grounded*, *Tangible* etc.—can enable meaningful delivery or reorientation of complex systems in a particular place or context, they do not necessarily enable elements to scale. Scaling innovation projects remains a challenge.

The Swedish innovation system is no different to others, in this sense. A common critique is that its pilot projects don't scale or replicate, or that experiments flare into life and then fade (the Swedish word *tomtebloss*, meaning 'sparkler' firework, is often overheard here).

Yet with systemic change in mind, we are intrinsically concerned with scaling, and building on prominent contemporary

thinking around 'platforms and stacks' enables a set of structures for scale. In our work, we are comfortable with drawing from examples of scaled software and hardware ecosystems, yet re-orienting them for a mission-oriented innovation context. Unhooking these platform strategies from the limited context of 'Silicon Valley'-based tech innovation is imperative, given that the context of our missions is oriented around societal outcomes and systemic change in a Nordic country.

Yet a **Platform→** strategy, which will be detailed and articulated later, gives a clear sense of how we might balance specific interventions in a place—a very particular context involves aspects not to be replicated or scale—alongside developing the more general characteristics that can be shared across a broader system—aspects which not only *can* be scaled, but may even *benefit* from being shared, co-developed and codified into institutional logics.

A simple **Platform→** strategy consists of a set of diverse application, customised to specific needs, which sit on top of a set of generalised system layers, which enable sharing and scaling.

If that broad benefit returns to the particular instance without reducing its local difference or diversity, this produces a form of network effect in reverse, a bi-directional movement of knowledge and value. The Platform approach suggests a way of pulling apart different aspects of the system—code, protocols, policies, laws, cultures—to enable system-wide scale balanced by a highly participative approach 'on the ground'.

Articulating and managing this interplay between specific and general, micro and macro, zooming back and forth, may be key to enabling both broad-scale system change and grounded, adopted and adapted local interventions. Lest this platform strategy appear too neat, local emphasis also means a way of surfacing a 'messiness', creatively complicating this idea of cleanly separated system layers for scaling. The REINVENT project recognises this *"messiness of scales … (resulting) in a greater assumption of interrelationship and interaction: what happens at one scale affects other scales."* There is clear analogy here with systemic design principles, in which all aspects are interconnected.

It may be that the place-based approach taken by Vinnova

A largely unquestioned conflation of "scaling" with "change" obscures important aspects of transformation processes.
—Scaling theories of change in REINVENT case studies, Fredric Bauer, Harriet Bulkeley, Karin Ericsson et al, 2 July 2020

is a way of combining the various theories of change that REINVENT researchers describe: Multi-Level Perspective (MLP), Multi-Level Governance (MLG), Material Politics and Cultural Politics. Repeatedly focusing on places—including directly engaging with its material and cultural characteristics—provide an environment which is quite different to a national innovation agency's usual ambit. For the agency, the concepts of 'niche and regime actors' are typical to transition-influenced theories of change, which also have useful frameworks:

> *"The ways in which innovations emerging from a niche (micro) can be scaled up from the city (regime/meso) to the national (landscape/macro) level (i.e. "vertical" scaling)."*

In design practice, scale is not simply a movement of a system but a way of looking at a system. Looking at a system through the lens of scale opens up new questions, different relationships. Whilst its emphasis may be on the nested integration described earlier, the maxim of the Finnish architect Eliel Saarinen (*"Always design a chair in a room..."*) also provides a sense of transition up and down through the scales, a zooming of perspective from door handle to city plan, person to clan, pixel to platform. Jamer Hunt's book *Not to scale* (2020) explores this practice in detail.

In designing prototypes within this process, there is early evidence of understanding system-wide scaling dimensions (parking space law, mobility data protocols, school kitchen procurement guidelines) and specific local interventions (Helsingborg pursuing the question of car-sharing whilst Gothenburg looks at high street resilience and Umeå considers both in the context of their relatively colder climate). A consistent system is already deployed in three or four cities at time of writing, rather than just one, by virtue of using these dynamics of grounded local prototypes yet with national agencies fully engaged.

Scaling via retrofit

Another aspect of scaling being deployed here concerns an approach to identifying what we call **Layers**→ and **Levers**→ in the existing systems, wherever possible.

As noted previously, this means identifying 'types' of environment or system elements which already exist within broader systems, and which could be sites for transformation, via various methods. This balances specific instances, or instantiations of systems, in place with an understanding that there are shared elements—by virtue of being a type. A street market in Malmö can be quite different to one in Umeå, never mind Mexico City,

yet they are all street markets at some level. Scaling via tangible, grounded prototypes and demonstrators involves repeatedly asking questions: *What is specific (and should not scale)? What can be generalised (and should)?*

Importantly, in a country like Sweden many of these systems have already been constructed, at least in terms of important system layers. The streets the country needs have largely been built; there are some 40,000 kilometres of them. Yet that hardware is now running the wrong 'applications' for 21st century challenges.

Yet changing these applications does not require building entirely new streets. Scaling can be achieved by reworking these existing infrastructures, once a different paradigm has been overlaid onto the system, as the streets have already been scaled (as have elements within them, like parking spaces). Scaling here is achieved by exploiting this pre-scaled system, exerting the lightweight layers of activity and life that sit on top of them.

Similarly, a nationwide network of schools, kitchens and support systems have been built. Producing different food outcomes from them must not mean knocking down these schools and rebuilding. Instead, it could be achieved by redesigning menus, changing discussions, modifying school cook training curricula, tweaking governance arrangements, and so on. To some extent, if capabilities and capacities can be developed by experimental prototypes, these new practices can be performed within the existing pre-scaled networks and infrastructures.

The authors of the REINVENT paper describe this approach to scaling as 'rescaling' rather than 'upscaling'. Crucially, this emphasis on re-scaling applied to retrofit recognises the value, in terms of scaling, of working with existing infrastructures. Cities can take on these prototypes as they belong to them in the first place. The streets and kitchens are their domain, and often pre-scaled. A sharp approach to system change involves switching their use, using public sector innovation methods to rework from within.

Typologies are core to design practice, enabling a way of thinking about general characteristics of a thing—a market, an app, a chair, a library—at some level, whilst also understanding that they are highly specific at another. Governance tends not to use this concept well, focusing instead on sectors (which don't exist in reality; we simply have diverse systems interacting with places) or places (which does not enable learning from one place to another, at the level of the type). The 'place-based types' approach here, focusing on grounded prototypes in places, enables scaling via transferable learning across types—i.e. streets, schools, parks, shops etc.

These are all Swedish houses. As types, they are the same at some levels. As specific things or places, they are, of course, entirely different too. Balancing this interplay between specific and general enables us to understand what can and should scale, and how, and what can not or should not.

Upscaling, the dominant understanding in hierarchical theories, tends to focus on temporal processes in which scaling is seen as an end in itself, while rescaling, which is more important in relative theories, tends to focus more on spatial and material conditions of already-ongoing change in which scaling is seen as one means (among many) to a broader strategic end.
—*Scaling theories of change in REINVENT case studies*, Fredric Bauer, Harriet Bulkeley, Karin Ericsson et al, 2 July 2020

As noted earlier, in this way existing budgets can come into play for scaling, instead of innovation agency budgets and actions being seen as the sole engine for change. The agency budget can initiate, working as kindling to start the fire, yet at some point the true innovation is in absorbing into transformed practices, building new capability and capacity as a result.

This places a powerful test on the innovation itself: if the interventions prove to be of value, or indicate that they are developing value, then that value can be redeployed to cover the cost scaling the innovation. This is scaling based on new conceptions of value, a perspective which brings together many of the principles here (upstream, as well as adaptive, iterative, tangible, participative and so on).

Snowball scaling

In complex systems – including human societies – tipping points can occur, in which a small perturbation transforms a system. Crucially, activating one tipping point can increase the likelihood of triggering another at a larger scale, and so on ... Whilst many factors – social, cultural, technological, economic and political – can influence a transition, policy can make a critical difference by redirecting support from incumbents to disruptors. From a policymaker's perspective, an upward-scaling tipping cascade offers the maximum possible 'bang for your buck'... The opportunity to activate upward-scaling tipping cascades will be missed if the value of decarbonisation policies is judged only on their immediate effects.
—Sharpe, S. and Lenton, T. (2020). 'Upward-scaling tipping cascades to meet climate goals: Plausible grounds for hope'. UCL Institute for Innovation and Public Purpose, Working Paper Series (IIPP WP 2020-07)

There is a further key to scaling, based on channelling the energy produced by the interaction of 'bottom-up' and 'top-down' processes. The former generates invention, insights, meaningful ownership and sets up paradigm change, yet cannot change the law, re-organise governance, or build large-scale infrastructures. Yet the latter tends not to easily produce diverse outcomes or new behaviours, to take risks or move rapidly.

So scaling in this sense describes how a mission that begins by aligning a flotilla of small, located prototypes can build over time to become a national-scale mission. These dynamics mean that missions are endorsed by national and political structures, consolidating the invention, diversity and legitimacy produced by participative movements, and thus based on meaningful evidence. Political capital is built over time, based on feedback loops from prototypes and demonstrators, with the mission growing as if a snowball rolling down a hill.

For our process, missions do not start with the Prime Minister; at least directly. (Indirectly, of course, the government has given Vinnova the responsibility for ensuring the Swedish innovation system is fit for purpose and delivers, and thus coordinating mission-oriented innovation falls into that remit).

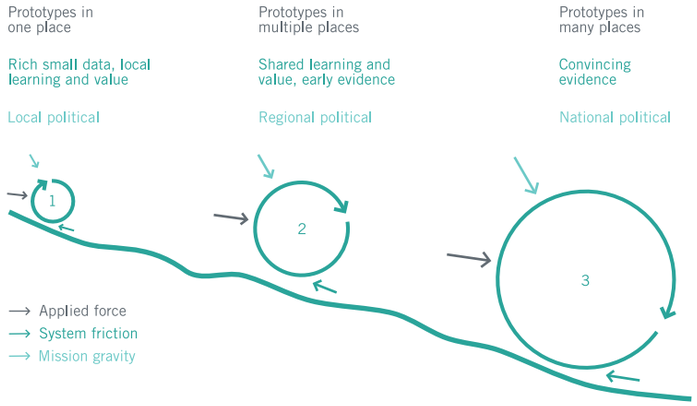
Instead, mission themes are drawn from politically-endorsed agreements, such as UN Sustainable Development Goals, for example, or the Paris climate accord, or previously-agreed national targets and strategies. These targets provide direction, and can be used, given Sweden is a representative democracy, as mutually agreed agenda, forming a kind of 'top cover' to produce action on the ground. The job is now to deliver, and everywhere, at scale and with speed: as agreed. This allows for a diverse array of rapid and agile experiments to rapidly create new evidence, whilst building momentum over time. A groundswell of action and evidence produces a far more convincing message for politicians to stand behind, as well as a tested playbook of interventions to commit to.

In an unstable complex system, small islands of coherence have the potential to change the whole system.
—Ilya Prigogine

Just as Donella Meadows points out that leverage points in systems cannot be identified in advance, influential evidence cannot be produced beforehand either. Instead, we have the logic of prototype-then-policy, with broad legitimacy and firm political will generated via bottom-up movements at scale, rather than a 'JFK-style' starters-gun. That endorsement follows once necessary investments, regulatory and governance changes have been demonstrated.

A small shift in one thing can produce big changes in everything.
—Donella Meadows

Snowball dynamics



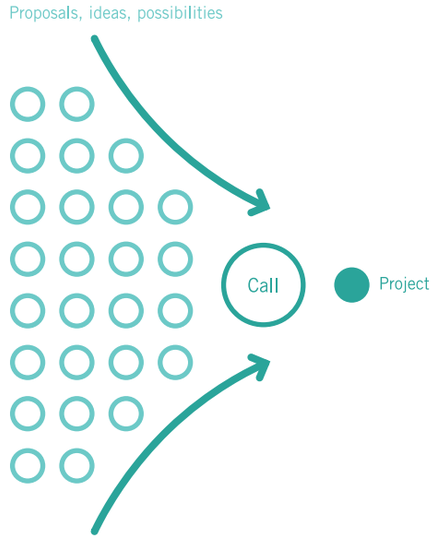
The Snowball approach starts with a small portfolio of experiments, which combine to quickly form prototypes of new practices and technologies. These immediately start to produce new evidence of action, impact and sentiment.

As momentum builds, resistance to change—a 'friction' in the system—is easier to overcome, and the mission begins to produce its own 'gravity', reinforced by public demonstrations and discourse. The friction of activity is actually producing insights and learning, informing the prototyping. The Platform strategies enable scaling to multiple places, building further evidence and insights.

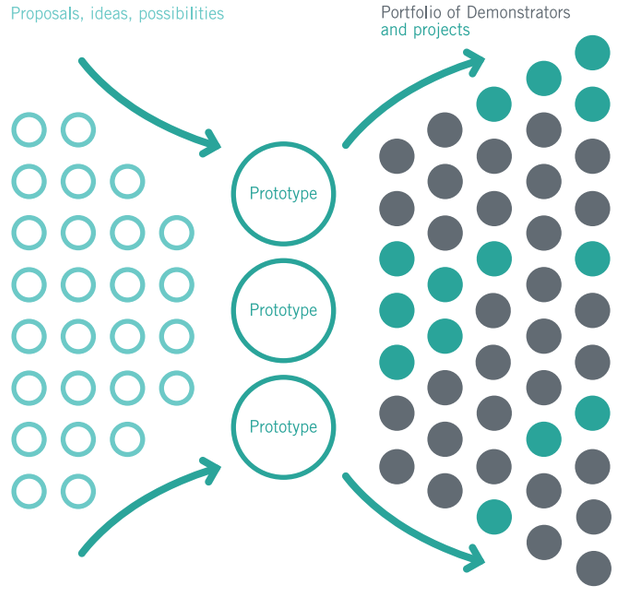
Force, in the sense of coordinated, resourced and directed activities, must still be applied, in the form of innovation agency support, particularly in early stages, until broader systems are capable of taking on the mission themselves.

Ultimately, high-level political stakeholders can be informed by a body of convincing evidence produced by real-world interactions in meaningful contexts. This could unlock significant commitment to further scaling, in the form of resilient investment, re-shaped fiscal policy, organisational alignment, and regulatory and governance changes.

Snowballs, and calls versus curation



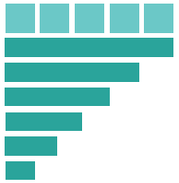
The call for funding is the typical tool of the average innovation agency, yet it can be a reductive process. Without careful framing, and flanking actions, it can tend to produce competition between actors, rather than collaboration. Its typical format takes numerous applications of potential projects, from which it selects a subset to be developed. A portfolio could be developed via calls for funding, yet not without significant administrative overhead. Such bandwidth could be used instead to identify, curate, nurture, and guide portfolios of projects via prototypes and systems demonstrators.



Given the necessity of a holistic portfolio-based approach, an alternative to calls is required, in which multiple projects are not distilled down to a few, in competition, but multiple projects are curated, aligned, integrated and scaled, via protoypes and systems demonstrators. This means commissioning 'strategic projects' alongside calls and other innovation techniques. The emphasis is on diversity and range, integrated via prototypes which lead to demonstrators. The culture is collaborative and generative. Projects are continually added to demonstrators, informed by insights produced by an iterative design process. The process is additive, learning and evolving as it develops, oriented towards the North Star of the mission.

Platform (re)scaling

Specific and general, social and institutional

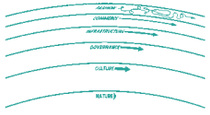


Specific to place

The **Platform**→ strategy, described later, is key to enabling systemic change, and therefore enabling forms of scaling. It balances the specific, grounded experience led by places on the ground—often prototypes and demonstrators in particular places—with the more general, transferable layers of cultures and skills, standards and guidelines, data and code, financing, policy and law. The latter can enable scaling as they are designed to apply more generally, across multiple environments. Yet the way that it is shaped is best informed by action on the ground, derived from specific places.

Social movement

Interventions at the level of place involve local culture, both within communities and within those organisations responsible for place. Culture is a slippery word, meaning patterns of living as well as cultural expression, but also organisational and political cultures. This layer of change is powerful, concerning the 'paradigms' that Donella Meadows described. It could be argued that *culture is what we do*, above all: *What does a street stand for? What does a school mean? What do they say about our society, about our relationships with each other and the rest of nature?* This layer is also fast-moving, and enables rapid transfer of ideas, shifts in norms, the creation of markets, and entirely new patterns of living and cultural production. This notion is often wrapped up in the phrase 'social movement', yet activities in this layer can also address questions of working cultures within public sector or other organisations, their capabilities and capacities.



Stewart Brand's notions of pace layers are useful for recognising that these different layers in a platform move at different speeds, and with different forms of resistance, as will be touched on later.

General across country

Using learning from a place, and generalising into shared cultures, policy, law or code, enables it to be shared. Often, projects do not try to stack up the whole platform around a local experiment—they do not try to bring the national transport or food agency into a street- or school-level project. This is fair enough; there are many reasons why a specific municipality might be disincentivised from solving the shared challenges of others, ranging from constitutional to cultural. This approach actively attempts to change that, with national activities actively engaged with local, glueing systems together in order to unlock careful scaling.

Institutional

These top layers of the platform are often the most powerful scaling layers—and particularly when concerning the (re)scaling described previously—yet often little-understood or used in traditional innovation policy. The corollary of this layer, at the other end of the platform, is the Institutional capability. This tends to move more slowly, though policy lab processes can change pace and dynamic here as well as insights, but its power is in unlocking scaling systemically and universally. And so its power concerns that slowness, and the broad legitimacy that can bring, if connected to participative processes on the ground. For example, changing the school law unlocks a possibility for school food all over the country, at the stroke of a pen. Missions must also build change in these layers too, if required for systemic change. This entire stack, and all its dynamics and relationships, can be brought to bear f or scaling, described as a **Platform**→ strategy.

Design principles in practice

Missions comprise a diverse series of interventions or acupunctures, arrays of top-down and bottom-up innovation actions which are put into practice. These Missions are derived from the angles generated in Systems Actors workshop. They combine to form a strategic portfolio of Missions, each affecting the others in various ways, such that a holistic approach emerges.

These Missions are formed into Prototypes, in order to move quickly towards action. These Prototypes, in turn, describe how and what to scale into major Demonstrators, as well as defining the necessary governance structures, systemic change strategies, and approach to ownership, participation and financing.

These things cannot be known in advance. One cannot know the end before the start. As simple as this statement is, it challenges much of the existing assumptions about policy-making, and indeed governance, in many countries.

Steinberg helped shape the overall approach with the Vinnova team. His work spans deep engagement within the Nordic context through to the UNDP's innovation activities.

Marco Steinberg describes this as the necessary end of the *'predict, then plan'* approach to governance. We are in a world defined by uncertainty, ambiguity, and diversity, and we must update the toolkit accordingly.

Or, as Mark Drewell and Björn Larsson put it, in *Changing the World We Create* (2019):

> *We cannot today realistically even imagine what the present societal transition will look like once the new perspectives we can now see emerging move to centre stage.*

As they point out, it was always like this. This does not mean we should not produce imaginaries of what these various *"centre stages"* might look like. Indeed, some of our prototypes will do just that. Yet we cannot pretend to plan using them. As Drewell and Larsson suggest, expanding upon Tomas Björkman's work, we must instead focus on build the capacity to work on them.

Again, in the context of public health under the conditions of COVID-19,—what Rutter, Wolpert and Greenhalgh call "par excellence, a complex problem in a complex system"— there

are many general insights to be drawn about the importance of working with uncertainty, ambiguity, and diverse unpredictable contexts. Our approach to mission-oriented innovation deliberately tests techniques for handling this complexity, just as several other innovation agencies and institutions are doing.

Of course, there is much to learn from more agile, located practices 'on the ground', at the heart of communities, places, or organisations. These actors find ways of making significant change happen every day, by wrestling with complexity directly. The challenge is how to ensure that these systemic changes are equitable and sustained, which means a shift in practice at the level of public institutions, of government. The fundamental nature of this shift is a constant learning process, such as those visible in the small, if promising, steps forward described here.

The dynamic of this culture, according to Trisha Greenhalgh, has its own structure of feeling. The energy is ploughed into ongoing work to create *"efforts (that) are typically iterative, locally grown, and path-dependent, and they have an established methodology for rapid evaluation and adaptation."*

There are further insights to be gleaned from David Ogilvie et al, in their paper exploring how a *"practice-based evidence pathway in which evaluation can help adjust the compass bearing of existing policy."*

This practice-based approach, with allusions to frequently taking bearings on compasses, adjusting course towards a North Star, has much in common with the design-led place-based approach to missions.

In focusing on practice—and thus delivery, engagement, context, culture, and so on—rather than a fruitless search for abstract a priori evidence, it suggests a meaningful way forward for situations in which there is no, or not enough, evidence. Innovation, almost by definition, means making new things happen that produce value *without evidence*. The power of these activities is that they produce new evidence.

The process on a page

Initially, the mission teams identify a set of mission themes. These are high-level strategic priorities, usually drawn from national targets and agenda or equivalent, such as United Nations Sustainable Development Goals. In doing so, their importance, legitimacy, and some broad understanding, is already in place.

The systems **Actors Workshops**→ then pick apart these themes, producing a **Systems Canvas**→, comprising a set of angles, which suggest interventions or acupuncture points. **Selecting Participants**→ from public, private and civic front-line actors enable the workshop to move towards a people- and place-based perspective on the mission as early as possible.

Angles are then developed and refined by the mission teams, via ongoing discussion with collaborators and actors and various supporting research approaches, and using systemic design principles, these angles are transformed into draft missions. In **Defining Missions**→ in this way, a focused, tangible and motivating vehicle or portfolio for a spread of projects, engagement, and collaboration at different scales of activity emerges; they work together as a set, as a platform, moving towards opportunities for in-depth and meaningful participation.

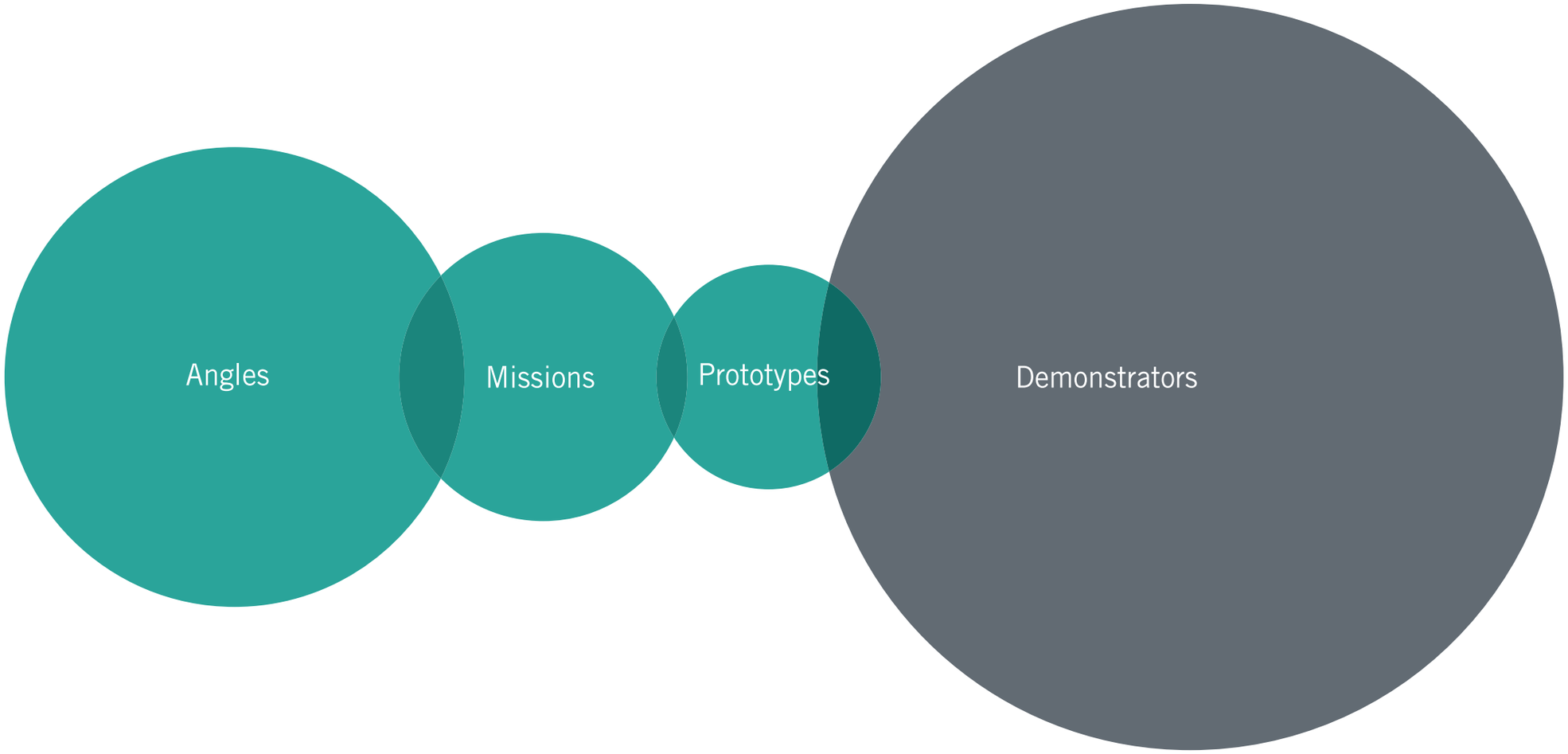
The missions are unpacked and refined in **Design Workshops**→ with further system actors. Analysing the results of these workshops, sketches of **Prototypes**→ are developed. Each of these prototypes explores different elements of the system, each supporting or affecting the others as a system.

Systemic design principles, working as a platform strategy to enable general scaling as well as focused specificity, indicate how to design prototypes to produce impact, and help understand which project partners tackle or govern each layer. The various guidelines, such as **Layers**→, **Levers**→ and **Lenses**→ for **Defining Missions**→ and **Designing Prototypes**→, help drive the design process, helping close in on prototypes whilst building committed networks.

These Prototypes can take various forms, as defined by the design strategies emerging within the mission. They begin to

comprise a portfolio of activities, addressing the mission. They are usually place-based endeavours, which means each articulates and embodies numerous systems. They provide opportunities to rapidly test ideas in context, to showcase and build momentum; to trigger discourse and public participation; to already shift behaviours and dynamics; and to flush out cultural or political dark matter. Formally, they may be strategic projects which move quickly to the ground, or they could be relatively typical innovation calls.

These prototypes are tangible and conrete projects, which can be pursued with partners, and provide deep learning in order to test and refine the mission statement and approach, and set up the next phase, of **Systems Demonstrators**→.



1 Angles

Co-design an initial view of the system, proposing angles of intervention

Form networks to co-design angles for intervention, via bilateral meetings, interviews and Actors Workshops. Usually many meetings, and several workshops, around the country. Counterpoint with sector analysis, domain research activities, and field research. Output is Systems Canvas and refined set of angles suggesting possible mission framing.

2 Missions

Develop angles into missions and design principles

Co-design missions in Design Workshops from developed angles. Use systemic change principles, as well as portfolio analysis and alignment and synthesis of research questions. Commission exploratory research and run public events around emerging themes.

3 Prototypes

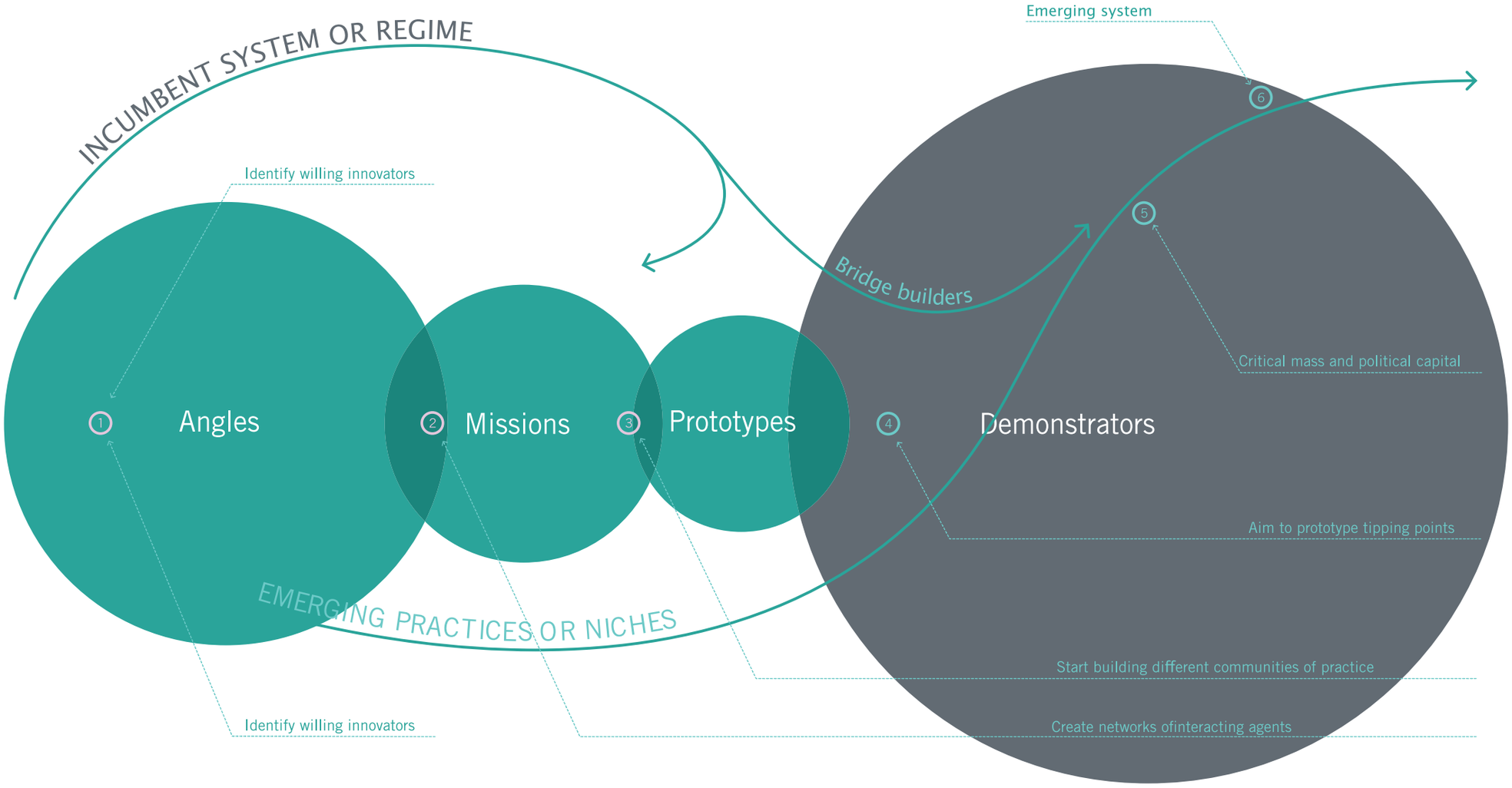
Co-design portfolio of prototypes to articulate mission

Design, commission, and deliver Prototypes to articulate, test and develop mission themes. Assess Platform strategy. Align with associated programmes. Run public events around initiative themes, and develop international engagement. Devise initial Mission Advisory Group, and/or Mission Board.

4 Demonstrators

Build system demonstrators from prototypes

Informed by insights from prototyping, the System Demonstrator is the large-scale demonstration of various systems and cultures scaled, indicating how the mission is achieved, within Sweden and globally. Scaling takes multiple forms.



There are various theories of change with which to describe systemic change, such as Transitions Theory, or the Berkana Institute's Two Loops model. Essentially, most are variations on the thought of bringing together the elements of existing systems or 'regimes' that can adapt to a transformed 'new normal' alongside and ultimately in union with the innovators, disruptors, or 'niches'. The mission design process provides a way of aligning these different elements in different formats over time.

There is good efficiency and bad efficiency, good inefficiency and bad Inefficiency … Preventative health care saves enormous amounts in medical costs later, and is a good efficiency. Any harm to people for profit is likewise bad, no matter how efficient. Using an over-sized vehicle to get from point A to point B is a bad inefficiency, and there are many more like it; but oxbows in a river, defining a large flood plain, is a good inefficiency.

The orienting principle that could guide all such thinking is often left out, but surely it should be included and made explicit: we should be doing everything needed to avoid a mass extinction event. This suggests a general operating principle similar to the Leopoldian land ethic, often summarized as "what's good is what's good for the land." In our current situation, the phrase can be usefully reworded as "what's good is what's good for the biosphere." In light of that principle, many efficiencies are quickly seen to be profoundly destructive, and many inefficiencies can now be understood as unintentionally salvational. Robustness and resilience are in general inefficient; but they are robust, they are resilient. And we need that by design.

Kim Stanley Robinson, *The Ministry for the Future* (2020)

0–3

Resourcing the process

You need a team, and a space, to make things happen. Given the emphasis on co-creation, mission-oriented innovation requires significant effort in communication, engagement, creative development, research, management and partnership building. This means a small multidisciplinary team, with a diverse set of skills. Given a team, a space is required, for idea development, team-building, mapping, co-design, and informal meetings.

Background

Building a mission, never mind several, cannot be done in ‘spare time’. Being the glue between disparate parts of a system is a demanding activity. It requires an agile approach to accessing a range of skills and perspectives, in real-time, which requires the conditions of a team.

I’m into having that sort of process foundation that then allows me to be incredibly improvisational. I feel secure in improvising because there’s a sense that even though I don’t know what could happen, I’ll know enough to handle it.
—Sarah Lidgus

Given the cross-cutting nature of missions, it requires a unit that can move between domain-based agencies, between levels of governance, between disparate forms of firms, between participants in social movements and politicians, between perspectives and disciplines. It requires both process and improvisation, with the ability to do the latter based on a solidity provided by the former. That is hard work, and requires the sense of purpose and unity that a team can bring. It also takes time, which enables a team, or series of teams, to be built.

At Vinnova, this initial design process took about eight months, from blank canvas to first prototypes. We ran this process for two missions simultaneously, with eight people in relatively focused roles, supported by several others. It’s worth noting, however, that everyone was working on missions part-time, to varying degrees.

Only someone who is well prepared has the opportunity to improvise.
—Ingmar Bergman

These core roles comprised two domain leads per mission and two strategic design leads. In terms of coordination, we borrowed a link back into the middle-management layer in the organisation, whilst a director took care of overall coordination, strategy and design, and link with other managers. Various others supported, particularly in analytics, communications, broader strategy and external relationships.

The form of design process used here, drawing from contemporary design practice, agile methodologies, public sector innovation, or even a version of Apple’s parallel production methods, requires the equivalent of product managers or project designers, rather than project managers. These roles are described on the facing page.

Strategic design team

Dan Hill
Director of Strategic Design, and responsible for designing and leading mission-oriented process and activity at Vinnova.

Andrea Råsberg
Seconded into strategic design team from Vinnova’s social innovation team. Has a background in political science.

Tobias Öhman
Seconded into strategic design team from Vinnova’s life science department. Has a background as an entrepreneur.

Anja Melander
Working part-time on strategic design whilst based in Vinnova’s innovation management team. Background in psychology and organisational cultures.

The core strategic design function works as a link within and across missions. They are responsible for assessing methods, as well as shaping the culture, via technique, space, culture and other tools. They have domain knowledge, yet their skills are also in translating, connecting, initiating, facilitating, hosting, integrating and organising.

In reality, due to the shifting demands common to any complex organisation, each mission only had one, perhaps two, ‘full-time equivalent’ people on it at any one time. Yet a key goal with these mission pilots was to enable learning-by-doing across the organisation; hence the larger numbers of people listed here and below.

Food mission team

Joanna Franzén
Coordinating food-related missions, and based in innovation management department. Has a legal background.

Camilla Sjörs
Coordinating food-related missions, and based in society-building team.

Jenny Sjöblom
Coordinating food-related missions, and based in society-building and social innovation teams. Has a background in food systems.

Alexander Alvsilver
Previously in international development, helping support mobility mission.

Domain-specific leaders, across food, mobility, and health, have a relatively constant engagement with the content at hand, and must possess a detailed knowledge of their particular domains—technically, but also in terms of networks. Yet given a systems approach, they too must also be able communicate and coordinate across other disciplines, actors and context.

A very blurred line exists between the domain-specific teams and the strategic design teams. Like most small teams, roles and perspectives are shifting planes. Equally, each domain team had around two people at any one time, with personnel swapped in and out.

Mobility mission team

Filip Kjellgren
Coordinating mobility-related missions, based in the society-building department at Vinnova.

Sara Hugosson
Previously in social innovation team at Vinnova, helping develop mobility mission.

Caroline Ekstrand
Background in health programmes at Vinnova, initial contributor to mobility mission.

Support and guidance

Jonas Brandström
Director of Vinnova’s key strategic programmes and teams relating to mobility and food mission themes.

Göran Marklund
Deputy-Director of Vinnova, responsible for strategic research and innovation proposition.

Ylva Strander
Project leader for national collaboration programme, and food area; link to Vinnova programme leaders.

Darja Isaksson
General Director of Vinnova, and overall sponsor of the mission-oriented innovation work.

Josefin Lundström
Analytics team, with particular focus on food sector analysis, and TIPC relationship.

Andreas Netz
Previously in challenge-driven innovation at Vinnova, now developing mobility area.

Sandra Karlström
Analytics team, with particular focus on mobility sector analysis.

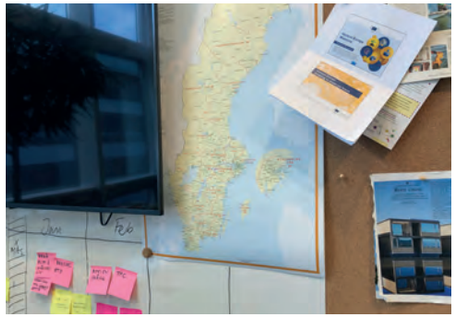
Björn Svensby Kurling
Sustainable society-building team at Vinnova, connecting urban planning projects to mobility missions.

Jenny Johansson
Communications, and particularly social media, around missions for Vinnova.

David Jonason
Analytics team, and with particular interest in data-driven network and sector analysis.

Jenny Elsberg
Director of Innovation Management department at Vinnova.

Maria Johansson
Area leader for sustainable society-building, and key urban programmes.



Maps are useful things, and good reminders.
VINNOVA, STOCKHOLM, AUGUST 2019

A small yet functional project space or studio—sometimes jokingly referred to as *Mission Control*—was created at the Vinnova office as a base for the teams. This was a new kind of space at Vinnova, predicated on a permanent base for a team, and the missions (sometimes called 'war rooms' in the trade, unfortunately), which had whiteboards and corkboards on all walls, for informal pin-up and drawing space, as well as storage for workshop materials, books and documents (out of shot). A single shared table (with overhead lighting and power added after this photo was taken) enabled flexibility. These shared tables for a team offered a different approach to the hot-desking elsewhere in the office, enabling Vinnova to prototype alternative approaches. Small surrounding offices enabled privacy, peace, and quiet. Wall space also included a large shareable monitor, as well as a map of Sweden. Another whiteboard on wheels (out of shot) provided further shared drawing space as well as acting as a form of threshold into the corridor. The choice of space was perhaps a little too far away from the natural centres of the Vinnova office—though it had the unbeatable advantage of being available!—but it was highly visible from the elevators, adjacent to Vinnova's entrance.

Strategic design team members conducting participant observation ethnography—or, trying not to fall off an e-scooter on the cobbled streets of central Stockholm.
KUNGSTRÄDGÅRDEN, STOCKHOLM, APRIL 2019

Monthly mission team awaydays were used to discuss progress updates and incoming opportunities, but also to co-design and reflect upon methods and approaches.
FOTOGRAFISKA, STOCKHOLM, AUGUST 2019

In order to tackle the grand challenges of the 21st century, innovation policy needs to shift from the existing support-and-measure approach to a lead-and-learn approach.

Mariana Mazzucato

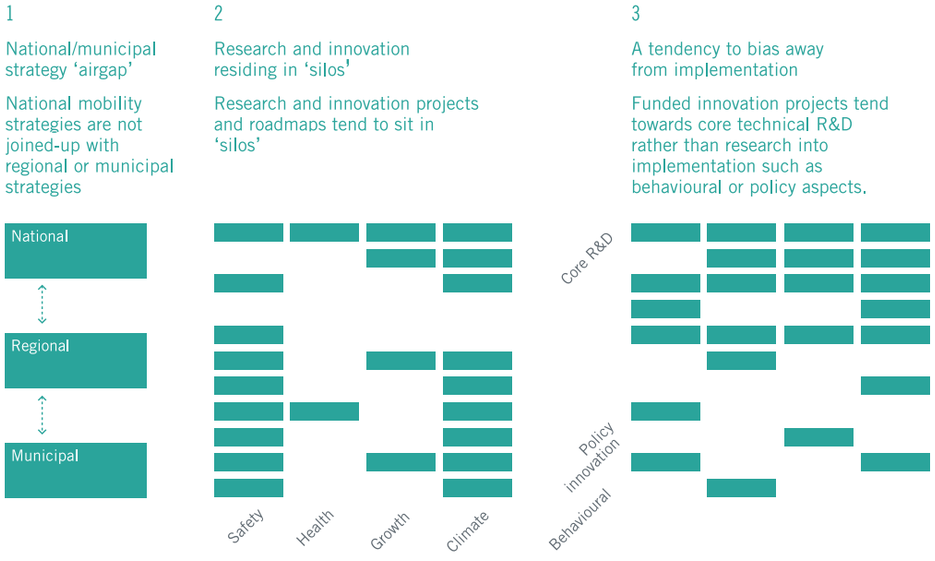
0–4

Analyse context

Significant analysis often exists, around many of the key areas relating to the mission themes. Such analysis includes the scale, components and dynamics of sectors, the status of research and innovation, assessments of capabilities and cultures, and so on. This analysis will not contain answers, but it may help frame questions, augmenting and refining angles that emerge through collaboration processes.

Contextual analysis

As part of the background research into the mission themes, the Vinnova analytics team surveyed both sectors—mobility and food—and located all recent research and innovation strategies, funded projects, surveys, strategic roadmaps and sectoral surveys. In particular, the mobility sector was analysed in depth, from both a research and innovation activity point-of-view as well as a national, regional and municipal strategy perspective.



This meant locating and reading every strategy in the country at all these levels, across municipal governments (who manage most private mobility in Swedish municipalities as well as conducting most urban planning and development strategies), regional governments (who run most public transport in Sweden) and national agencies and ministries (who set the legislative and policy agenda for the country, and plan and implement major intercity transport infrastructure like motorways). The

results indicated a significant 'airgap' in terms of these strategies. For example, national strategies sometimes appeared to run counter to municipal plans. Put clearly, if high-level, cities were often trying to reduce their reliance on private cars whilst national traffic agencies were planning large car-based motorways running directly into cities. Or, not as clearly, national agencies were arguably not doing enough, in terms of traffic reduction strategies, to match the ambition at city level. Equally, regional mobility plans tended not to include significant input from municipal planning teams, and vice versa. These findings in the strategy documents were reinforced by statements made in research interviews.

Equally, when reviewing research and innovation projects, roadmaps and strategies—including a detailed analysis of the Vinnova-funded projects—the analytics team found that activities largely existed in silos, leading to gaps in knowledge and a lack of integrated approaches. For instance, Swedish research and innovation activity is clearly strong around safety and climate, yet has relative gaps around 'mobility and health'.

Similarly, the analytics team found that research and innovation activities tended towards core technical R&D, rather than areas associated with implementation, such as policy innovation or behavioural research. This perceived 'bias' became an issue when a clear message emerged from the **Actors Workshops**→ that followed. This could be summarised as "We have all the technology we need; we just need to deliver it."

Whilst 'delivery' is rarely this easy, the disparity between this message and the analysis of our research and innovation activities is problematic, to say the least. This provided further impetus for the mission design to focus on implementation questions, via **Prototypes**→ as well as supporting policy lab activities and **Platform Strategies**→.

Similar desktop research was carried out concerning food sector and systems, and broadly similar patterns emerged—with some differences. As the workshops unfolded, similar questions emerged about the lack of behavioural and policy

Thanks to Vinnova's Sandra Karlström, Josefin Lundström and David Jonasen for their work on this analysis.

innovation. Yet it was also noted that more core R&D into food production (what became the New Food mission) was perhaps relevant necessary.

This may reflect the simple fact that Sweden has heavily invested in core R&D around mobility systems, and especially the vehicle industries, for many decades, whereas food has been a less significant part of the research and innovation system. Vinnova placing emphasis on food is an important step towards resolving this imbalance to some degree.

Exploratory research

During the design process, research questions will emerge. Some of these will concern existing research around the mission themes. For instance, for the Healthy Sustainable Mobility mission theme, Vinnova commissioned pre-studies from researchers around the e-commerce sector, and its impact on logistics and mobility, as well as baseline user research into street use in Göteborg.

These are exploratory questions which cannot be resolved simply by desktop research or further discussion with actors.

Instead, they are usually forms of user research or field research. They produce insights to in order to shape initiative design, prototype design, and ongoing stewardship. They also provide baseline research, meaning that the research questions can be repeated throughout, supporting impact analysis and mapping.

Ideally, the mission-oriented innovation processes progress rapidly towards **Prototypes**→ and **Demonstrators**→, within which such design research can be embedded as a core practice, and repeated indefinitely.

Within the context of the ongoing stakeholder engagement processes, given the emphasis on building productive networks for action, the range, diversity and quality of participants themselves must also be continually assessed. Therefore, another form of research is constantly assessing how and where to expand the network of participants. The Vinnova analytics team

used simple mapping tools—like Excel spreadsheets plugged into the Kumu platform—to keep a track of such networks (see overleaf for an example).

Avoiding ‘Analysis Paralysis’

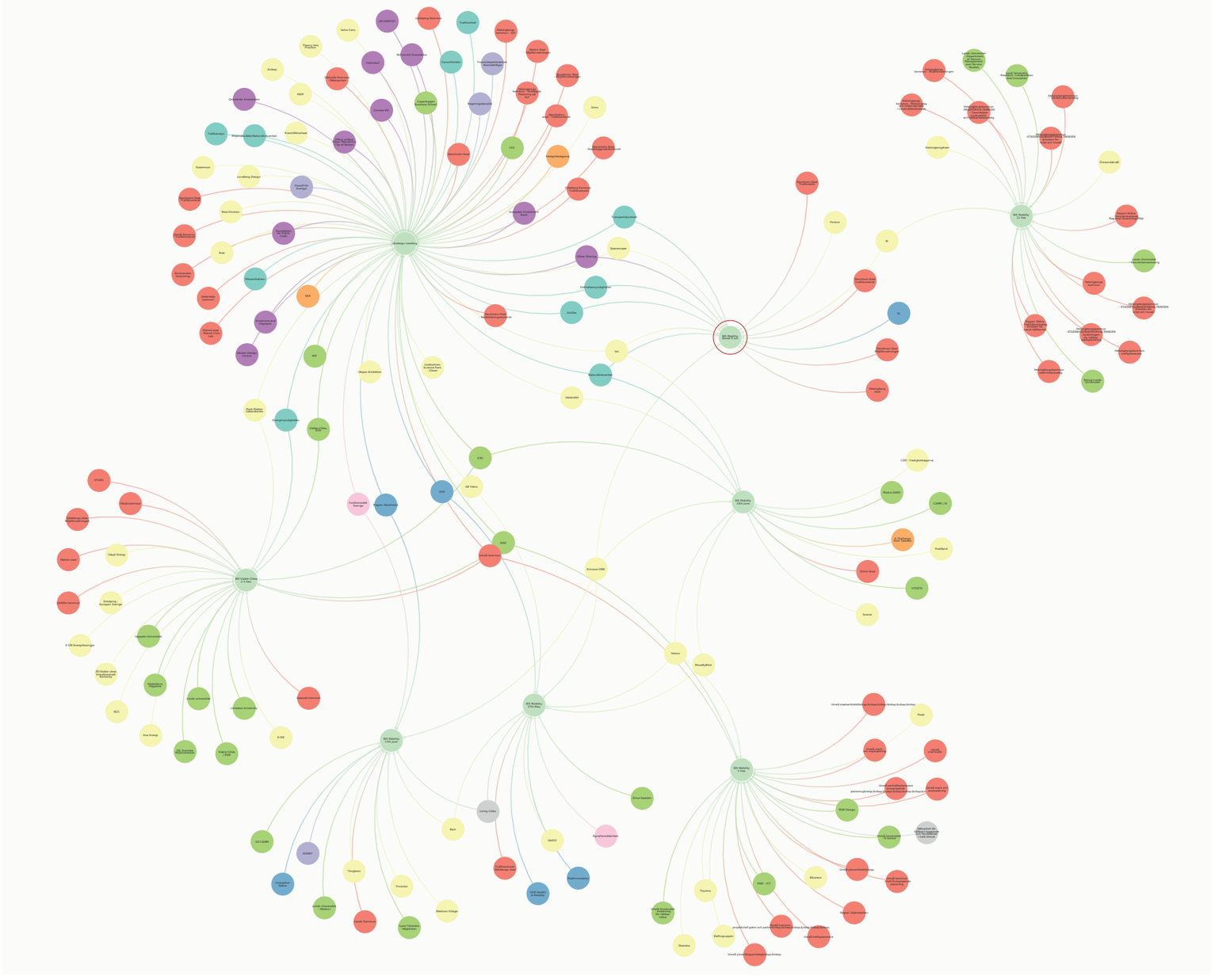
Following the earlier discussion of engaging directly with complex systems, there is a clear preference for producing analysis in context, mapping as we go, during engagement. This is in order to mitigate against a priori assumptions, ensuring we are as close as possible to understanding systems on the ground, as they are.

It also prevents ‘analysis paralysis’: the sense that we might discover answers to complex challenges if only we gather enough data before we take our first step. Often taking the form of desktop research, this tends to put off initial engagement with systems. In its attempt to mitigate risk, such approaches actually mitigate against action, unlocking the now-far greater risk of not taking action against our challenges. In this design-led approach to mission-oriented innovation, the emphasis is on engagement as rapdily as possibly, building vehicles for ongoing learning, via continual analysis of interactions.

Analysis beforehand provides useful clues for these starting points—which is why we do this too, as described—but it simply tells us how things are, not what to do. Building on analysis, synthesis can help sketch scenarios, trajectories, and first tentative steps. This discovery-oriented approach remains a huge challenge to prevailing policy-making cultures, however.

Change in Sweden is slow and deliberate. What has been done over nearly five decades cannot be abruptly undone.
—Marquis W. Childs, *Sweden: the Middle Way On Trial*, Yale University Press (1980)

The greatest error is not to move.
—Dr Michael J Ryan, World Health Organisation, discussing the Covid-19 response, March 2020



Sketch visualisation of a mapping of stakeholders engaged in the Healthy Sustainable Mobility co-design process, produced in Kumu by Vinnova's David Jonason. Each dot represents an organisation, clustered around workshops and strategic dialogues run throughout 2019 and 2020 as part of the mission design process. The well-populated cluster at the bottom represents 'Strategic dialogues' i.e. direct conversations with stakeholders, whereas the other clusters are generally Actors Workshops.

- National government agency
- Company
- Government ministry
- Municipality
- Regional
- Branch organisation
- Academy
- Think tank
- Social innovation organisation
- International actor

Towards complexity

Jakob Trollbäck

Jakob Trollbäck runs The New Division, a strategic communication group based in Stockholm. He and his team helped the United Nations devise the iconic language for the Global Goals in 2015. We asked The New Division to develop the concepts for a visual toolkit, with which convey aspects of mission-oriented innovation. Jakob contributed this passage, outlining some of their background thinking.

Moving Toward Complexity

Since the beginning of time, the universe has been on the move toward higher complexity. Here on earth, it is best illustrated by the biological evolution that led to the rise of Homo Sapiens.

Today, nature has lost its monopoly on complexity. Ever since we came to be, our curiosity have resulted in discoveries that have helped us to create objects and systems outside of the natural state of the world. Innovation have transformed our knowledge into increasingly complex systems.

While it is fair to challenge the wisdom of many of our decisions, there is no question that the essence of what we do, apart from reproducing, is working overtime to create a world of increasing complexity.

Complex Systems

A system is a set of things—people, cells, molecules, or whatever—interconnected in such a way that they produce their own pattern of behavior over time. The system may be buffeted, constricted, triggered, or driven by outside forces. But the system's response to these forces is characteristic of itself, and that response is seldom simple in the real world.
—Donella Meadows, *Thinking in Systems* (2008)

The essence of a complex system is that even if the individual parts follow rules, it is very difficult to predict how they will interact. There are no higher instructions that define the interactions. In here lies the fundamental dilemma when we attempt to guide them.

The best thing we can do is to find a desired direction for the system to move in, and create the best conditions possible for that to happen.

Opportunities

The unruliness of complex systems can be frustrating, but the lack of strict rules is also an opening for creativity.

Complexity and creativity feeds on each other and within that feedback loop, we gain knowledge and find inspiration to create new things, structures and ideas that would not occur by chance, like bridges, Bach and Bittorrent.

Because of the interconnectedness of complex systems, carefully targeted innovation also gives us the opportunity to create positive network effects beyond our initial target.

Challenges

The complex systems that we develop are rather vulnerable. They are sensitive to imbalances and when they fail, they can be challenging to fix. It is hard to pinpoint the reason for failure, and it is very unlikely that we will find a single solution that is effective.

What causes a student to fail in school? Is it bad teachers? Bullying? Too many digital distractions? The food in the cafeteria? Too little sleep? Unsupportive parents? A rough neighbourhood? Nobody around to help with homework? The solutions we need will have to involve many disciplines on many levels.

Our Goal

Creativity is said to work best when it is free, but in fact, creativity and innovation needs limitations to challenge, and a desired direction.

This project aims to create a method that helps both in finding and defining this direction. We want to make it easier to decipher complex systems in society and suggest how we can enable and encourage mission oriented innovation that result in systemic solutions.

None of us see the system. We see our own part based on our own background and history. And we all think we see the most crucial part.

Peter Senge, MIT Sloan School of Management

0 Preparing the ground

Summary

— Mission-oriented innovation has the potential for transformative systemic change. Yet it cannot deliver without fundamentally innovating the ways in which we innovate.

— Mission themes may be best framed in the context of nationally-agreed challenges such as UN Global Goals or national and regionally agreed policies and strategies. This inherits legitimacy from those previously agreed directions. Yet they may need transforming to missions.

— These mission themes can be broad and open. Do not attempt to lock them down into missions too early. Yet they should nonetheless map onto recognisable and meaningful systems, infrastructures and experiences.

— Articulate the difference between outcomes pertaining to these themes, and enablers of these outcomes—a difference between means and ends.

— Given a mission theme, background analysis can be conducted or collated, in order to understand the key dynamics within it. Portfolios of existing activities can be drawn up. Yet avoid 'analysis paralysis' by focusing on the initial engagement process.

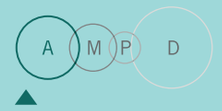
— Develop a set of systemic change-oriented design principles.

— A multidisciplinary team should be constructed to drive the mission-oriented design process, and given appropriate resources, such as budget, space and 'top cover' as required.

1

Discovering missions

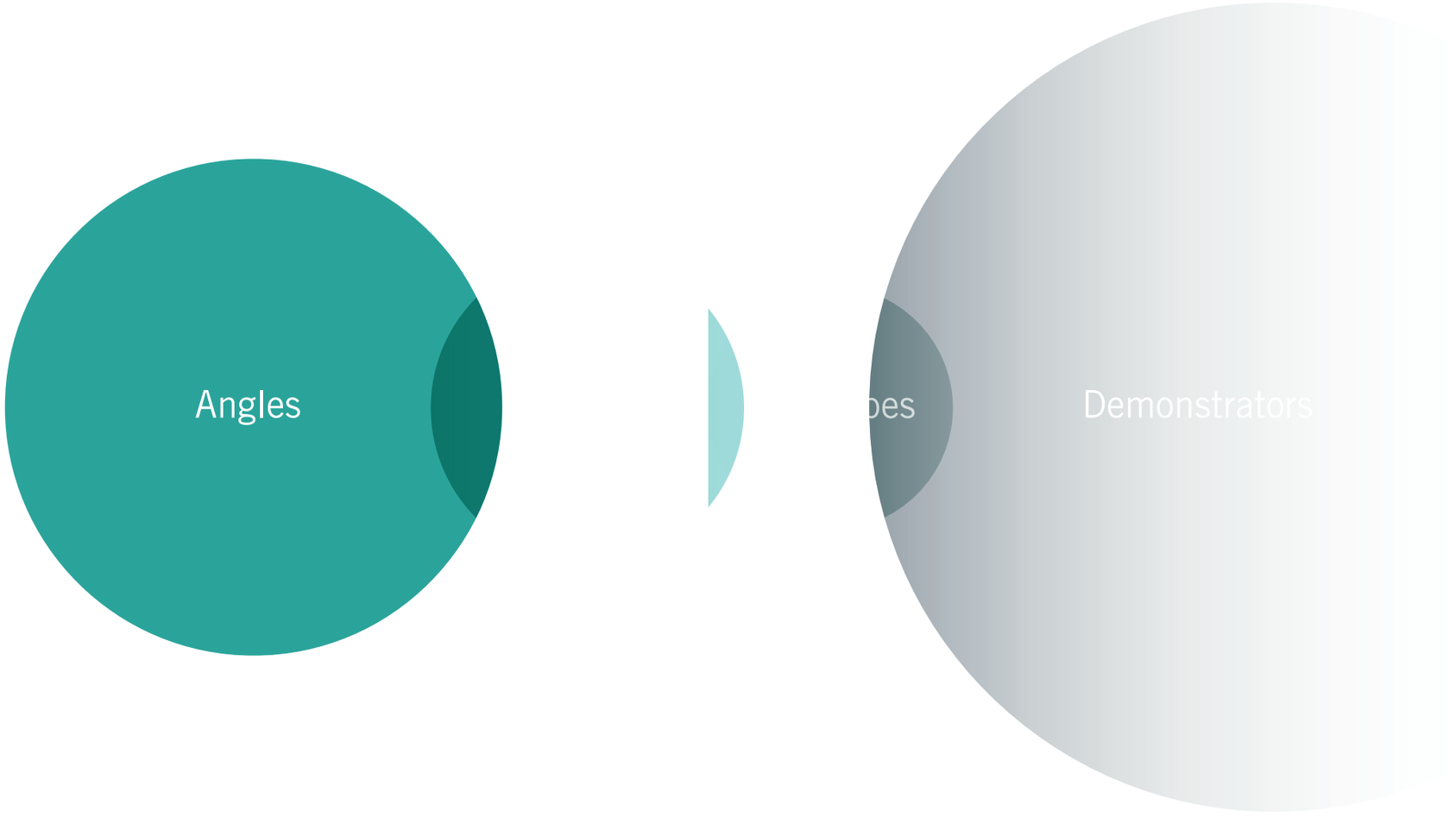
In which diverse groups work together to investigate and define a mission theme, identifying key angles as intervention points within systems.



1 Discovering missions

The first part of this process is about understanding the system by touching it. A series of co-design sessions with system actors build up portraits of the systems in question, sketched out on broad canvases. Interviews counterpoint workshops. A diversity of groups ensures a multi-perspective composite emerges. This not only identifies promising angles on the question at hand, but also promising collaborators. In building a shared understanding of the system, the ground is prepared for action. These are not distanced analytical exercises, attemping a purist completion oriented towards abstract exactitude rather than active intervention. Rather, they are systems maps biased towards action, developed by actors, and as living as the projects they produce. In a sense, the system itself is the map, recalling Umberto Eco's *The Impossibility of Drawing a Map of the Empire on a Scale of 1 to 1*. In other words, engaging with the system is more important than building the map. The system is real. The map is not. Yet mapping as a process sketches the arcs of missions towards their North Stars, whilst pinpointing our next steps.

1 Discovering missions



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Identifying angles

Broad mission themes, such as Healthy Sustainable Food, can often be selected from existing strategic priorities. Yet the specific missions within them, with ambitious goals, specified impacts, and an emerging portfolio of activities, must be carved out of those large blocks. Collaboration exercises can reveal the initial form of potential missions, by suggesting and exploring acupuncture points in systems relating to the mission themes.

Background

The format used to identify angles was a rolling iterative workshop, designed to locate and understand key intervention points, or 'angles', in systems. In these workshops, representatives from public, private and social sectors build and refine a systems canvas with associated angles. The outputs inform the next step in the design process—forming missions and principles—whilst the critical discussion and carefully facilitated interaction helps build new networks for subsequent action.

These early workshops are crucial to co-creation between new networks of system actors, comprising open creative sessions with diverse groups from public, private and social sectors. The workshops were designed and led by the Vinnova team, such that the agency can learn as much as possible 'from the front line', in terms of systems and angles, but also networks and participants.

The case study detailing how Jeugdbescherming Regio Amsterdam transformed their approach via "the system in the room" is detailed in OECD report *'Systems Approaches to Public Sector Challenges: Working with Change'* (2017)

The Systems Actor Workshop is designed to produce meaningful constructive and critical discussion amongst participants who don't usually interact.

The actors in the workshop, whether public or private, represent numerous angles in the systems at hand, with an emphasis on 'problem owners' and delivery agents, working at the 'front line'. Each is participant represents their organisation, but is also selected for their ambition, openness and collaborative approach.

It is of fundamental importance that the group is diverse. This diversity can be cut across several axes—social, cultural, type of knowledge, position within the systems at hand, gender, age, ethnicity, and so on. Research indicates that a diverse group will almost always outperform a less diverse expert group. Equally, one role of these workshops is to get the system in the room, a phrase borrowed from transformational work by Jeugdbescherming Regio Amsterdam, and enable different aspects of the system, in the form of the actors, to encounter each other.

This straightforward idea—the system in the room—can of course be critiqued. It is not the whole system, and tends to rely on the networks, and extended networks, of those organising the workshop. And it is in a room. Yet it is quite impossible to get a full representation of a system. One would need an infinitely large table in an infinitely large room enduring an infinitely long workshop.

Depending on quality of execution, however, 'the system in the room' approach can be very powerful, and it can produce a far more diverse condition than is usual. Here, we are looking for starting points: genuine systemic engagement, including citizen participation, comes later. There, systems are built in everyday life, as **Prototypes**→ and then **Demonstrators**→. That is where the system is out of the room, and in forms of reality. This process is something of a race to that point, to where systems get real.

Working with systems is not, in the end, an analytical exercise; is is experiential. Moving policymaking on from systems thinking means systems living; producing innovation environments that can be experienced from within, explored in situ, engaged with and negotiated. Attempting to assess systems analytically is a little like capturing a butterfly and pinning it under glass in a museum: it does not capture the richness of the butterfly's interactions within its environment, nor is it great for the butterfly.

Yet approaching this early stage with as broad and diverse a representation as possible produces a strong start, and helps us frame subsequent development activities, enabling us to create these living system environments for innovation actions. Equally, bringing these relatively diverse groups of stakeholders together, with the imperative of sniffing out starting points, also helps spark new insights. It also provides a supportive environment for collectively challenging assumptions within the group, via dialogue and contestation. Participants often find their pre-existing viewpoints challenged and altered in such workshops, and though this is an intentional and valuable side-effect of the task, it takes skilful facilitation.

The moment we stop listening to diverse opinions is also when we stop learning. Because the truth is we don't learn much from sameness and monotony. We usually learn from differences. In life most of what we have come to understand throughout the years we have acquired by interacting with dissimilar, and often challenging views, and by encountering information, criticism and knowledge hitherto unfamiliar to us, and then processing these internally by growing insight from seeds of discussions, readings and observations.
—Elif Shafak, *How to stay sane in an age of division* (2020)

... the Cartographers Guilds struck a Map of the Empire whose size was that of the Empire, and which coincided point for point with it. The following Generations, who were not so fond of the Study of Cartography as their Forebears had been, saw that that vast Map was Useless, and not without some Pitilessness was it, that they delivered it up to the Inclemencies of Sun and Winters ...
—Jose Luis Borges, *On Exactitude in Science*

As Peter Senge says, *"None of us see the system. We see our own part based on our own background and history. And we all think we see the most crucial part."*

Key outcomes of the workshop include increased critical discourse as a result, as well as the creation of new networks amongst the participants. These are social, or network-based outcomes; yet the tangible artefact the workshop produces is a co-created systems map with intent, indicating key intervention points, or angles on the system.

Planning and logistics

Loosely inspired by Michel Callon's 'hybrid forum' format, amongst many other participative co-design processes that have informed this approach, various techniques are used to flatten hierarchies and dissolve borders between participants. These include choosing and preparing the environment, as well as the participants and the process.

Detail of a flipchart page from one of the Actors Workshops, with some of the 'groundrules', deliberately conveying formal instructions informally. These are visibly drawn in front of the workshop group, and talked through, partly in order to help create an approachable, convivial environment.

- Around 20 to 25 people is a good number for a workshop like this, as they can gather around a large table (or series of tables joined together), split into five or six groups, and still be addressed as a group, and enabling a series of conversations as a group.
- We ran three actors workshops per mission theme, with the results of each being testing in the subsequent workshops.These workshops were complemented by bilateral Strategic Dialogues. Not everyone is suitable for a collaboration workshop, and some people or organisations may need to be handled differently.
- See the separate note on **Selecting Participants**→. Stakeholders should represent a group with authority, some broad representation, but also a motivation for change.

- A workshop takes all morning, followed by lunch or preceded by breakfast. Mornings are generally better for group energy. Food is extremely important in terms of delivering results.
- Make clear that each workshop is part of a larger process of further workshops, discussions, and analysis. Each workshop will build on the results of previous workshops, and thus affect the next, equally.
- Send the same information about the workshop logistics in emails, as well as in a meeting request format suitable for most common email platforms (different people look in different places for their agenda). Give participants plenty of notice, and send reminders the day before, with supporting information if necessary.
- Select stimulating yet functional **Workshop Locations**→. People behave different, and usually more openly, when removed from their usual locations. A short journey to a different location prepares participants. The location should be comfortable, spacious, light, airy, and preferably with a view (bonus points for a view that speaks to the workshop's focus: a school, harbour, or transport networks). 'Unusual' does not mean absurd or distractingly spectacular; a circus tent or underwater restaurant will be more trouble than it is worth. It should just be different to 'normal public sector workshop' locations, have some semblence of quality, and the right amount of character.
- Keep the workshop in one space. This should be big enough to hold one large very table in the middle of the room, with enough space around it for people to walk around freely, and gather in groups. The workshop will start with a short introduction, which can take 15-20 minutes, so participants should be able to be seated for this.

Healthy Sustainable Mobility actors workshop #1
STADSBIBLIOTEKET, GÖTEBORG, June 2019

Healthy Sustainable Food actors workshop #1
SPRITMUSEET, STOCKHOLM, June 2019

Healthy Sustainable Mobility actors workshop #2
WHITE ARKITEKTER OFFICES, STOCKHOLM, June 2019

Healthy Sustainable Food actors workshop #2
HARBOURSIDE, GÖTEBORG, June 2019

— Depending on the overall numbers, each workshop will need around four facilitators, including a workshop leader. This enables two or three facilitators to be involved in particular groups or angles, whilst another keeps track of time and process, and the workshop leader can engage with the big picture of how the canvas is shaping up, or which groups may need particular attention.

— Ensure that some of the facilitators are tasked with capturing images of the workshop in action. A good quality, recent-model phone camera is fine for this, but a camera in timelapse mode, fixed on a tripod, can capture the canvas emerging. Such footage is highly useful for subsequent storytelling, as well as workshop analysis.

Preparing the ground

As with any kind of craft process, good preparation is fundamental. This is not simply ensuring that everyone turns up, and that there are pens and paper and so on, but also creating the right atmosphere in the workshop space. This may sound intangible, but is key to building confidence in the process, and a spirit of collaboration between participants.

— Avoid the use of screens or projectors at any point. Not using PowerPoint presentations keeps a focus on the participants, facilitators and the room. The workshop context and instructions can be drawn on flipchart paper or whiteboards, and talked through. This keeps key messages simple and accessible throughout.

— Such key messages include the overall mission design process, drawn as a diagram indicating the actors workshop, as well as listing some key founding background documents, such as Mazzucato's papers for the European Commission. They also include some groundrules and

primers, such as the goal of critical constructive discussion, of avoiding the use of screens, and noting that we will be taking pictures. Keep a space for participants' questions or comments. Drawing these informally, on flipchart paper or whiteboard, will encourage participants to contribute with their own pens later.

— Indicate to participants that their intellectual property is for them to choose how to deploy. In other words, anything on the canvas is likely to end up in the public domain, and perhaps even an open source strategy of sorts. Therefore, if there is something they want to keep back, it is up to them to not say it. This is a light touch—no 'NDA' required, and not Chatham House rules—way of dealing with potential legal or competition issues, in keeping with the spirit of the exercise.

— Ensure cellphones are kept away from the action. Give people regular check-in points with their phone, but politely request them to keep phones away otherwise, from the start. Of course, lead by example.

— Ensure good coffee, tea, water and fruit is available throughout. Serve a communal lunch, ideally on one long table (the canvas table itself can be used afterwards, perhaps). Ensure the food is high quality, with some subtle messaging, such as local, organic, and sustainable.

— Use humour during intros and summaries. Though do not overdo it.

— Have the group collectively view an exhibition, or equivalent, before starting the workshop. Of course, locating the workshop in a room at a museum or gallery makes this easier. An exhibition gives the participants an early and informal opportunity to cohere as a group, whilst also providing stimulus for the ensuring workshop.

— Prepare the walls with prompts, in the form of disruptive

(or otherwise) examples and cases pertaining to the system at-hand, to which participants can refer to as required. These are not necessary, as experience indicates that they are only actively used on occasion, yet they also subtly indicate that the facilitators have done their homework.

— Make clear that participants can speak in the language they are most comfortable with, and most communicable within the group. This will primarily be Swedish, of course, yet it may also mean switching between English and Swedish at different points. Also point out that photos and videos will be taken.

Starting the Systems Canvas

Maps can present a typical overview of a food system, or they can capture the dynamics of very specific food systems, at a regional or local level. Such maps—particularly when co-created with actors of a food system—can help us understand the connections between parts of the food system. In doing so, we can better understand where our challenges lie and begin to understand a way to address those challenges. —Afton Halloran & Amanda Wood, Food systems as entry points to tackling grand challenges (2021)

The large canvas does several things. See separate the Technique note on Systems Canvas, but essentially, it provides a shared interface for group collaboration in order to develop a shared sense of a rich and broad system.

This attempts to trigger a different kind of knowledge. As Marco Steinberg points out, in government we often rely on *"document knowledge"*—that form of knowledge captured in fixed, apparently objective, and often abstract decontextualised documents. These tend to be the lifeblood of the policymaking process. Trying to capture complex systems in a stream of Word documents, is a little like pinning a butterfly under glass in a museum; it is possible to do, but doesn't do much for the butterfly, or its surrounding ecosystems.

Bornemark, J. (2018), The Limits of Ratio: An Analysis of NPM in Sweden Using Nicholas of Cusa's Understanding of Reason, in Ajana, B. (Ed.) Metric Culture, Emerald Publishing Limited, pp. 235-253

In the context of Swedish public sector, Jonna Bornemark has applied the perspective of 15th century philosopher Nicholas of Cusa to the contemporary shift towards New Public Management techniques. Bornemark describes the move away from intellectus, a reflecting capacity, towards ratio, a calculating capacity. Echoing Steinberg's 'document knowledge', Bornemark notes that this reorientation is articulated as *"an 'empaperment' when every act has to be documented in order to be counted as complete, and where the empapered world of ratio becomes more central than the lived world with its constant presence of not-knowing."*

As Steinberg and Bornemark suggest, there are also many other tacit, informal, highly contextual, performed and 'lived world' forms of knowledge, in numerous different formats, which participants can both embody and develop together, in conversation, and make concrete through writing, drawing and acting in place.

This knowledge is created through collaboration. It relies rather less on repeating apparently objective 'facts', which may actually be assumptions, somewhat subjective, or simply out of date.

Instead, it emphasises synthesis, on co-producing a shared understanding from multiple angles, and sometimes generating entirely new ideas as a result. In this, the emphasis is on performance, interaction, and co-production.

— These are important points to convey within the opening framing speech by the workshop leader and facilitators. The Actors Workshop is not about right or wrong—after all, if we knew all the answers to solving these systemic challenges, why are we all here? It is a collective sense of the 'architecture of the problem', an informal but co-produced understanding of how the systems fit together, broadly speaking, and where fruitful intervention points may lie.

— In this, it is already making clear that this mission-oriented innovation is a process to be performed, or a culture to create. A mission, whether Apollo, D-Day, or Miljonprogram, implies a journey as much as a destination, and this initial stage is not far past 'Base Camp One' in that journey. This takes the pressure off the group a little,

but also makes clear their importance in guiding these first steps with some clear trajectories to explore.

Workshop with system actors concerning a Government investigation into physical activity, White Arkitekter offices Stockholm, October 2020.

Different spaces produce different behaviours. Architects' offices often have spaces conducive to creative and collaborative behaviours, as well as often affording views of everyday infrastructures. Ask nicely (and let them join in) and they will often let you borrow their space.

Actors workshop for Healthy Sustainable Food mission theme, Spritmuseet Stockholm, June 2019.

Food, and the way that it is served, also changes behaviours. Hosting a workshop at a local museum means the agenda can be bracketed with a group visit to an exhibition, providing a different mode of enquiry as well as informal exchange, but the museum café also makes workshop catering easy and engaging. Here, Spritmuseet's café provided a tasty on-theme sustainable lunch for the participants to unwind after the workshop.

— In terms of keeping the pressure on, however, the opening speech should also make clear that we are here to find news ways of addressing the biggest, most complex challenges of our age. The basic condition of a mission—to be inspiring, ambitious, and focused on genuinely meaningful action—should be sung loud and clear at this point. Equally, that many of our challenges require us to move at greater speed, with greater purpose. These can be the key motivating and unifying messages with which we can prime the workshop for new kinds of behaviour amongst participants.

— At the start of the workshop, faciltiators should demonstrate how to 'unpack' an angle, in terms of following system logic around a scenario, indicating multiple systems at play, drawing out relationships and activities, step by step. Imagine unravelling the system before, and after, a plate of school food ends up on a student's plate. Or how the various forms of mobility might interact within a neighbourhood, mapped against resident and visitor patterns of activity. Or how a prescription gets to be handed over to a customer in a pharmacy. The workshop actors' knowledge will combine to do this, even though each actor may have one particular view of the system.

— Facilitators should prepare this example beforehand, and test on colleagues, in order to be credible enough—although it is important not to make it perfect, in order to encourage all participants into the process, and to stimulate a sense of active critique about the canvas.

Putting the cat on the table

For example, Grundmann, R. *The Problem of Expertise in Knowledge Societies*, Minerva 55 (2017)

There are sometimes awkword points to convey in the opening framing, including forms of knowledge, the role of expertise, and the important of 'saying the difficult thing that needs to be said', particularly in consensus cultures. These must be

addressed early, and subtly so as not to offend, but equally with clarity and purpose.

— The canvas is about tacit and informal knowledge, gaining insight into were exploratory action might be initially located, and understanding the multi-perspectival breadth of systems, rather than an exercise in formal systems analysis with narrow focused niches of disciplinary expertise. Do keep stressing this, as some participants, particularly nominated 'experts', will often find it frustratingly high-level. Facilitators should actively listen to, and recognise, any such concerns, but make clear that the nature of the complex systems at hand means that one body of expertise, in itself, is only useful when put alongside many others. It can be respectfully pointed out that we are intrinsically dealing with unknowns, and with different forms of knowledge that cannot be analysed a priori, in the abstract. There is deep understanding of the problem of disciplinary-based scientific expertise as regards policy-making, or even basic intervention-based strategies and yet such expertise if fundamentally useful and important, if contextualised, challenged, and refined by sessions such as this. Balancing these dynamics between profession groups and perspectives, in a real-time workshop setting, will be one of the biggest challenges for facilitators.

— One way of doing this is to describe the workshop's emphasis on action, and on deliberately cutting across traditional boundaries in new ways. This, by definition, means no single area of expertise or governance can 'own' the problem at hand. We are all in it together, and we have to act in new ways.

See the short downloadable booklet *Creative Collaborations*, by Helsinki Design Lab (2012), for more detail on participative groups and collaboration techniques.

— Leading by example, the workshop leader or facilitator should briefly demonstrate how the canvas is intended to work by unpacking one angle, in real-time with the

whole group watching, at the start of the session. This is worth practicing beforehand, and carefully pre-selecting the angle, such that the right messages are conveyed in terms of workshop practice. It is more important to get show the complexity, multi-faceted nature, and interdependence with other angles than it is to produce a perfectly articulated 'systems acupuncture' point. Various opportunities should be sketched out, however, so that the momentum is positive. Yet clear blockers, problems, or 'unknowns', should also be described. This should take no more than a few minutes, yet it is an important performance—it sets the tone.

— A final message to get across with the framing is that, although this is far from the only time participants will be able to engage with the process, it is fundamentally important that difficult issues are aired at this point. The workshop leader may wish to use an idiom at this point—most cultures seem to have one!—about saying the difficult thing, the thing that needs to be said, no matter how uncomfortable. This can be a variation on *"the elephant in the room"*, or the great Finnish saying: *"We must put the cat on the table"*. This is particularly important in a consensus culture that may not naturally confront in public. Note that is important that such issues are addressed respectfully, and constructively, but as a key goal of the workshop is critical, constructive discussion, the group's ability to handle confrontation and sometimes dissent, is crucial.

— It is also the facilitators' job to draw out issues, where they can be identified emerging in small pockets of conversation. It is better to have them out on the canvas at this point than for participants to walk out of the workshop thinking that there was something they could have said but didn't. These points of contention are amongst the most useful, and the canvas can work as the container

for them, to be addressed later, which de-personalises the confrontation a little.

— Finally, note that the results from this workshop will feed the next workshop, as well as subsequent synthesis. This enables participants to understand that the results of the canvas will not simply be enacted as projects or calls, but are part of a broader process.

Format and rhythm

Key to this process is building a shared and collective understanding of the 'architecture of the problem', and what appropriate intervention points might be.

— This means moving each small group of 3-4 people around the single shared canvas, as opposed to focusing on particular bits. such that each group addresses, challenges, and refines each emerging angle. This is a variation on a World Café-style approach, and it often makes sense for two or three of the facilitators to stay with one particular angle, or cluster of angles, in order to introduce the incoming group to the previous conversations.

— Each participant is encouraged to 'make marks'. Sometimes this means literally putting a pen in the hand of someone who is talking, to encourage them to articulate the thoughts on the canvas. This should be done with a smile, such that they don't stop talking, but instead talk and draw. The idea is that the conversation leaves traces, for susequent groups to build upon, and for post-workshop synthesis.

— Regular pauses are used to collectively reflect on the canvas, with groups playing particular details or thoughts back to each other.

— Timekeeping is key here, such that each group has addressed each emerging angle, within the timeframe.

Ideally one facilitator is appointed timekeeper, with a personal mission to ensure the groups move at the right point. This frees up other facilitators to be more involved in group discussions. This exercise can take two hours, depending on the group.

— At the end of the canvas session, the facilitators host a group discussion, centred on the key angles on the canvas. At this point, if makes sense for workshop leader to probe the group about the key angles. These can be marked with a simple asterisk, in a different colour pen, to enable easy identification afterwards. Equally, this act concentrates the discussion on key points. Sometimes several angles can be lassoed together, already suggesting a strategic grouping. Equally, connecting lines can be sketched between angles, to suggest systems. It is imperative that the participants feel ownership of this process, so the facilitators' must watch the group for telling glances, body language, and side conversations, and bring any issues to the surface in public.

— Equally, make clear that the results will be taken to the next workshop, and further iterated by the mission team. So this is far from final. Whilst ideas and angles can fall onto the table relatively easily, we cannot expect a perfect systems analysis and synthesis to happen in real time, nor is this group particularly representative of anything other than themselves. Facilitators can manage expectations positively, by describing the process of sythesis that will follow, and by noting that workshop participants will be sent summaries for comment.

— The workshop can be used to suggest possible mission statements at this point, once participants have spent some hours exploring the mission theme. This can be done as a group discussion, though this is hard, or by working in smaller groups, whose suggestions are

brought together in plenum. Again, manage expectations by making clear that 'wordsmithing', as with synthesis, is not really a 'team sport'. It is best done after the workshop. However, the participants will have extremely valuable suggestions to make at this point, and it is worth reserving 20-30 minutes to capture them.

— At the end, make clear that the results will be processed, and tested in the next Actors Workshop, as part of a rolling series of workshops, as well as further strategic dialogues and supporting analysis.

— In terms of some of the participants, the next step in the mission-oriented innovation process is the Design Workshops stage. These are based on the candidate missions that have emerged from synthesising the output of these Actors Workshops. Describe this next step to the whole group, whilst also assessing which of the participants may be particularly keen to take part in mission design stages, and have signficant value within the wider process.

Post-workshop review

This Actors Workshop is the beginning of the process, or one end of the beginning. Further work starts immediately afterwards, whilst the experience, and insights, are fresh in the mind. Whilst there is often an emphasis on getting the workshop done, in terms of the team's energy and workload, more effort is required before and after the workshop than during.

— Photograph everything; a good quality recent phone-camera will do (though you may also want to experiment with a camera on a tripod trained onto the table, taking a time-lapse movie showing the development from blank canvas to messy systems).

— Photograph images of the workshop in action, for communication materials aftwards, as well as the canvases

themselves. Take detailed crops of the canvas as well as ‘the big picture’ (you will need to stitch multiple images together for the latter).

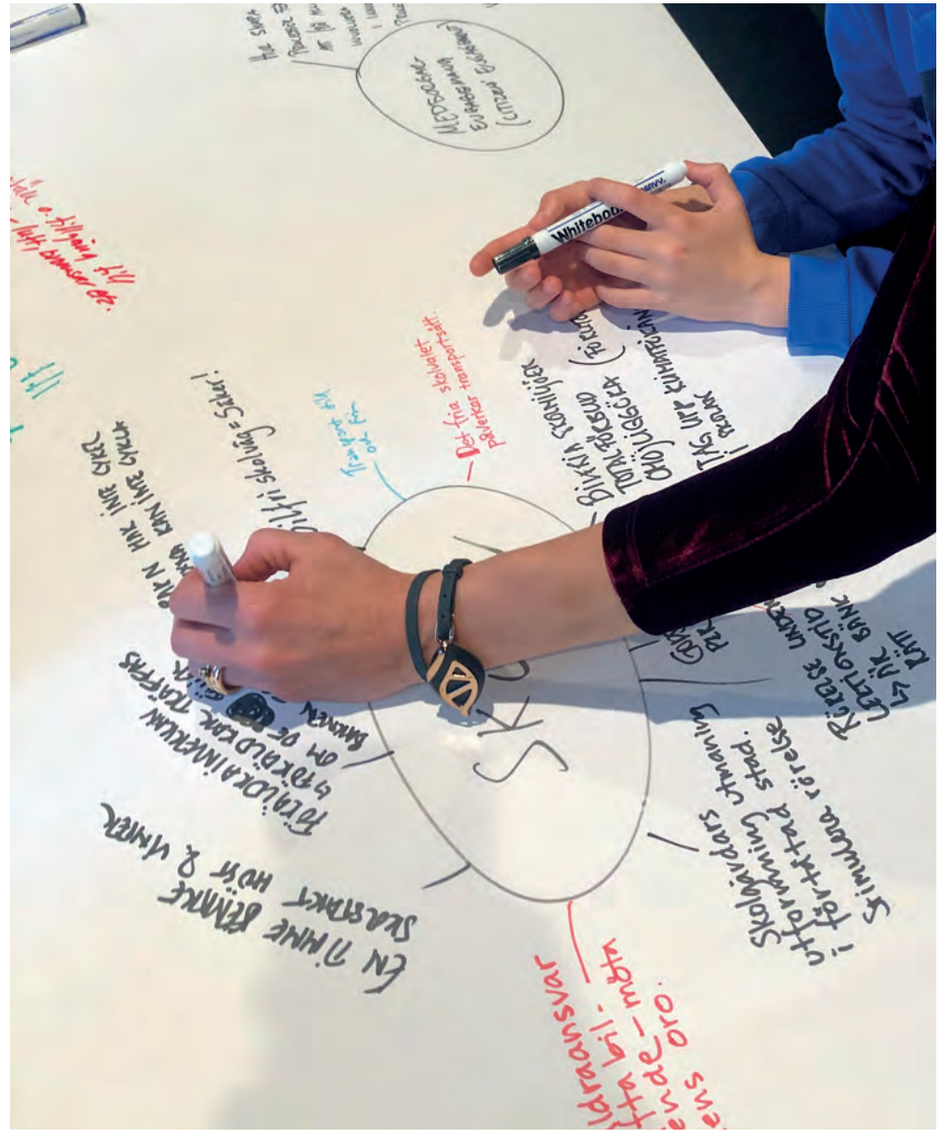
— It is worth keeping the canvases, but they will almost certainly end up rolled-up in the corner of the office, so photograph all the details. The images are more accessible, time- and location-stamped, and can be used individually as well as stitched together into a large image representing the overall canvas.

— Immediately afterwards, host a quick review with the team of facilitators. As well as a critical reflection on the execution of the workshop, use this time to capture any interesting insights from facilitators, particularly if they are shared, as well as key comments from participants.

— After the workshop, send a follow-up email to participants thanking them for their time and contribution, and asking them to get in touch if they have further things to say.

— After two weeks, send a summary of the workshop’s results, again requesting further feedback.

— But in order to produce that summary, you will need to create an analysis, and a little synthesis, of the workshop results. Do this while the workshop is fresh in your mind. That’s next.



Whilst there is an emphasis on system actors as participants in these Actors Workshops, the process is often engaging enough for multiple types of user, or citizen, to get involved.

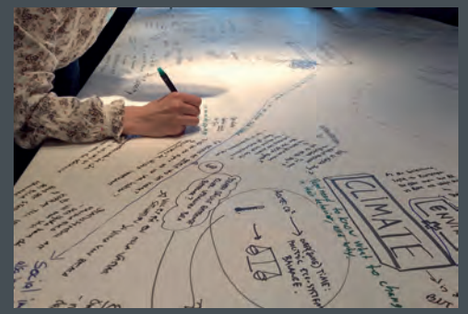
We must all be fully engaged in a well-designed process that encourages our participation, draws upon our local wisdom, and defies the distant experts … We must create the conditions for a dexterous application of openness, receptiveness, attunement, new frames of reference, and the dogged persistence to design and design again and again and again. Small, nimble, recursive, and scattershot designing may not necessarily more quickly evolve a complex system in the right direction, but at least its self-correcting tendencies will overcome the temptation to give the system one big push … in the wrong direction.

Jamer Hunt, Parsons School of Design

Systems canvas

Actors Workshops→ use the format of a co-produced large canvas to sketch out systemic ‘angles’ on the mission theme. These can be thought of as acu-punctures, interventions, or leverage points in the systems in question. The resulting **Systems Canvas**→ is a form of systems mapping with intent, used to identify, and build momentum for, next steps.

Visualising systems via the canvas forces a tangible approach, drawing from strategic design practice. A single shared canvas, which the whole group builds together, suggests a common view of key angles, as opposed to separate canvases for sub-groups; it subtly forces people to come together and draw connections between parts of the same system, as opposed to fragmenting. Using paper rather than screens ensures approachability, group interaction, and legibility at multiple scales



The systems canvases perhaps uniquely enable both ‘wide angle’ and ‘macro’ views on systems simultaneously, with many participants able to address the canvas at scale at the same time, as well as sketch and scribble small details.

simultaneously. Few other interfaces have these affordances.

The core role of the Canvas is to capture angles. An angle is a key component in what we call ‘the architecture of the problem’. It describes an area of concern or interest—it is often a cultural activity or technology, or it could be a business model or a policy position. Around the angle, participants can scribble key actors and indicate relationships, scenarios, and perhaps even early hunches as to a way foreword. The canas is deliberately open, rather than categorised. A canvas is not a spreadsheet. Simple arrows can reflect power, logistical, cultural, or transactional relationships between actors and angles, connecting across the canvas.

As we are also using the canvas to build a network, and some consensus, the participants should feel they can build the canvas on their own terms. Facilitators should be prompting and questioning, in order to ensure that angles are unpacked, in terms of underlying causes, manifestations, key actors, cultural patterns and so on. But the canvas is a record of the collective discussion, built up, refined, and challenged, by multiple groups. This is an additive process, constantly enriching.

Crucially, these canvases are not attempts at rigorous systems mapping, in an analytical sense. That can be commissioned separately, and good examples exist, such as the UK Government Office for Science obesity system map (2007).

Yet these analytical maps tend not to reveal possibilities for action, and can obscure as much as motivate. Equally, by being presented as objective fact, with little sense of collaboration in production or recognition of partiality, they are rather closed forms of knowledge, unable to build networks.

The Systems Canvas, in being produced by front line actors, is a middle ground—an

informed, collective portrait of relevant systems relating to a mission theme, as well as a shared statement of intent by its producers.

In building the canvas collectively, almost in real-time, it suggests that mapping is an ongoing process, not an outcome. It is a verb not a noun.

Far-left: Thévenot after Blaeu, 1659, from Tasman, 1642-4

Left: Vaugondy's Map, 1756 showing the longitude problem.

Both maps via Project Gutenberg Australia

Early explorers of Australia produced maps based on what they could see in front of them. With the benefit of hindsight, they seem laughably incomplete—yet who knew how the eastern seaboard would resolve, from the colonial perspective at least, until it was explored? When building an understanding of networks and systems in our complex environment, we also take an exploratory approach. We map as we go. One cannot assume that the map is ever complete, as it changes and evolves with each new connection. Equally, comparing the crudeness of these maps to the richness of First Nations peoples' understanding of the same continent, it is clear that mapping reveals the map-maker's prejudice and purpose. It is not objective; it is a cultural artifact, rather than objectively 'scientific'. In this, it reveals that much science is also subjective and cultural, and asks the map-making to be open, considered, engaged and respectful.

What matters are the public processes through which the map arises — and the publics that emerge around it …What also matters is the inevitable partiality or excesses of our maps, and how they create productive 'moments of contestation' that give people an opportunity to imagine different forms of society, to engage politically with their social world … to make demands of their governments and state shared claims as citizens'.

Shannon Mattern, *Post-It Note City* (2020)

Selecting participants

Forming a network for a mission—as one would form a team in business, or in sport or music—is, perhaps strangely, often uncharted territory for agencies.

Participants for innovation activities are usually selected through open call processes, in an attempt at fairness and transparency. Despite those good intentions, such open call processes may not always be fair. Equally, they can also inadvertently create competition between actors, rather than enabling collaboration.

Here, however, there was an interest in actively curating networks for cooperation and collaboration. Yet curation is not something that open call processes, or standard forms of procurement, can easily enable.

The Vinnova team, with a deep knowledge of the systems implied by the mission themes,

could get beyond ‘the usual suspects’ to potential participants that could represent what Mazzucato calls *“the coalition of the willing.”*

Yet the process of selection still had to be fair and transparent, of course, and so great effort was put into engaging communication activities around this effort, across various formats, and then responding to all those who showed interest in the process. In fact, many more engagement processes were run by the mission teams than an innovation agency typically does with a call process. The feedback from actors in the system was always highly appreciative of this effort, whether they ended up being involved in subsequent activities or not.

This form of open system engagement represents a strong role for Vinnova, as ‘the glue’ between often disparate system elements, working in new gaps created by changing circumstance. It requires a great sense of purpose, as well as patience and persistence, from the team, yet after only ten months of activity, the Vinnova mission teams had run over 25 major workshops, across all points of the compass in Sweden, and supported by hundreds of strategic dialogues with

system actors. Approximately 500 organisations had been directly involved.

Additionally, members of the team participated in numerous events and conferences, nationally and internationally, describing the mission-oriented activity. Web pages for missions were put together on the Vinnova site, with clear contact details, and social media and podcasts all deployed in order to cast a net as widely as possible.

As a member of Vinnova's board put it, reflecting on a presentation of the **Actors Workshops**→ in September 2019, in this way, the mission-oriented co-design processes could be a highly useful articulation of *"the voice of the system."*

Within all this, there is still the task of locating participants to be part of a network to lead the missions. The criteria for selection included: Can they represent a relevant part of the system, and thus have meaningful agency, or leverage? Do they have meaningful knowledge relating to the mission theme? Are they likely to be good collaborators? Are they primed for action? Do they have good local, national, and international connections?

The Vinnova team also attempted to curate for a diverse group, a crucial if sometimes sensitive topic, discussed separately. Yet even the perception of a national innovation process led by the national innovation agency needed to be addressed.

Previous mission-oriented processes such as the UCL-led MOISS, for the UK government, had worked well in terms of engaging high-level stakeholders, including national ministers and ministries, as well as departments and agencies. It was driven by an impressive array of academic expertise, but had also, uniquely, drawn on different forms of knowledge, such as the artist Brian Eno and Lord Victor Adebowale, CEO of social enterprise Turning Point. Learning from this, and with an emphasis on people- and place-based delivery, the Vinnova-led process deliberately engaged front-line actors from municipal and regional government in terms of public sector.

This local level is where most of the services and touchpoints that affect or articulate the infrastructure of everyday life are defined, procured, or delivered. Although national agencies set fundamentally important frameworks, their touchpoints

with people and place tend to be more limited. In Sweden there is a strong emphais on a relatively decentralised and distributed governance model. Although national agencies remain involved, the balance is local.

Of course, firms and other organisaitons are also usually at a front line, and key stakeholders from the private sector and third sector, relating to the mission themes, comprised an equally large stakeholder group.

The concept of ‘stakeholder’ has, in recent years, been problematic, in terms of representation in such processes. However, in Sweden there is a strong tradition of working with stakeholders from industry or civil society, underpinning many of the key developments that formed our society.

Ultimately, participants were selected on various combinations of these criteria—as well as practical questions of availability— such that the mission-oriented process could be located at the ‘front line’. This enabled a short-cut to an authoritative view of the system, produced by those that largely comprise the systems. It also meant richer ideas could be produced by those who would deliver upon them.

Importantly, there was no promise of funding dangled in front of participants. In fact, the mission-oriented process has been run with relatively small budgets, and essentially no project budget for participants. Once this mode was established with participants, usually early on, the relationship was built around genuine commitment to co-design and contribution. Working essentially without funding seemed to produce greater commitment, at least at this stage.

Finally, this focus on participants from the front line also recognised the contemporary understanding that new technologies, and new ideas, are best delivered and refined via a people- and place-based approach, in deep collaboration with the communities that it concerns. Whilst academic researchers were also participants in the mission design process, they were carefully selected with this in mind.

I just describe the things as they are.

Jane Jacobs

Workshop aiding Vinnova's strategy development for health and life science, featuring external collaborators and stakeholders, October 2020.

Workshop for emerging Swedish government mission around physical activity, September 2020.

Diverse teams

As well as an emphasis on ‘front line’ stakeholders, the Vinnova team also attempted to curate for a diverse group.

Diversity can be described in numerous ways, but certainly here included social, cultural, gender, age, ethnicity, as well as type of knowledge and perspective. Stanford’s Banny Banerjee describes both ‘horizontal and vertical diversity’ being important, assessing positions within the systems at hand.

Transition Theory’s description of ‘regime and niche’ actors is also useful here, and the Vinnova team looked for both to be represented (including participants who may represent a niche position within a regime organisation). In discussion with peers in other innovation policy contexts, this interplay within niche and regime was questioned. Surely it would lead to conflict? Yet in practice, we found that pulling a relatively diverse group into sessions, framed positively,

rarely created real problems. And some conflict is useful in a creative process—the grit in the oyster.

Such diversity is not simply a question of fairness and ethics, but about the performance of the network.As Steven Johnson writes, *“Diversity does not just expand the common ground of consensus. It also increases the larger group’s ability to solve problems ... when it came to measuring collective intelligence, diversity matters more than individual brainpower.”*

In the early stages of this process at least, teams may be stakeholder-heavy, which can make diversity a difficult goal, particularly in the Swedish context. It is far from impossible, however, and drawing from Sujin Jang’s research into cultural brokers, and Amy Edmondson’s on teaming will help identify useful participants.

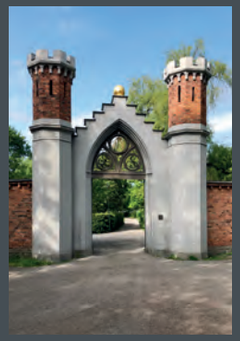
As the collaborative process progresses, so must diversity and agency.

Workshop locations

Producing new insights from confronting collaborations between disparate actors requires new behaviours, from all concerned.

As well as format, the workshop location can help break unhelpful habits by placing participants outside of their usual work environment.

Workshop locations also have basic jobs to do. They need enough space, including long tables for the canvas as well as surrounding chairs, as well as being a humane space.



Walking to island locations like Djurgården in Stockholm mean participants enter the workshop in the right spirit, whilst an urban farm on the Göteborg harbourside provided an ideal summer food workshop location.

White Arkitekter's office provided both a great space and useful context for the mobility workshop. Visiting Spritmuseet's exhibition on food futures was the ideal social and intellectual hors d'oeuvres before the food workshop upstairs.

We create a productive environment partly by choosing a space that involves a stimulating walk to get there, or may have supporting exhibits or relevant context, and has good food and coffee. This all helps to unlock different behaviours from participants.

The journey to the workshop is part of the workshop itself. Often, in a Nordic context, we can choose a location in or around the sea, yet still in the middle of the city. These locations are ideal, as they mean a different kind of journey to the everyday.

As Daniel Kahnemann's work indicates, walking itself creates different performance: *"The mild physical arousal of the walk may spill over into greater mental alertness...I did the best thinking of my life on leisurely walks."*

As well as walks to the workshop, a walk during the workshop can create different dynamics and social interaction, and, as Kahnemann writes, “greater mental alertness.” Facilitators will need to carefully prompt the groups, to unlock this sensibility for continual observation. See overleaf.

Walks can also be a creative component of the workshop experience. An hour-long walk was central to a workshop with Boverket and Stockholm Region’s health departments. Participants were charged with carefully observing the immediate urban environment, for places that could generate or hinder mental and physical health and wellbeing.

The workshop location was chosen with this walk in mind. This part of the city has significant amounts of construction activity, within 19th century mixed-use quarters sliced apart by late-20th century transport planning. Creating a shared journey can informally bind a group together before a workshop as well as shift mental gears during a workshop. Equally, the workshop will quietly benefit from a room with a view of the systems in question.

Workshop spaces can be subtly inspiring, with natural light and good furniture, but not too distracting. It also needs enough space for, and around, the canvas. White Arkitekter’s Stockholm studio and Umeå’s Pink Building were ideal.

Finally, the location should be able to provide good quality food and a place to eat it, as well as places for coffee breaks and quiet chats. As food is culture, it implicitly sends messages as well as providing sustenance. It need not be expensive, but it should be a considered choice.

Workshop spaces can be subtly inspiring, with natural light and good furniture, but not too distracting. It also needs enough space for, and around, the canvas. White Arkitekter’s Stockholm studio and Umeå’s Pink Building were ideal.

Observation

This set is from a workshop with Stockholm Region and Boverket in February 2020, concerning mental health and living environments.

Participants are asked to observe the infrastructure of everyday life. For instance, what proportion of our living space is traffic-oriented hardscape?

Not only sight, but multi-sensory. Do these trucks physically fit the environment they are in? What is the smell like? What do they sound like?

With the theme in mind, how might things be reoriented to promote mental wellbeing? What if recycling points were purposefully convivial space?

Evaluate the policy, service and experiential layers around us, not simply static environments. How do new technologies change old spaces?

What positive reflections can we share? The design of this end of the street presents itself to the sun, for the benefit of diverse human and nonhuman life.

Fredrik is asking, *"Façade, why so blank?"* Why is life only at the end of the street? Whose are these cars? What if eight year-olds and eighty year-olds had designed this potential promenade? What if the design driver was mental wellbeing?

The groups return from the walk-and-observe to reflect and discuss in the workshop, before presenting their observations, and suggested interventions, to the wider workshop. As well as talking and writing, participants are encouraged to draw. This unlocks another way of seeing, capable of combining multiple interests and responsibilities in a single image.

Navigating mess

Pernilla Glaser

Pernilla Glaser is an expert facilitator, researcher, writer and coach. She teaches at Konstfack, Sweden's largest university for arts, crafts and design, and The Academy of Dance and Circus, where she leads classes in Critical Thinking, Method and Linguistic Design. Pernilla has also worked at RISE in Built Environment, System Transition and Service Innovation, and as a coach and method support for numerous cultural institutions, organisations and companies. She is running several programmes for facilitators as supportive learning strategist at Förnyelselabbet, part of the organisdation for Swedish Industrial Design. We asked Pernilla to share her thoughts about the practice of facilitation given the context of complexity.

Everyone who has negotiated with a teenager, started a company or moved country knows what complexity is. Or at least what it feels like. It is not something that can be figured out and solved.

Complicated problems are solvable, even when they are difficult. It's possible to find an appropriate response by matching the right skillset to the problem at hand. Complexity, however, is a continually evolving web-like structure of various challenges where there can be no single expertise for understanding it. The complex is in movement, merging and reorganising with some parts that are visible and identifiable, and other parts that are obscured or unnamed.

So complexity is not a problem, but a context, a dynamic to be understood and to be interacted with. Getting acquainted with complexity can offer rewarding learning, perspectives and insights. It helps you change positions, language, ideas, interventions, ways of measuring and understanding. But how to find some solid ground when the landscape is shifting under your feet?

This feeling of complexity is an early warning that there is something bigger or messier in play. It will not fit neatly into the box of a given project or single organisation. So 'together' is the best place to explore complexity.

But not simply any 'together'. A group needs to generate psychological safety to be able to explore complexity together. One must feel safe enough to express half-baked thoughts or hunches, and that they will be received with a curious kindness. You must not be made to feel inadequate, unprofessional, silly,

time-consuming or stupid. When we are hunted by something that we find hard to express, we are vulnerable. But this vulnerability is a short-cut to *collective intelligence*, in which we can not only understand things together but also generate insights and inventions.

With psychological safety we prioritise questions over answers. We give everyone time and space to express themselves in their own words. We are mindful not to get caught up in stress and we avoid over-disciplining each other with deadlines. (That doesn't mean we ignore them; we just don't remind ourselves about them all the time).

When we set out to explore complexity we need a space that is closed and open at the same time. Anthropologists call this a liminal space, a space dedicated to transformation, the in-between. A liminal space can be erected anywhere just by us saying, *"Now this is a liminal space!"*

In this in-betweenness, uncertainty can be carefully unpacked and harvested for all its meaningful information. What kind of uncertainty is it? When does it occur? Is it contagious? The answers will help us to understand where complexity is and how it is experienced. In the in-between we can observe things from as many different perspectives as we can.

We can explore how time is factor; are we talking about something that is slowing down or speeding up? What does that tell us? We can role-play how we imagine it to be experienced by someone else. We can talk about place: where is the project happening? How is that facilitated? We can explore terminology: What are the most used words? Are there words that are taboo, and if so why?

The liminal space allows us to act as existential detectives. We begin to understand the anatomy of a complex challenge. We can also rewrite our own story. What if we describe it in another way? What if we try to embrace what we previously pushed to the side?

This is still a workplace, containing different forms of knowledge: that which comes out of our lives, from messiness,

Get comfortable with the fact that you don't know what you don't know.

Think about the questions you want to ask, not the answers you want to give.

Be kind to yourself. Experiment but don't judge.

Try everything before you evaluate.

Invite as many perspectives as you can.

Speak and act from a personal stand-point. Express what you feel and think, not what "everyone" thinks.

When confronted with something you don't understand, react with joyful curiosity.

Appreciate the detours for their scenery.

View everything as potential material for your exploration.

from transition, shifting perspectives and relationships … and the knowledge we have acquired in formal settings. These different but equally important forms of knowing interact if we are brave enough to let them, unlocking fuller forms of learning.

Most of us operate in projects where there is a high expectation of finding solutions, reaching decisions and then moving on to the next thing. But some things disappear when you try to look straight at them. You need to wiggle your way to an understanding. Resting together is part of that. Not the rest that happens when you grab a drink after work, though that can be useful too. This is a rest that is included in your work as a reflective practice. Experiment with deliberately slowing down, finding pockets where you can allow everyone to take a step back and just sit for a moment, checking in with themselves, exploring different kinds of spaces in different ways, like wandering through a forest or an art gallery.

Don't get stuck in one way of communicating. Share experiences, write each other letters. Be an anthropologist in your own environment, recording what is actually there. Ask each other real questions. And allow for self-reflection. Give space for everyone to ask themselves, "How is this for me?"

When you try to navigate complexity it is useful to adapt an attitude of enthusiastic doubt. Not skepticism, which sails too close to undermining criticism, but instead a supportive sense of uncertainty that allows for the possibility that your own reactions and opinions might not be the only valid ones.

We can prototype everything, not least the way we think and act, and socio-cultural prototyping provides a sort of reflex test, a way of flushing out hidden responses. What can we understand together, that we couldn't understand apart?

Collaboration requires abstractions of space, time, kindness and relationships. But the resulting understanding, prototype or idea will be real. It will be the result of collective effort, and it will be solid enough for further testing, exploration and renegotiation.

We often equate goal-setting with the question of what we

want to achieve. Perhaps a more useful question might be, "How would you like to learn together with others?" For no-one knows exactly how it will work. And sometimes it won't, of course. You hit a dead-end or find yourself entangled in more confusion than you can handle.

The beauty of prototyping is that we can fail without risking everything. We can try again, testing out new routes or dreaming up new questions to explore. This kind of failing is learning, and we can use it to fertilise the next iteration. Practice together by sharing and reflecting on failures, support patience and assist each other in directing kindness inwards as well as outwards. We are all we've got. But that is all we need.

1 Discovering missions

Summary

1 Discovering missions

Summary

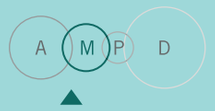
- Mission themes can be drawn from agreed political and societal priorities, such as Global Goals or existing national and regional strategies.
- Cultivate an awareness of the difference between outcomes and enablers. Both are required, yet don't confuse one for the other. Frame discussions around missions with both in mind.
- Co-designing with stakeholders not only develops rich, integrated and holistic insights and angles but builds engagement, motivation and commitment from those who must deliver missions.
- Working with stakeholders actively engaging with systems 'on the ground' produces tangible, representative, and action-oriented insights and issues.
- Pay attention to creating formats and environments that will unlock different ways of thinking and acting, enabling participants to safely and confidently challenge assumptions, silos and risk.
- Ensure diverse groups of stakeholders are drawn together in a variety of formats.
- Concentrate on facilitation, to ensure that participants can contribute in numerous and diverse ways.
- Recognising that mapping is an ongoing process, and ideally collaborative, start synthesising the systems canvases, looking for repeated patterns and themes. These are the angles, suggesting the key intervention points within systems. Missions lie within.

Self-governing, self-authoring, self-organising, the sense of personal responsibility, and the cultivated sense of belonging in the nation are crucial to the success of our countries.

Lene Rachel Andersen and Tomas Björkman

2

Developing missions

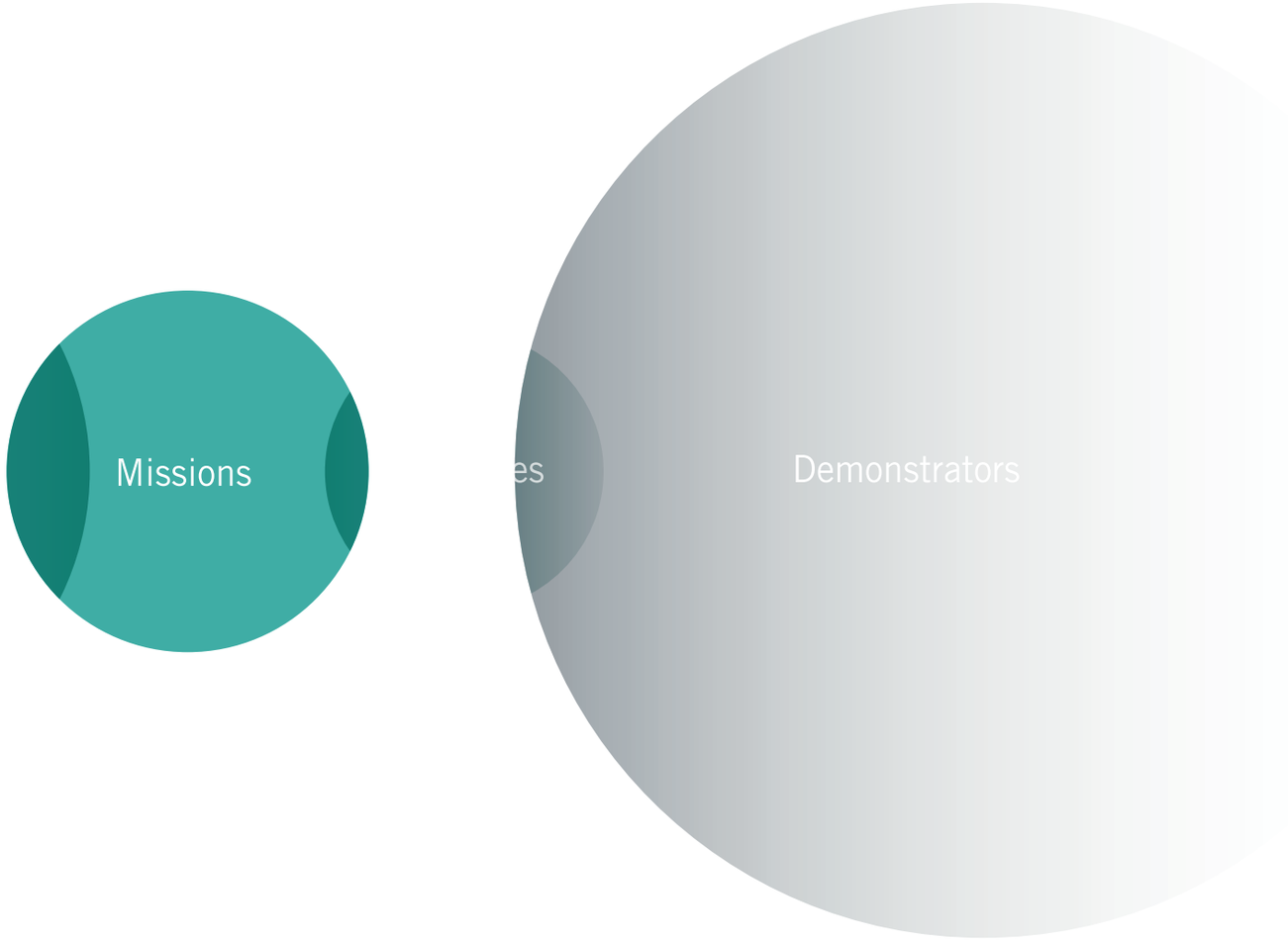


In which diverse groups work together to develop angles, or ways into the systems, from which they can start creating portfolios of missions, using systemic design principles.

2 Developing missions

A network of engaged actors and agents. An array of angles, suggesting system dynamics, intervention points, and possible touchpoints. The first stages of the process are richly textured, full of possibility. This is the opening up dynamic of the design process, in which the landscape can feel a little boundless, positively and negatively, and perhaps with little sense of hierarchy of feature or depth, structure from perspective, edges and connections. Next, then, comes making maps, signposts, compasses, vocabularies, and movement in particular directions—the components an explorative process neccessitates. Unless previous eras of empire builders or colonialists, this navigation is respectful, careful, self-critical, and looks to touch the ground lightly. It continues as a participative process. It begins to develop a structure for systemic change, yet predicated on understanding the diversity of human and non-human life in places. It starts developing a portfolio for action, and focuses on partners that are willing and able get involved in delivery. Missions emerge from this stew, accordingly.

2 Developing missions



2–1

Locating the missions

Using systemic change principles applied to the angles emerging from the Actors Workshops, a set of draft missions emerges. A portfolio of activities, such as the interventions discussed in workshops as well as existing innovation activities, can be aligned around these missions. These missions will be refined through prototyping. As such, this definition stage is not an end, but a beginning of the missions themselves.

Background

The output of the first phases of **Actors Workshops**→, and subsequent synthesis, can be formed into a portfolio of loosely-defined draft missions. These draft missions comprise a clear sense of site or overarching vehicle for projects and activities, as well as sense of direction, or 'North Star', and impact and outcomes.

The Actors Workshops often included an attempt at co-producing a mission statement, yet it quickly became clear that there would be multiple missions per theme. A portfolio of several missions, each supporting the other, would provide a more realistic, yet still ambitious, way of addressing the mission themese of Healthy Sustainable Mobility and Healthy Sustainable Food.

Equally, these draft missions will actually contain multiple projects, which can fit together as a portfolio. A design process suggests these are best articulated initially as **Prototypes**→, as the richest, and fastest, way to to learn as much as possible about a mission, before scaling into systems demonstrators. Identifying the prototypes within a particular mission will ultimately be done in facilitated **Design Workshops**→, with system actors and others engaged in more focused co-design sessions.

Yet prior to this we must sort the output from the **Systems Canvases**→ into meaningful missions, selecting the most promising angles in order to enable systemic change.

Selecting angles

When reflecting on the many angles articulated in the Actors Workshops, we are looking for a particular set of conditions.

— *We look for examples of emerging activity within Swedish society that could be inflected towards future strategic priorities and ambitions for Sweden, locally and globally.*

— *We are looking for a 'pull', niche or emergent, where we can generate momentum, attract attention, and develop transformative societal outcomes.*

— *We are looking for what Mazzucato calls 'a coalition of the willing' within incumbent or 'regime' actors, after Transition Theory, who are also interested in this pull.*

— *We are looking for scalable activities, which have the possibility of enabling systemic change when working in a portfolio approach, and which might require a 'push' of infrastructural support, or policy or regulatory refinement.*

— *We are looking for genuinely meaningful activities that will connect with society, broadly speaking, as well as private, public and third sectors, and with the political process, in order to build new consensus.*

Key systemic design principles, described here as **Levers**→, **Layers**→, and **Lenses**→, are also used to help form coherent missions from the selected and synthesised angles, enabling us to address these motives.

Before this stage, however, all the content from each Systems Canvas was distilled using a series of synthesis approaches informally described as **Chunking**→.

This chunking is performed by the mission teams, although supported by ongoing analysis and multiple strategic dialogues.

Ultimately, after many group sessions, the team arrived at six summarised angles for Healthy Sustainable Mobility and eight for Healthy Sustainable Food. These are still not missions, as they comprise a mixture of angles, lenses, projects, and things that could be missions. These need further processing to form a portfolio of missions.

Unpacking angles

Initally, this processing involves reviewing the activities that participants had identified or invented, and discussed and proposed, during the Actors Workshops. Many of these often 'smell like' plausible projects or programmes, perhaps unsurprisingly, given the type of people in the workshop.

Many others, however, are a mixed bunch: discrete elements of infrastructure, policy initiatives, incentive schemes, regulatory shifts, ownership structures, lifestyles, or simply increased capacity of a particular capability.

These can be plotted in terms of 'push and pull', or 'supply and demand', as one way of better understanding and separating out the various activities.

By 'push' and 'supply' we mean actions or infrastructures which are technology-led, or involve building infrastructures, or concern the supply chains or production lines behind people-facing touchpoints, transactions or experiences.

Systems do not get unstuck
—they learn.
—Nora Bateson

And by 'pull' or 'demand', we mean, in effect, the other end: precisely the context of those people-facing touchpoints or experiences. With demand-side measures, we can shape supply, of course.

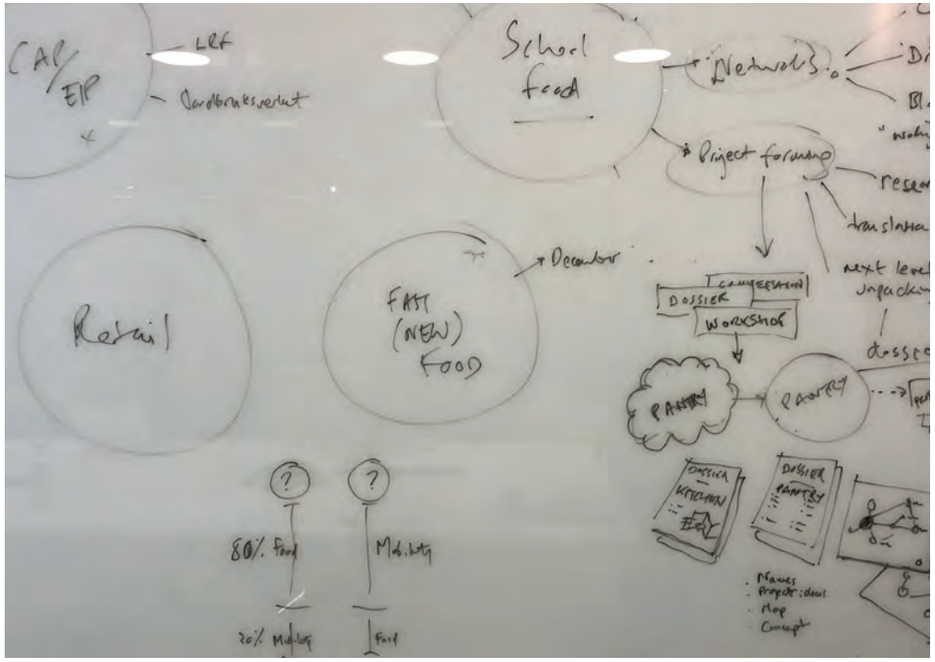
In other words, it is not enough to simply design the on-street chargepoint infrastructure for electric shared vehicles; we also have to create a demand for electric shared vehicles, and thus the chargepoints.

This symbiotic relationship could be very impactful, in terms of time and cost, as well as, ultimately, a better-integrated design process, connecting people, place and technology.

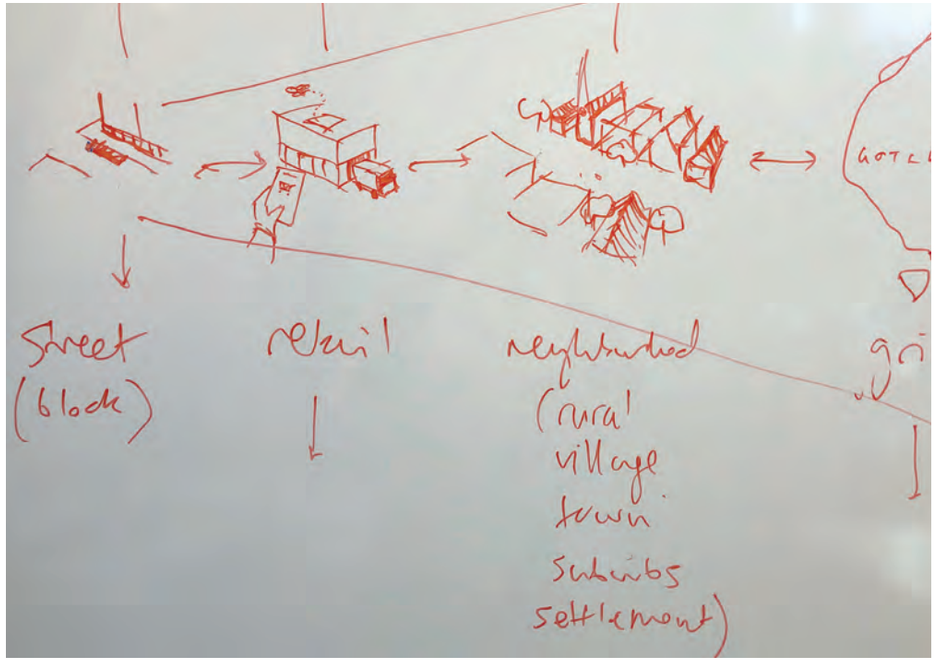
For example, by reducing the overall volume of privately-owned car traffic on our streets, through a series of demand-side measures such as incentivising shared car use, walkable green environments, better cycling infrastructure and public transport, full pricing of externalities, and so on, the overall volume of electric car chargepoints is also reduced. This enables a faster rollout, at lower total cost, of the supply-side technology. These initiatives can go hand-in-hand, to ensure that sufficient economies of scale exist for the supply side producer and operator, but that it is not scaled any more than it need be.

Equally, this unpacking of supply-side and demand-side measures begins to suggest other co-benefits, revealing assemblages of activities that could work together harmoniously. These will be explored in greater depth later, when developing

prototypes, but already it is possible to see how connecting farms (supply) to school food (demand) more directly could be beneficial, just as integrating approaches to last-km logistics, new forms of retail, kerbside management and sensing infrastructures could enable healthy, green walkable and bikeable environments.



Emerging ideas as to the specific missions within the Healthy Sustainable Food theme.



Emerging ideas as to the specific missions within the Healthy Sustainable Mobility theme.

Chunking

At the end of the Actors Workshop, canvases are a rich stew of opportunities, blockers and enablers, design principles, notes about context, and random thoughts—and somewhere in there lie potential missions. Working through the canvases and sorting missions from principles from projects takes several hours, multiple eyes and hands, and some further strategic dialogues.

This clustering and chunking may be art as much as science. The systemic design principles of **layers**→ and **levers**→ provide insight as to what to prioritise. A balance of demand-side—or behavioural, cultural or social—measures as well as technical, infrastructural and supply-side measures is required. Some angles can be combined with others, to ensure each angle has critical mass and richness. Some angles are clearly principles rather than programmes or intervention points. They enable something to be defined and delivered, but are not an activity in their own right.

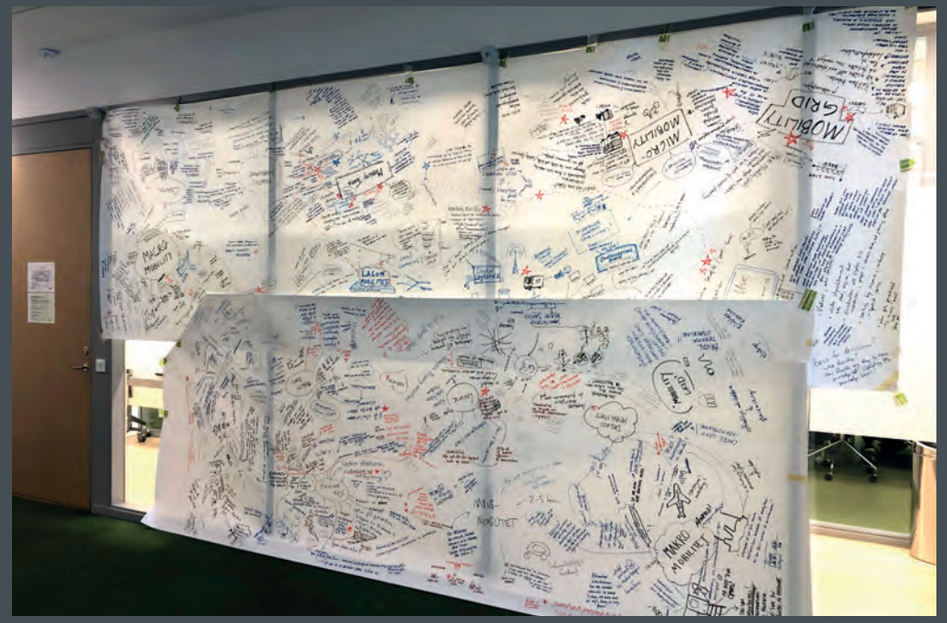
A sense of how systems fit together, or might fit together, is crucial to being able to form attractive clusters. This requires a fairly deep familiarity with the socio-technical context.

Yet equally, using analogy, metaphor and examples from other, quite disparate contexts, can help identify patterns. Spotting patterns is a core capability here, a key tool in the designer's toolkit.

The notion of chunking is drawn from user experience design (see *'How Chunking Helps Content Processing'* from NN/G, which in turn draws from cognitive psychologist George Miller's famous 1956 research) focusing on the amount of information suitable for processing.

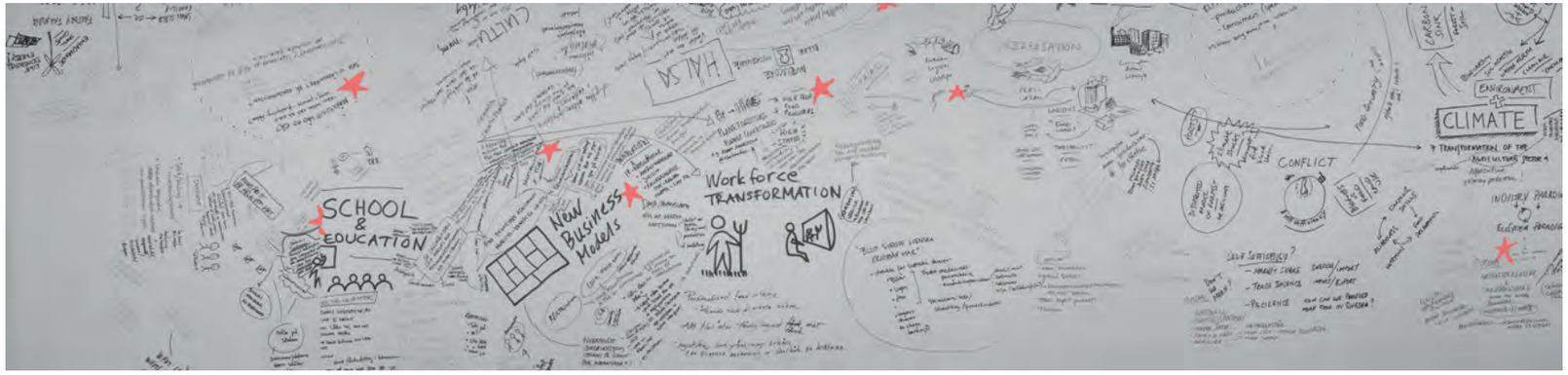
Chunking should uncover the potential systemic relationships between elements as well as the 'massing', amount, and distribution.

Vinnova teams reviewing and analysing the systems canvases from the first Actors Workshops for Healthy Sustainable Food and Healthy Sustainable Mobility mission themes.



An open morning for various Vinnova teams to review all the systems canvases from the Actors Workshops.

Composite image of Systems Canvas from Healthy Sustainable Food Actors Workshop 1



Composite image of Systems Canvas from Healthy Sustainable Food Actors Workshop 2

Composite image of Systems Canvas from Healthy Sustainable Food Actors Workshop 3

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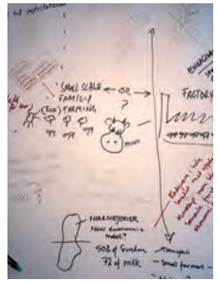
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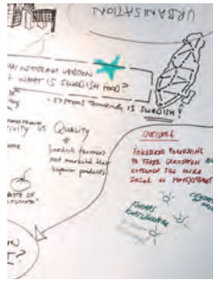
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01 Climate crisis
02 New business models
03 Small scale family farming
04 Swedish food
05 Technology and automation
06 Food culture
07 Health
08 School food and education
09 Workforce transformation
10 Urbanisation and peri-urban spaces
11 Global markets and foreign aid
12 Integrated health and sustainability

This list of 12 describes all of the primary angles emerging in the workshop. After the workshop, the Vinnova team clustered and chunked the angles down into a list of six. This synthesis of the angles represented the most frequent and urgent topics of conversation as well as comprising a balanced set of interventions, capable of working different aspects of the system. The list of 12 on the left became the list of eight on the right.

Healthy Sustainable Food
Selected and chunked angles

01
School food

Sweden has a large and well-regulated school food system, with around 2.5 million meals per day served, from kindergarten through to high school. If we added university food, and potentially meals for the elderly, the total 'public foods' market is the largest in the country, greater than all food formally served in other contexts outside of the home. Currently optimised for safety and efficiency, at this scale and governance it could be a significant lever for system change.

02
Macromobility

How might we remove barriers to new forms of food—defined loosely as currently non-mainstream culturally-speaking, but safe, healthy and tecnically capable of being produced at scale—that could be significantly contribute to a healthy, sustainable diet and a circular, clean and resilient food system. Workshop participants often described legacy regulation and policy environments holding back scaling of these new food systems and cultures.

03
Healthy resilient farming

Repeated in every workshop as the most fundamental aspect on the table, in that farmers are the root of the food system, and yet arguably positioned at the wrong end of the value chain. There are issues of farm and land ownership, ecosystem services versus crops, skills bases and new technologies, strategic questions of types of farming (rediscovering old approaches or developing entirely new forms—or both), mental and physical health, climate-adapted land, circular systems, and so on.

04
Traceable trusted produce

In order to enable zero-carbon, health-creating and inclusive food systems, clear, trustable information is required, not simply at point of purchase, but tracked throughout the food system. Contemporary digital technologies exist to support this, yet this also means new practices and business models. Such tracking would in turn enable different logistics systems—and so there is a crossover with the mobility missions here, from long-distance food import/export to super-local last-km delivery.

05
Modern Swedish

A richer sense of identity in Swedish food—and the processes and cultures that produce, enjoy, and reuse it—was often highlighted by workshop participants. This could include building on the New Nordic Cuisine movements of the last decade, yet can also broaden outside of this niche, by mainstreaming ideas of local, indigenous food practices. This would involve reinvented traditional practices and entirely new ones, engaging the entire country's resources and environments, as well as our global food exporters.

06
Circular zero-waste systems

Given the food industry's footprint, the opportunity to genuinely create a circular, zero-waste food system was thought to be prime 'mission-territory', unsurprisingly. Whilst daunting in scale, breadth, and complexity, participants suggested this should be underpinning any activities around missions. It may be that this goal is best handled by locating it within every mission that emerges from this work, as a core principle.

07
Peri-urban and urban farming

As an adjunct to the focus on farming (03, above) there are particular opportunities around new, or indeed old, locations for farming. These include areas of towns and cities that are changing due to shifts in adjacent markets, such as retail—for instance, space currently dominated by 'big box retail' at the edge of cities becoming available due to disruptive e-commerce. These could be prime sites for retail. Equally, new tech enables different farming methods, such as vertical farming and basement farming, for new garden cities.

08
Ecosystem services

Recognising the value of food production and use in terms of ecosystem services, this angle covers the various use of agricultural land and resources, in terms of the additional value produced by sustainable and resilient farming, over and above food production, as well as the value of food waste, in terms of composting and other uses. New metrics, or value statements, were key here, moving beyond traditional industrial-age measures of valuable transactions, as well as better understanding through new tech.

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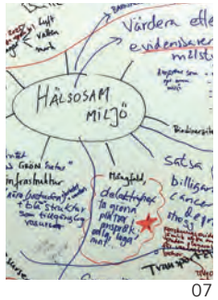

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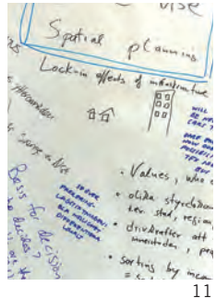

11

12

01 Lagommobilitet (contextual mobility)
02 Macromobility
03 Micromobility
04 Digital logistics and e-commerce
05 Mobility grid
06 Integrated teams addressing mobility
07 Hälsosam miljö (healthy environment)
08 Consolidation points
09 Anpassad mobilitet (custom mobility)
10 Delad mobilitet (sharedmobility)
11 Land use and mobility
12 Rural, exurban, and small towns

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Healthy Sustainable Mobility
Selected and chunked angles

01
Lagom mobilitet

Shaping and controlling the supply and demand for mobility to be 'lagom' given the context—in terms of numbers, space use, time of day, noise, emissions, speed and so on.

Requires significant digital innovation—sensing, analytics, learning, geofencing, control systems—as well as policy innovation, predicated on user research, behaviour change, systems mapping and procurement design.

Also requires new skills and organisations, both public and private sector, working together to achieve lagom outcomes.

02
Macromobility

Pushing towards zero-carbon, health-creating and inclusive forms of long-range transport, principally aviation, rail and long-distance trucking, as well as their associated systems, resources and spaces.

Core R&D needed in certain areas, such as aviation fuel, electric aircraft and charging infrastructures for electric trucks. Also policy design, smart procurement, operations and control systems for delivery of existing technologies.

Includes data-driven planning, infrastructure upgrades including charging systems, data protocols and services to enable effective load management, autonomous mobility, and more.

03
Micromobility

Designing and operating to significantly inventivise healthy, sustainable and inclusive forms of mobility at the scale of the first or last few kilometres, including active transport such as walking, running, cycling and scooting, as well as small-scale and shared transport, for people and logistics.

Requires significant improvements and increases in digital skills, services and infrastructures in order to effectively manage such spaces and services in real-time. Equally, radical changes in planning, permitting and operational culture based on integrated, user need- and data-driven approach. Requires data-sharing policies and protocols, as well as sensing infrastructures and new teams.

04
Digital logistics

Driving healthy, sustainable, resilient and inclusive outcomes for retail-oriented logistics, and their wider impact, via policy innovation, digital infrastructures for data-driven operations, new planning models for retail, and service design.

Prior to full disruption, devise outcomes for distinctive retail consumption/production that creates and reinforces resilient local economies and places, and diminishes retail-associated traffic. Equally, displace other retail to e-commerce, delivered via active, zero-carbon modes and appropriate fiscal measures, within agreed 'lagom' frameworks. Devise spatial strategies for resilient retail and space unlocked by displaced retail.

05
Mobility grid

Electrifying the network of grids and resources associated with transport, driving the transformation to fossil-free renewable energy-fuelled transport.

Requires digital infrastructures and services for planning, management and operations. Includes design and roll-out of charging infrastructures, including holistic approach to integrated spaces and services for charging, from micro- to macro-mobility, urban to rural.

This benefits from associated demand-side measures to reduce unnecessary mobility, including sevice design, policy design, as well as predictive analytics, thus enabling more cost-effective and rapid roll-out.

06
Integrated mobility teams

Creation of multidisciplinary teams in municipal, regional and national government, addressing mobility holistically. Teams balance rapid response with planning, as well as devising and delivering new mobility products, services, spaces, policy and regulation, via directly operating or strategically procuring. Crucially, helps coordinate coherent delivery of new inner-urban, suburban and rural spatial strategies, policies and regulation.

Major shift towards internet-era ways of working, including human-centred service design, data science and machine learning, and real-time data-driven operations, alongside transformed architecture, planning, social, cultural, economic expertise.

Supply-side, or 'push', interventions

Healthy Sustainable Mobility

Demand-side, or 'pull', interventions

					Lagom mobilitet	Geofencing infrastructures and street/kerb	Packet-switched logistics networks	Real-time traffic control systems	Procurement guidelines for S-M-L-XL municipal vehicles	Real-time privacy-preserving sensing infrastructures
Chargepoint and hub design and delivery	Public and private electric vehicles as distributed battery	Circular battery storage programmes	Procurement of electric buses and other municipal	Incentive schemes for electric car transition	Mobility grid	Develop legislation for bans on fossil-fuel vehicles by 2030	Marketing for electric mobility in towns and cities	Citizen participation approaches to unlock on-street charging		
Coherent logistics networks by rail, sea, and air	Very low emissions aviation	International fast and slow rail services	Efficient and electric shipping, ferries, boats	Long-haul electric truck infrastructures	Macromobility	Routing, load management & localisation	Taxation and levies to enable carbon pricing of aviation	Social movement campaigns to reduce aviation		
Community-scale autonomous shuttles	Micro-mobility hubs via green extended parklet model	Safe and sustainable scooters	Infrastructure for 5x increase in cycling	Policy and legislation for electric car-sharing	Micromobility	Geofencing policies, infrastructures, and campaigns for safe	Campaigns and infrastructures for walkable green			
					Integrated teams	Integrated plans for healthy, fossil-free rural mobility	Integrated plans for New Garden City suburbs	Integrated plans for car- and large vehicle-free inner-city	Integrated planning, service design, user research, and co-design capability	Municipal and regional data science capability
			Step-down consolidation centre networks	Shared emission-free, healthy and social last-km	Retail logistics	Legislation and incentives for load management	Localised on-demand fabrication centres and policies	Design for diverse and productive high-streets and centres	Appropriate taxation for e-commerce	

Supply-side, or 'push', interventions

Healthy Sustainable Food

Demand-side, or 'pull', interventions

	School kitchen design and procure	Circular approaches to school food waste	School food supply chain	School law change to enable food as education	School food	Training school cooks and redesigning meal culture	Student, staff and community forum			
		Core research and development into new foods	New farm design for new foods	Regulation and policy for new foods	New Food	New foods in school food programme	Marketing and media campaigns for understanding of new	New retail concepts for new foods		
Learning, research and education for farming	New approaches to land ownership rights	Family-owned, diverse and distributed farming	New approaches to risk-sharing and profitability	Robotics, IoT, and machine learning on the farm	Healthy, resilient farming	Community- supported agriculture models	Campaigns for Swedish restorative, clean and zero-carbon agriculture	Connecting farmer to retail in new ways		
			Traceability	Animal welfare	Traceable trusted produce	Communicable data-driven labelling systems for accurate	New retail concepts enabled by zero-carbon, clean, healthy			
					Modern Swedish	Swedish restorative, clean and zero-carbon agriculture	Swedish food eco-tourism	Communicable data-driven labelling systems for accurate	Social dining rituals, campaigns and infrastructures	New Swedish circular, ecological, and educational retail
	Circular logistics services	Phosphorus capture and re-use	Traceability and data for waste	Biofuels and energy from food systems	Circular zero-waste systems	Clear labelling for circular use models	New packaging concepts	Retail as circular hub		
Circular logistics services	Land-use regulation	Traceability data services	Reusing big box retail	Local logistics via active transport	Peri-urban and urban farming	Public spaces and streets as food production	Incentive schemes for local food			
	Farm as carbon capture and storage	Methane capture	Land ownership as ecosystem services	Biodiversity and land-use	Ecosystem services					

Portfolios as systems and assemblages

We can never fully understand our world, not in the way our reductionistic science has led us to expect. Our science itself, from quantum theory to the mathematics of chaos, leads us into irreducible uncertainty. For any objective other than the most trivial, we can't optimize; we don't even know what to optimize. We can't keep track of everything. We can't find a proper, sustainable relationship to nature, each other, or the institutions we create, if we try to do it from the role of omniscient conqueror.
—Donella Meadows, *'Dancing with Systems'* (2001)

These diagrams are the next stage layer of synthesis from the workshops, indicating how the various interventions and elements discussed in the workshops might interact with each other. This form of drawing helps further define and refine these place-based missions. It allows us to see the relevance of particular interventions—those clusters of lines illustrating dependencies—as well as outliers. In following the lines, new intervention points emerge.

These diagrams are not analytical attempts to capture and articulate an entire system, as if opening the bonnet on a car to reveal the engine. That analogy makes clear the difference with a complex system, with unpredictable interactions constantly evolving, an engine building itself as it moves, in ways that cannot be planned.

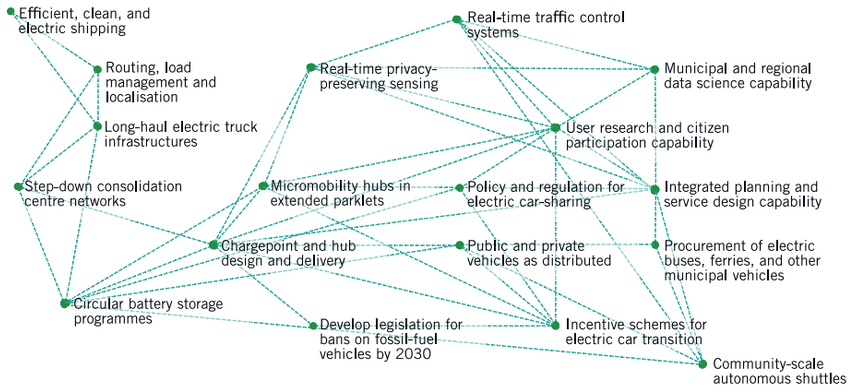
They are not systems maps, as they do not involve causal relationships and feedback loops. They are deliberately incomplete, too. This is partly to recognise the limits of complex systems modelling, with its allusions to cybernetics and top-down technocratic control systems.

What we've ended up with is a civilization built on the constant flow of physical goods, capital, and data, and the networks we've built to manage those flows in the most efficient ways have become so vast and complex that they're now beyond the scale of any single (and, arguably, any group or team of) human understanding them.
—Tim Maughan, 'The Modern World Has Finally Become Too Complex for Any of Us to Understand' (2020)

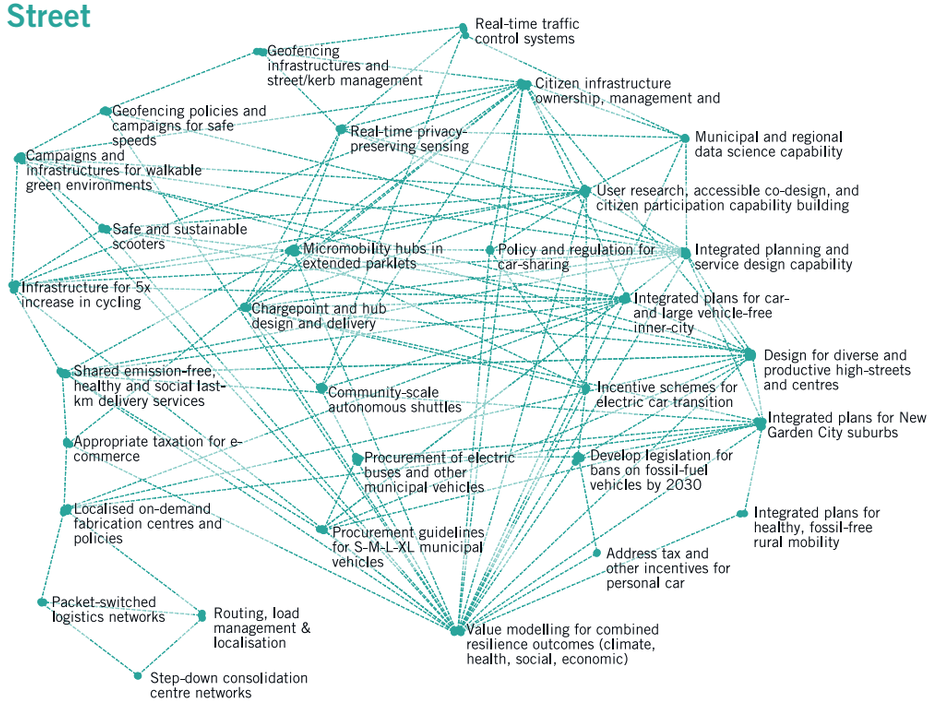
Instead, the tangles and thickets of lines loosely represents the idea of 'assemblages', after the work of Anna Lowenhaupt Tsing and others. We have a preference for systems doing, rather than simply systems thinking—being present, and adapting. Donella Meadows extolled us to *"stay wide awake, pay close attention, participate flat out, and respond to feedback."* Jamer Hunt suggests systems are not things to analyse but environments to be engaged with, via *"small, nimble, self-correcting"* participative processes. Following Meadows again, who said we can't know leverage points in advance, contemporary complex systems resist human understanding, at least *a priori*.

But we can make maps as we go. These diagrams are living stories of that work of 'systems doing', updated as we go, based on feedback from Prototypes.

Grid



Street



Layers

Understanding how to exert the different layers of change in a system is crucial to unlocking systemic change. Here we draw from Duffy's 'pace layers theory' within architecture. It enables us to sort activity in fast-moving layers of change, such as changing diets or mobility technologies, from slower-moving layers, such as infrastructure projects or constitutional law.

The systemic change design principles opposite ensure that local prototypes can be distinct, tangible and specific to culture, climate and landscape, whilst ensuring that innovation, whether in the form of specific practices or policy changes, can effectively scale nationally and globally.

1 Platforms rather than standalone projects

Develop a platform strategy—multiple diverse touchpoints, but built on a common codebase of capability, regulation, policy, data- and practice-sharing—which explicitly indicates how disparate activities are integrated and interrelated.

2 A diverse portfolio rather fund-and-forget

Ensure that each activity is part of a broader active portfolio of connected programmes, projects and systems, with reinforcement loops producing multiple outcomes which are actively engaged with, tracked, maintained, and guided.

3 Soon and fast as well as later and slow

Ensure there is the possibility of starting soon with meaningful prototypes, which are nonetheless agile, lightweight and can be malleable in early stages, whilst not ignoring the power of slower transformations.

4 Rewrite code for systemic change

Ensure some activities explore whether regulation, policy and governance capabilities need altering to ensure system-wide equitable and effective change, across multiple scales and conditions, whilst interpreted locally.

Levers

Most accounts would suggest that Sweden is a coherently-governed nation, with significant infrastructures already in place, whether social, political, or built. This coherence enables significant possibility of system change, using existing infrastructures as levers to produce change; in effect running new ‘applications’ on existing hardware.

We are no longer in 1900, or 1950, when we needed to build entirely new heavy infrastructures from scratch. There are still new systems, services, and spaces to build, but in many cases it makes sense to direct existing systems in new directions. Think of this like pulling a lever in a different direction to generate greater impact—like switching points on railway tracks.

Repair and retrofit are different forms of innovation and governance cultures, yet could be faster, cheaper, inventive, productive, participative, engaged, and ultimately refined.

1 Existing systems over new build

Identify and align installed or latent system elements, organisations, programmes, or infrastructures as ‘vehicles’ for the initiative, enabling replicable action, rapid scaling, sustainable resourcing, and fewer distractions or duplications.

2 Pull as well as push

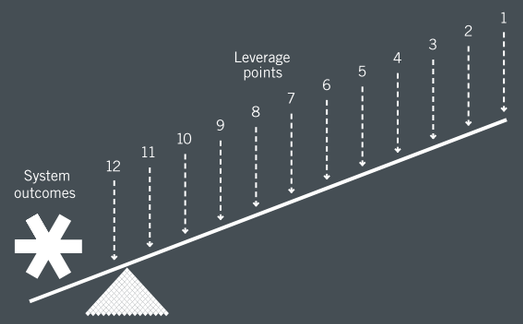
Engage with and develop social movements to create a ‘pull’ on systemic change as well as producing a ‘push’ from technological or sectoral innovation. Embed actions in existing communities and networks, in both emergent/niche and established/regime cultures.

3 Interconnected rather than insular

Use Sweden’s existing networks and relationships to create meaningful connections to relevant regional, international, and global actors and networks, in order to ensure broader worldview of systems. Equally, ensure other actions develop new relationships.

4 Prototypes over investigations

Facing systemic challenges, identify potential for tangible prototypes within existing projects or places in order to rapidly flush out cultural responses, technical challenges, and policy issues, whilst building public interest and political capital via engagement.



As described earlier, Donella Meadows’ 12 intervention points, suggest how a lever can be exerted to produce systemic change. By choosing existing everyday infrastructures as levers—key nodes—all aspects of a system are in play, combining material interventions with participative approaches that address mindsets, goals and paradigms.

Lenses

Missions enable portfolios of bold activities to combine, through intensive collaboration, towards ‘North Stars’ of clear societal outcomes.

Whilst those outcomes provide direction in themselves, each activity, whether a project, capability-building service or programme, must also address a set of cross-cutting issues. For instance, the Street mission, as part of Healthy Sustainable Mobility, might be looking to impact upon carbon, health and economy.

Yet given its people- and place-based focus such a mission cannot ignore additional issues, such as social justice outcomes like gender equality.

Equally, there may be some core design principles which are not projects but cross-cutting heuristics or themes, which can help shape how projects are designed and delivered. The Actors Workshops around mobility produced the notion of ‘lagom mobilitet’, describing a way of thinking of providing just enough mobility, given the context, at *just the right scale*, and with *just the right speed*,

and so on. Lagom became a powerful principle that could run across many projects. But it is not a project.

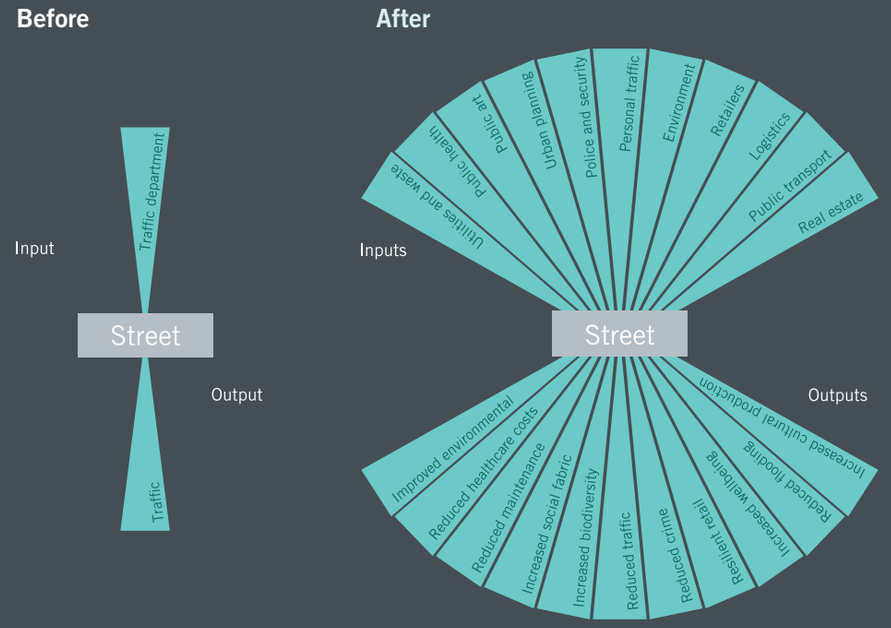
Primarily, however, the key lenses will concern the issues articulated by the Sustainable Development Goals, mapped onto national priorities.

These examples—addressing issues like social justice, circularity, social norms and diversity, public sector transformation, contemporary Swedish and Nordic culture, design strategies and so on—can be combined in order to ensure that projects are designed to produce multiple, integrated outcomes.

The idea of multiple lenses also describes how we bring new perspectives into an existing context, in order to unlock many diverse forms of value.

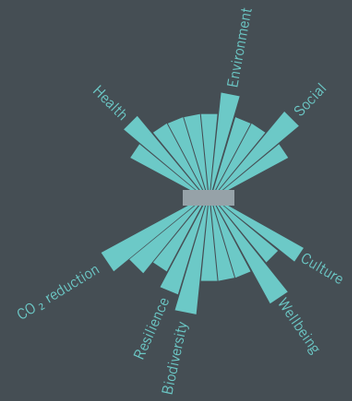
For illustrative purposes, this might be visualised as if a Japanese fan. With the fan closed, there are limited inputs flowing into the element in question, and so there are limited outputs.

Yet opening up, by including more inputs into the question of what this particular arena is, we can reframe what the system element, or environment, is about. This can unlock new dynamics, generating richer, more diverse forms of value and values, and exerting its potential for systemic change. This means not settling for simply effective management within one or two silos, but asking what this system is really about, and what can it be about. What could it do? Who is involved? What value could be produced? In effect, this is like snapping the fan open, enabling its inherent richness to be revealed.



Here, using the example of a street, if the municipality's traffic department is given primary responsibility for the street, the street tends towards traffic. It is either implicitly or explicitly managed around that structure and its typical skillsets, cultures, and tools (after Conway's Law). However, the richer view of the street suggests we can involve and emphasise many more 'inputs' (people, organisations, and policies) in the question of the Street, and what it might be for. This allows us to bring these inputs together, in holistic, multi-perspective place-based interventions, from which many forms of value can be unlocked. This can produce 'win-win' strategies leading to co-benefits. It also implicitly asks which outputs are most important (diagram to the right).

This illustration is used simply to unlock the principle. In reality, of course, a more rigorous approach is required for mapping both inputs and outputs. Streets currently convey communications infrastructure and utilities as well as traffic. Equally, it is not possible to exhaustively and completely map such a complex system. The principle is to recognise its complexity, and manage it accordingly.



You have to keep your eyes as open as fans.
—Charlotte Perriand

Portfolio

The portfolio of activities within a mission must be carefully framed in order to produce systemic change, by maintaining a multi-perspectival approach, creating multiple outcomes, and building capability, infrastructure and other enabling conditions.

Portfolios should therefore comprise a diverse set of activities, which taken together scope out an entire territory, with an emphasis on learning-by-doing and building engagement. From an innovation agency point-of-view, they will require a diversity of funding and collaboration approaches. It is likely that new portfolio-oriented management tools will need to be invented, mapping onto systems.

Opposite, a list of design principles for mission portfolios. These can be used as a form of checklist, in order to suggest how to think more broadly about the portfolio, ensuring that it describes a rich, diverse, and holistic set of activities.

In reality, portfolios provide a useful way of thinking about bundles or chunks of activities, aligned around a

1 **Portfolio**
The angles, and proposed activities, should lock together to describe a diverse portfolio of systems and relationships.

2 **Platforms**
Disparate activities in the portfolio should indicate how common layers of code, practice, or place could integrate and interrelate.

3 **Dynamics**
Identify activities that exert fast-moving layers, enabling action soon, along with slower layers, requiring careful engagement.

4 **Recode**
Activities should explicitly explore how regulation and policy—aka ‘code’—can be reworked to unlock systemic change.

5 **Reorient**
Identify existing activities, resources, and capabilities that can be aligned or oriented towards the mission theme’s challenges.

6 **Movements**
Disparate activities in the portfolio should indicate how common layers of code, practice, or place could integrate and interrelate.

7 **Interconnect**
Identify activities that exert fast-moving layers, enabling action soon, along with slower layers, requiring careful engagement.

8 **Prototype**
Each activity should suggest promising prototyping opportunities, enabling immediate further development and learning.

theme. With missions in mind, portfolios exist at multiple levels: portfolios of missions themselves; portfolios of demonstrators within missions.

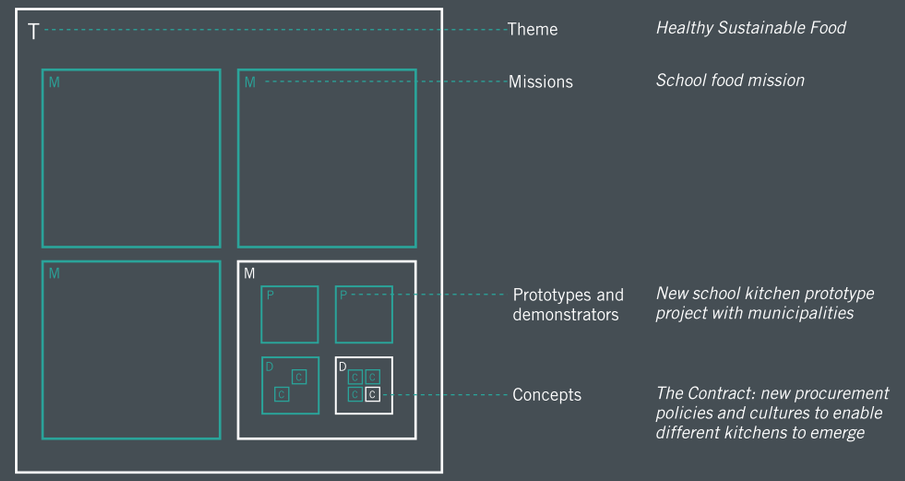
The word ‘portfolio’ has certain connotations. It can suggest a loose collection of work, as in a designer’s portfolio. Yet in the context of innovation agencies, it usually connotes an investment portfolio. This could be a little misleading. It may emphasise an often-distanced financial investment culture, to the potential detriment of other forms of engagement, other interventions. It may be that adding finance makes a system less sustainable, or produces perverse incentives.

So whilst investment is often highly relevant, it is not the only tool in the toolkit. It may be that a direct emphasis on working with systems of systems, with multiple diverse interventions aligned by Demonstrators, produces a richer set of outcomes, and a more engaged ongoing process.

A portfolio approach can mean placing a diverse spread of ‘bets’, which balances the risk of investments whilst accessing multiple parts of a system, and opening up multiple routes to solving a challenge.

As Mazzucato points out, the Apollo mission provides a good example of the sheer range of initiatives required to achieve the single outcome—from spacesuit

A nested approach to portfolios



Repeating patterns occur at different scales, each nested inside the other. In this context, a Mission Theme contains a portfolio of Missions within it. Each of these is articulated via portfolios of Prototypes (and ultimately Demonstrators). In turn, such prototypes are bundles of concepts. Some of these concepts are tested across multiple prototypes. So at each level, a portfolio approach is required. Equally, each level must be aware that there are portfolios ‘above’ and ‘below’. This requires a certain way of thinking, acting, leading, and managing, common to strategic design practice. The great Finnish architect Eliel Saarinen said:

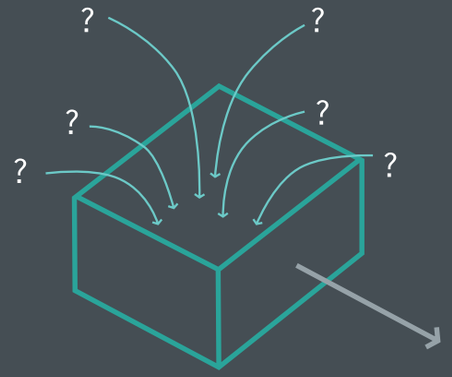
Always design a thing by considering it in its next larger context–a chair in a room, a room in a house, a house in an environment, an environment in a city plan...

Continuing this sensibility, we must see that Vinnova’s mission themes at the Swedish scale ‘fit within’ broader European missions. City-level missions, which will inevitably have implications for health and public transport, say, must be seen in the context of regional policy, and so on (as Swedish regional governments have responsibility for healthcare and public transport).

Matryoshka dolls, also known as Russian dolls, are a well-known design paradigm describing repeating patterns within nested elements. Similar concepts are the ‘onion metaphor’, based on nested layers, or even a fractal sensibility, in which patterns can be identified and evaluated at multiple scales.

Missions oriented around place-based types help align portfolios

We use place-based types to align multiple projects in a portfolio. This moves from a position where multiple projects can often co-exist without interacting formally at all, although they are clearly systemically connected in reality. Conversely, a portfolio oriented around a mission enables multiple disparate projects to be aligned, coalescing around the mission theme's North Star, and made tangible through grounded place-based demonstrators.



Here, a type—street, school, forest, suburb, port etc.—can align multiple projects with a direction. From a point of view of innovation policy, formally, this is a mission: a container for multiple systems to align, around a clear direction. The 'container with a direction' is really a systems demonstrator, a platform that can host multiple research and innovation questions and actions.

design to food innovation, jet propulsion technology to project management.

Consequently, the diversity of possibility spillovers is also increased. Similarly, holistic place-based innovation projects move in multiple ways—aligning architecture, health, jobs, infrastructure, culture etc.—in order to come together to produce a place.

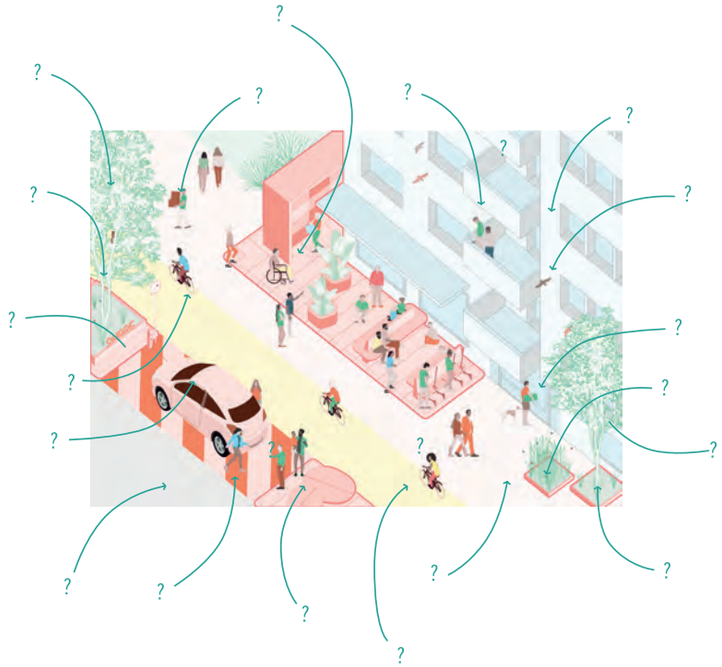
In fact, the challenge of place-based development is that these connections between these various moving

pieces are not ususally considered. A place is produced either way, because systems. But to intentionally plant the seeds for a place, with the 'companion planting' and careful nurturing that ensures it has the best chance of growing into a vividly thriving, resilient and regenerative place? That is clearly a challenge for a system divided around sectors.

Hence the approach of devising a portfolio of actions, exploring different system layers, aligned coherently around a mission. Testing that in place-based prototypes and demonstrators provides the necessary gravity to hold the portfolio together. Here, we can discover how systems align and realign.

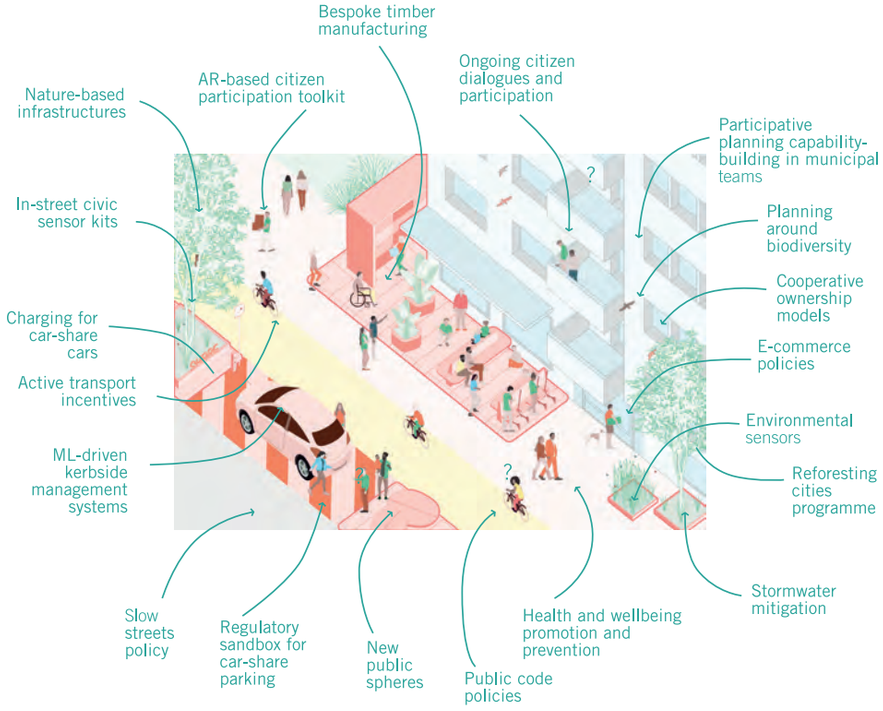
Asking questions via place-based vehicles

The systems **Prototype**s→, and then **Demonstrators**→, provide a vehicle for the continual and ongoing process of framing, asking and testing of a portfolio of research and innovation questions and actions. Milica Begovic of UNDP calls this kind of vehicle, *"a mechanism that gradually resolves/explores uncertainties about system dynamics through learning and adaptation and ongoing sense-making,"* suggesting a form of live 'design probe'.



Such prototypes will provide a way of experiencing living systems, rather than simply cold analysis in Excel. They are places to hold and pursue research questions, but also contestation and dialogue, as well as enabling change on the ground via the *"small, nimble, self-correcting"* participative processes that Jamer Hunt proposes.

Analysis can be conducted in these environments, of course, and the Value Models constructed around the prototypes and demonstrators should ultimately provide a means of gathering real-time data from these environments, which can be augmented by qualitative research. But the emphasis here can be on creating systems doing rather than simply systems thinking.



At this point in the process, these typologies of places—often social infrastructures or living environments—will quickly start emerging from dialogues. The diagram above indicates the eventual possibility of turning questions into actions, yet all we are looking for here is the angle: the fruitful starting point, a tangible lead, a thread to pull.

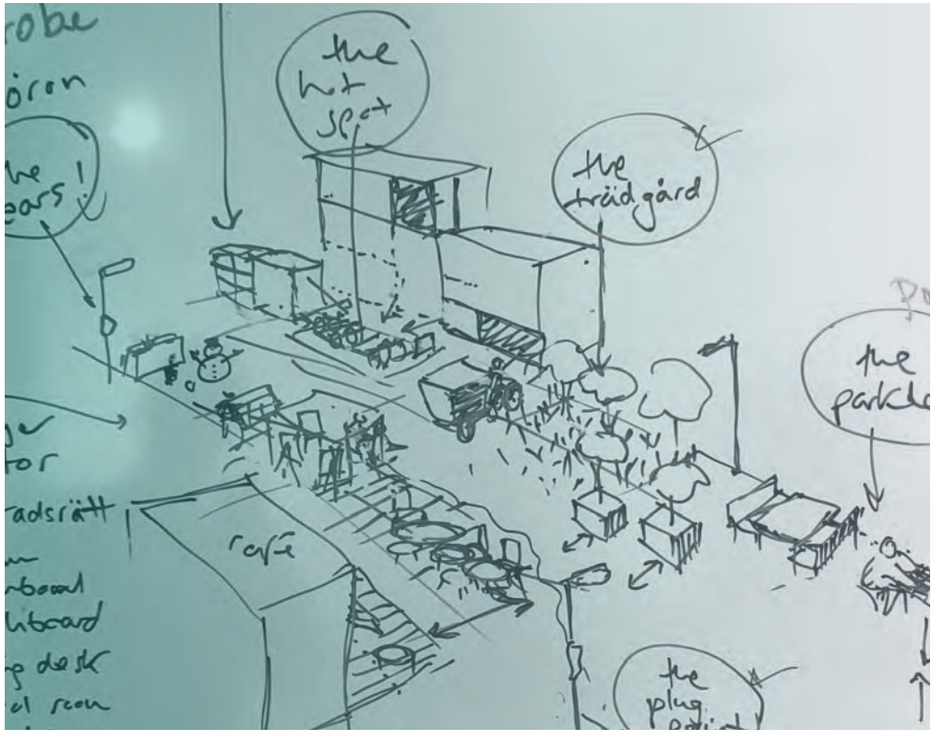
Mission-oriented innovation workshop on the occasion of the Prime Minister's Innovationsrådet (Innovation Committee) visiting Kalmar.

In this picture, the then-Swedish Prime Minster Stefan Löfven and Health Minister Lena Hallengren are engaging with the co-design processes run with stakeholders from the Kalmar region. The exercise involved teams working towards 'North Stars' around key challenges and opportunities for the region, before describing and discussing integrated interventions that could follow those trajectories. Finally, teams were asked to describe the diverse forms of value that could arise from pursuing an integrated and systemic approach.

Here, the Prime Minister is pointing to the fact that a proposed mobility-as-a-service intervention creates more diverse uses of space and citizen engagement, and in turn can produce social capital as well as environmental value. These same co-design techniques can be used by stakeholders in Actors Workshops or Design Workshops, as well as directly with citizens, in participation formats.

2–2

Framing the missions



The set of angles is beginning to ‘smell like’ a set of missions. Yet a process of careful framing is required to reveal and refine the most meaningful shapes within. A set of framing tools, such as lenses, levers, layers, patterns and types, can be used to interrogate and hone the emerging missions. With different forms of scaling in mind—not simply ‘scaling up’—platform strategies are used to bring together a set of actors, policies and influences for systemic change, preparing and seeding the soil.

From chunked angles to draft mission portfolios

At this point, the angles from the **Actors Workshops**→ have been refined into a set, each described in terms of the potential interventions, initiatives or projects—all drawn from the fertile discussions in the workshop.

Unpacking these angles in this way enables us to see repeated elements across the set. For instance, the 'new retail concepts' intervention occurs in multiple angles related to the Healthy Sustainable Food mission theme, each with a subtly different focus but clearly capable of being combined into a holistic activity focused on retail concepts.

Similarly, within Healthy Sustainable Mobility, there are a slew of activities concerning the way streets are designed, governed, managed and inhabited, including micromobility hubs, chargepoints for electric vehicles, last-km logistics, walkable green environments, privacy-preserving civic sensing infrastructures, various ways of reducing speeds, and so on.

As mentioned previously, assessing the possibility for **Levers**→ and **Layers**→ helps at this stage, enabling us to sort some angles into candidates for missions that can achieve systemic change. These design principles will be explained over the following pages.

Equally, some angles are fundamentally important, yet simply do not lend themselves to missions, in terms of having a clear outcome or goal, which is broadly motivating, and with clear societal outcomes. They are better thought of as enabling activities, and thus located within a mission. An example might be the various activities aimed building capability and capacity for integrated multidisciplinary mobility teams across the public sector. This can hardly be a mission, but is fundamentally important to enabling multiple missions.

Similarly, approaches to a topic such as circularity, for example, will be required in almost every mission. This makes it a candidate for a mission in itself, in a sense—*"A circular Sweden"*—but that same overriding importance makes it too

broad, and leaves it without either a focus, or a clear, working environment in which to be prototyped, located, exerted.

'Circular' can instead be a **Lens**→, variously applied to every mission, just as with social justice aspects like gender, so-called general purpose technologies like machine learning, or organisation and governance questions, like building capability in the public sector. Each mission should address these concerns. It will translate to set of capabilities, approaches and infrastructures which enable forms of systemic change, yet they are not missions as such.

Instead, these skills, capabilities, and infrastructures comprise a **Platform**→ strategy. Each mission is built upon these shared platforms.

Finally, the People- and Place-based approach described earlier—looking for the 'everyday complex' environments in which we can meaningfully locate missions—also provides us with a way of transforming these angles into missions. Here, we are looking for clearly understandable, tangible environments, which contain, represent, and articulate the complex systems that are around us all, all the time, everywhere and everyday.

This way of thinking and acting is intrinsic to design, which looks to prototype and iterate as quickly as possible within clear touchpoints embedded broader systems. These prototypes are vehicles for learning, for generating insights, for mitigating risk by enabling exploratory models to be tested and by flushing out latent issues, before committing to full-scale demonstrators.

Sorting through all these principles, the team imagined a series of coherent place-based environments, or everyday systems, as containers for the draft missions. These provide immediately recognisable concrete entrypoints for citizens, yet they are all complex objects, requiring multiple layers of government and public sector, as well as different actors from private and third sectors, to work together in order to address them holistically. None of them fit neatly into one 'silo', despite first impressions.

The idea begins to emerge of places, defined by key 'types' such as housing, streets, schools, forests, farms, shops, factories,

Around two decades ago, ecologists understood that a very specific and important type of keystone species warranted its own term entirely. Ecosystem engineers actually create habitats for other organisms, building platforms from which several others benefit. Consider for example the beavers that dam rivers turning forests into wetlands, or the coral that builds thriving reefs into the middle of the ocean.
—Steven Johnson. *Where do good ideas come from?* (2018)

depots, ports, generators, and so on. The way we design, develop, fund, operate, and govern these things speaks to what we value and what we stand for. They are where everyday systems converge.

In turn, these constructs contain and articulate more abstract elements of society, technology, governance, supply chains, investment, and so on. They are present in each instance of these types, and so each type can be used to prototype, test, and develop both highly particular place-based demonstrators as well as the more abstract layers that tie these systems together.

For platform basics, read *'Playbook: Government as a Platform'*, Richard Pope, November 2019, Ash Center for Democratic Governance and Innovation, Harvard Kennedy School

As discussed earlier, this approach is particularly powerful in terms of devising place-based missions, which keep systems complex, whilst also being tangible, approachable, communicable, and situated in reality.

By organising and communicating in this way, it is possible to see how each mission would interact with each other mission, creating an initial high-level **Portfolio**→ clustered around each mission theme, supported by a shared **Platform**→ strategy. The places bring all this together in integrated fashion, ultimately in the form of **System Demonstrators**→. It is then possible to explore how the mission themes—of Food and Mobility—will overlap within and around certain missions.

So, each theme has a linked portfolio of missions, each mission has a linked portfolio of actions. These actions are wrapped up into bundles of prototypes, which are early, testable forms of demonstrator.

Draft missions

The synthesised output from workshops, interviews and analysis should be framed by these various ways of seeing: **Levers**→, **Layers**→, **Lenses**→, **Places**→, and **Platforms**→.

Deploying any one of these concepts will provide insights into sorting the array of angles produced in the workshop. Yet they also work as a set, enabling the team to assess the angles from multiple perspectives.

It may also be possible, even at this early stage, to assess the potential for **Prototypes**→ that may lead to **System Demonstrators**→ within the angles. This insight may come from existing projects that could be re-aligned, coming together to form a cluster of related activities, such that they begin to feel like a coherent prototype.

Pragmatic issues can come into play here—if a project is already running, and has years left on the clock, it must be considered part of the game-plan. Perhaps some minor adjustments could be done, in order to portray it in a new light, as part of a potential Systems Demonstrator.

Ideally, each project in the portfolio is related to Prototypes and Demonstrators in some way; without that alignment work being done, the legacy project will still remain in-play and may only distract.

Managing Matryoshka dolls of portfolios

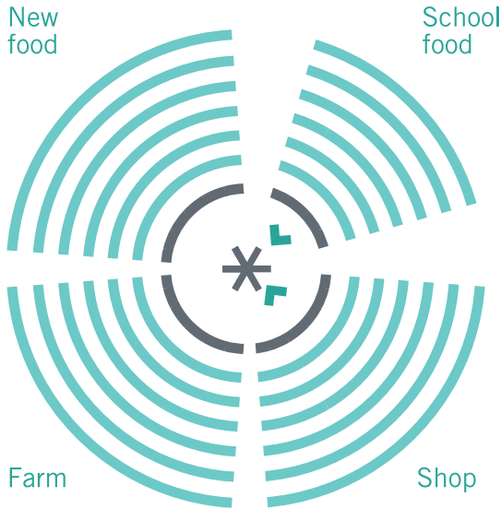
The Matryoshka doll principle for **Portfolios**→, describing nested approaches at different scales, almost fractal in nature, is a useful design pattern here. The Mission theme is articulated as a portfolio of Missions. Within that, each Mission is articulated as a portfolio of Prototypes (and then Demonstrators). Within each Prototype, several projects might combine in a portfolio.

New porfolio management tools will be required of innovation agencies, enabling systems to be managed, rather than silos or sectors. Currently, few agencies have anything sophisticated in place on this front.

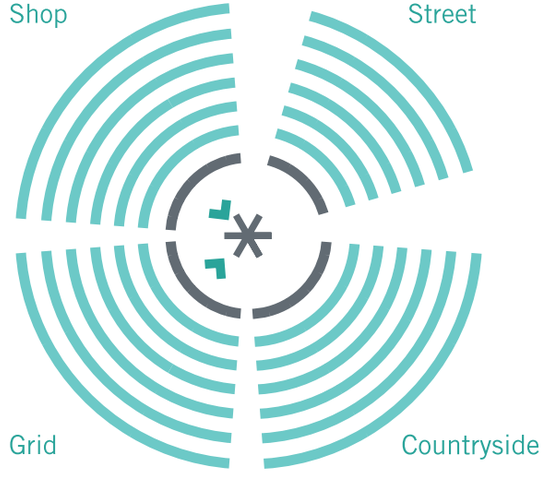
Emerging missions

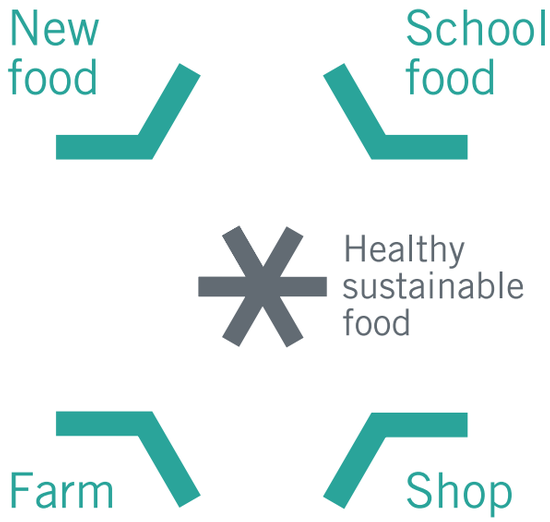
Each mission is a set of projects, exploring system layers, aligned and delivered through Demonstrators, and pointed towards the North Star. The mission symbol indicates a clear direction but also an umbrella over multiple activities in a portfolio.

Healthy sustainable food



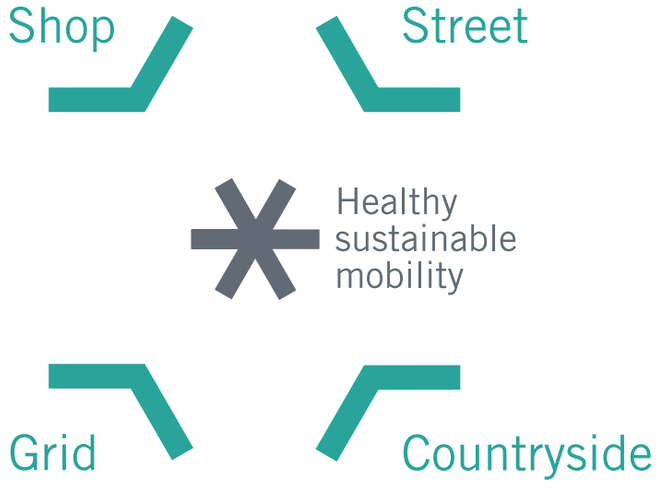
Healthy sustainable mobility





Draft mission within this theme, to be developed in Design Workshops into a defined mission.

Overall North Star for this mission theme, delivered by the combination of these interconnected missions.

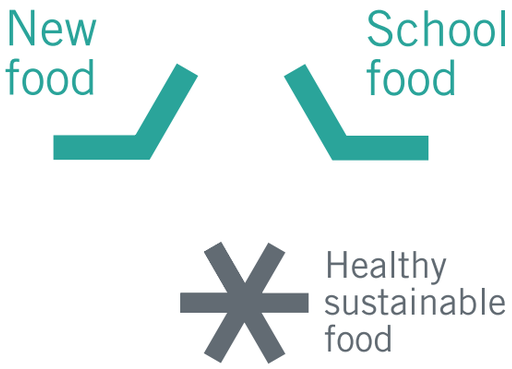


Each mission theme is addressed via multiple missions, aligning as a connected portfolio, and e ach building from particular angles in the broader systems.

Draft missions emerging from the Healthy Sustainable Food mission theme, suggesting types and places to drive missions from. These statements are early drafts, giving some sense of goals or outcomes were the mission to be pursued.

Sweden is recognised as a leader in new food innovation, in both inventing and producing new foods as well as effectively moving them into mainstream healthy food practices and infrastructures. Its new food, and especially its new forms of water-based farming, is sustainably sourced, produced, used and re-used in circular fashion, producing zero carbon, regenerative and biodiverse environments.

School food is Sweden's biggest kitchen, serving up almost half of all the meals consumed every day. Sweden uses this extraordinary capability to transform health and learning outcomes for students, whilst making the school kitchen a multi-functional resource at the centre of the local community. It works as a powerful lever to transform agriculture, logistics and waste, but also to build diverse social fabric via cuisine.

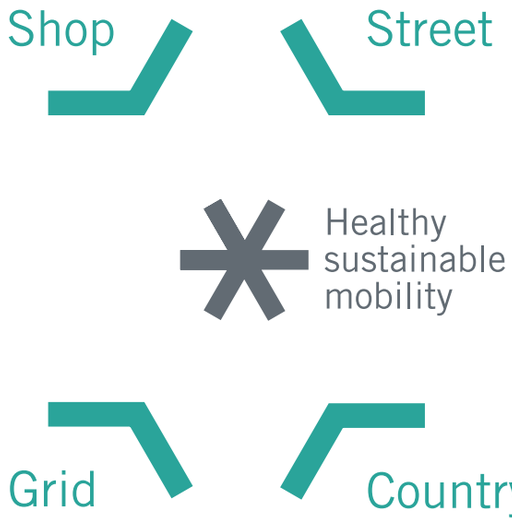


Swedish farming is recognised nationally and globally as successfully balancing numerous tensions: a regenerative a pproach to soil, water, biodiversity and landscape; a thriving farming life characterised by dignity, wellbeing, agency and craft; a productive and valuable food and living resources sector; an inventive, high-value, sustainable and ethical 'life-centred' approach to technology development; and an intrinsically meaningful connection to local places and cultures, across all of Sweden.

Swedish food retail is world-renowned for its diversity, inventiveness and resilient local cultures. It creatively, fluidly and effectively moves between physical and digital experiences in order to create thriving local food scenes, reinforce regenerative and net zero local agriculture and circular practices, and develop richly diverse, healthy and sustainable places, people and environment.

The mobility patterns associated with both e-commerce and traditional retail logistics are transformed to ensure that they are sustainable, healthy, convivial, and circular in terms of material processes. Via innovations in lifestyles, business models, logistics tech and urban space, and supported by adjusted policies on national and international freight, Sweden's retail sector is resilient as well as zero-carbon, whilst producing great shared spaces and cultures.

Every street in Sweden is being transformed to become healthy, sustainable and full of life (whether that life is buzzing with people or bees—or both). The Street is where all mobility systems converge as it is where all broader systems converge. Sweden has an installed base of 40,000km of streets, ripe for transformation into convivial, healthy, safe and biodiverse public spaces, via participative design, new tech, and new nature.



Sweden transforms its energy infrastructure and services to support the complete switch to electric mobility throughout the country, for both short distance and long distance vehicle movements, and for industry as well as personal use. Grid balances the supply-side (mobility, energy, municipalities and regional gov) with drivers of demand (industry, resources, agriculture, retail, and personal use)

Driving the resilient, healthy and sustainable transformation of mobility systems that support and enable the spaces beyond the city: the lower-density suburbs, towns, villages and rural environments where car-dependency is greater, spaces of logistics increasingly dominate, and yet patterns of living are radically transforming due to remote working, new industries, and demographic shifts.

There are clearly fruitful connections between missions, across the two different mission themes e.g. the two retail-related missions of Shop, or the relationship between Farm and Countryside, or between Street and Shops, and so on.

Healthy sustainable food

Draft missions

Food is a connected and complex system, thus these discrete initiatives can combine to enable systemic change throughout food, Sweden's third largest industrial sector which directly shapes significant broader sustainability, health and social justice challenges.

The collaborative processes start to build networks for action around ideas immediately. School food emerged as a strong contender immediately, in terms of system effect, with Shop to follow. Farm and New Food need to be cultivated a little more.

Shop

Shop addresses the retailer's role as the primary broker between new habits, trends and consumer awareness in food, and the network of suppliers, producers and service companies.

Working with key food retailers, in both emerging and established brands as well as related retailers in homewares and fashion, the Shop initiative explores innovative new retail models.

These address e- commerce and physical retail, aspects of traceability and consumer awareness/ behaviour change, logistics networks and related service companies, food waste and circular aspects, digital health services, local food production etc.

New food

New food devises approaches to mainstreaming new foods types and new food production—healthy, sustainably sourced, produced, used and re-used in circular fashion. In doing so, it generates innovative new products/services, companies, and sectors. In particular, it addresses water-based agriculture in new areas such as algae, aquaponics, and fish farming. Yet new agricultural technologies, from pixel farming to satellite data, apply across all food, linking to the Farm mission.

Working with startups, food producers, local and national government, supporting services (such as logistics, tech) and consumer-facing touchpoints (such as retailers, schools, restaurants etc), the initiative uncovers policy and regulator innovation, new business models, behavioural change approaches.

Outcomes are multiple, from water and soil quality through to carbon, preventative health and sustainable growth.

School food

School food takes advantage of the fact that school food can be seen as large, distributed 'installed system', located almost everywhere and delivered systemically at scale.

A draft mission statement is 'Ensure that every student in Sweden eats healthy, sustainable and tasty school food', which produces multiple outcomes, from social justice to health, sustainability to industry, educational performance to biodiversity.

Approaches include human-centred design, working with schools (students, teachers, cooks) as well as 'system players', policy lab to unlock regulation, procurement, curriculum, new usages of the school building and planning guidelines for neighbourhood, new forms of logistics, and a large market for healthy and sustainable food producers and agriculture.

Farm

Farm addresses the context of farms, farmers and farming. The background at the start of the process is that Sweden is deciding on how to better use the CAP (Common Agriculture Programme) financing and strategy for the period of 2020-2028.

Therefore, the initial objective is to better understand the context of farmers with regards to CAP, by deploying a 'farmer-centred design' process of user research and service design (including re-assessing the EIP application process for innovation funding in order to increase the flow and quality of funding through the agricultural system). This approach must be in balance with other goals, such as the need for regenerative approaches to soil, water, biodiversity and landscape.

Working with Jordbruksverket, Regeringskansliet and others, the mission moves from an effective, innovative strategy for the design, delivery and governance of the next CAP, to helping articulate the future of farming.

Healthy sustainable mobility

Draft missions

As mobility is a connected system, these discrete initiatives combine to reduce dependency on unsustainable systems and increase healthy zero-carbon forms of mobility. They engage multiple places and multiple forms of value.

A sense of urgency and commitment emerges from collaborative processes, indicating that some themes may be more 'mission-ready', whilst others need more preparation time. Street and Shop emerged quite readily, with Grid in development.

Street

Streets, with their replicable elements like parking space, are everywhere in Sweden, yet rarely oriented to creating a truly healthy, sustainable and vibrant street.

This mission, based on demonstrators in cities with existing street retrofit programmes, looks to transform the conditions of all streets in Sweden, scaling via platform layers of code, data, law, skills and capabilities, and policy.

It will demonstrate new forms of mobility, energy, green infrastructure, urban space, cultural and social interaction, and decision- making.

Participative processes will be core to this transformation, alongside new tech and new nature.

The street is everywhere; wherever there are people and diverse mixed-use spaces. The impact is across the whole country, in all towns and cities, across tens of thousands of square kilometres. In this senses, it could be thought of as the largest urban development project in Sweden since Miljonprogrammen.

Shop

Shop takes advantage of the small window that Sweden has, before the global e-commerce retailers truly consolidate within the country, in order to better understand and design how the mobility associated with e-commerce, and traditional retail logistics, can best happen.

This would directly address the negative climate impact from the retail sector that is currently increasing rapidly, via innovations in behavior change, business model, logistics and urban space, supported by adjusted policies on national and international freight.

By working in collaboration with retailers (digital/physical), cities, and logistics providers, as well as better understanding consumer behaviour, this initiative addresses regulation, policies, planning and urban design guidelines, incentive schemes, and supporting energy infrastructure.

Countryside

Countryside addresses the scales beyond the city, driving into the lower-density suburbs, towns, villages and rural environments where car-dependency is greater, spaces of logistics increasingly dominate, and patterns of living are transforming.

It focuses on the balance of car-ownership and other modes of mobility, as well as different forms of infrastructure possible in peri-urban, suburban and exurban environments—such as electric mobility interchanges, co-working spaces, remote working, new forms of manufacturing etc.

It innovates in terms of policies and strategies for reorganisation of shared activities and shared mobility, amongst other demand-side measures. It explores the energy, mobility and social infrastructures that could enable healthy, sustainable mobility in this context.

Grid

Grid concerns regional-scale renewable energy infrastructure and services for mobility, particularly addressing longer, larger-scale vehicle movements, such as logistics for industry, but also integrating electric charging and storage for lighter vehicles in cities.

Developing several Systems Demonstrators, Grid works with consortia of mobility industry, energy industry, municipalities and regional government, as well as drivers of demand for mobility.

Working with other national agencies, we intend to build demonstrators at scale. For example, a Demonstrator at the scale of Gotland would show closed-loop energy self-sufficiency, addressing supply and demand across a set of uses like port, town, agriculture, factory etc. Similarly a project emanating from Västra Götalands region addresses electric transportation requirements for heavy trucks and logistics. New street-level grids are also pursued.

Platform

A stack of shared system elements can underpin a series of otherwise disparate place-based interventions. In doing so, we unlock a way of enabling systemic change; not simply changing one milieu, but looking for common elements that enable scaling, translation, collaboration, sharing, and learning.

Yet such common elements are refined and contextualised by a pull towards distinct real-world environments and experiences. Given its focus on societal challenges, missions deploy Demonstrators within particular places, ensuring that new technologies, organisations and policies are developed in the context of human and nonhuman biodiversity, history and culture, landscape and environment.

This balancing act between the particular and the specific is addressed via a platform strategy. This creative juxtaposition is at the heart of systemic change, and a key design method.

Experiences and platforms

Distinct approaches to particular system environments—typologies like Street or School Food, located in particular places, like streets in Gothenburg or schools in Västervik—enable prototypes and demonstrators to be tested in real-world context. These are small-scale interventions on purpose, enabling deep engagement, learning, and local ownership.

System environments

Place-based physical, digital and social experiences

System layers

Cultures and capabilities

Standards and guidelines

Data, code, and services

Financing

Policy

Law

Yet crucially, the prototypes and demonstrators are designed to reveal and ultimately adapt all layers of the system implied within the prototype. These are aspects not usually accessed in a small local project—such as broadly shared cultures and social movements, national law, tax policy, curriculum or street design guidelines, data platforms, international partnerships, and so on. The organisations responsible for these layers must be present and active throughout the mission design process, including the prototypes, no matter how small they appear to be at first glance. All change starts small; the question is whether the project is designed to scale.

Scale can be of various kinds—lateral, relational—but all rely on these cultural and systemic layers. Describing them as separate layers does not quite imply how these complex assemblages intertwine—clearly culture affects what and how laws happen—but they provide a guide for building both mission consortia and portfolio.

Distinct experiences, instances and places

Shared cultures and capabilities

Shared institutions, policies and laws

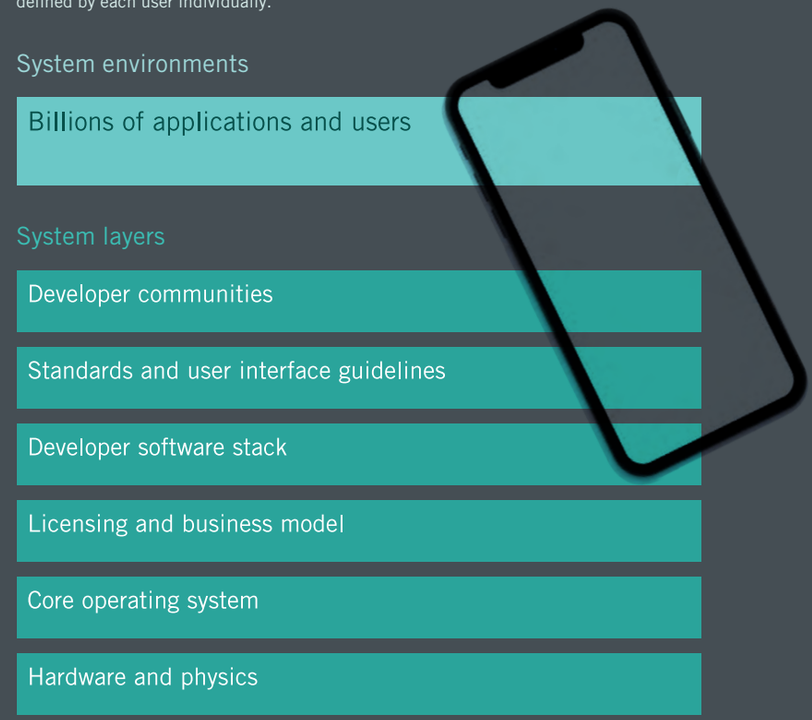
For example, a particular building may innovate with timber construction tech; yet *systemic* change is unlocked by changing the *general* building code based on insights from the *particular*, such that other buildings may follow, enabling equitable outcomes. Making the building without updating the code does not tend to change systems. Equally, focusing solely on a system layer, as if often the case with policy, does not tend to produce diverse and located outcomes.

A growing and shared cultural understanding of new timber buildings can grow out of specific examples, but spreads more broadly, actually making 'room' (in the form of understanding, legitimacy and motivation) for the code to be changed. Triggering social movements may be key.

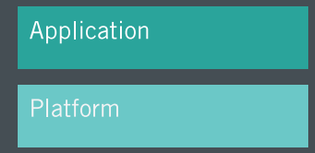
The word 'platform' suggests an analogy with contemporary technology strategies, which also balance diversity at one end—enabling billions of different apps—with entirely consistent stacks of software and hardware 'underneath'.

Platforms, by analogy

Contemporary tech, and in particular the smartphone, uses this form of platform strategy. Your phone has different apps to your neighbour's, as you are different people—although some apps are shared, no doubt. There are literally millions of apps occupying this layer of highly personalised experience, a rich diversity of choice, defined by each user individually.



Yet below the smartphone's glass, as it were, there are entirely coherent layers common to most phones. Developer and designer guidelines precisely define possible interactions, whether for the LinkedIn app or Super Mario Bros, ensuring consistency underpins diversity. Trends and shared practices buzz around the designer and developer communities. A coherent set of developer libraries provide shared toolkits. Within the phone's operating system, common databases are made accessible to a set of defined application programming interfaces, controlling what can be done, and how. And finally the layers of hardware and physics. All are common and shared, and enable the smartphone to scale.



Distinct experiences and places, each enabled by shared systems and cultures to enable forms of sharing and scaling

Platform layers across missions

A portfolio approach to missions is framed around the sets of system environments identified in the Actors Workshops. These are often articulated as typologies of place-based interventions—such as Street or Port, Farm or School, Shop or Forest.

There are clear societal outcomes that can be associated with these environments, yet they are directly shaped by a set of supporting layers underpinning these public-facing touch-points. These comprise a set of coherent activities across systems, acting as a platform.

Emerging food mission system environments

Shop School Lab Farm

Emerging food mission system environments

Cultures and capabilities
Data science; user research; citizen participation; innovative procurement; urban planning; shared cultures and movements

Standards and guidelines
Food traceability standards; carbon accounting standards; nutrition standards; land-use guidelines for ecosystem services

Data, code, and services
Digital fingerprinting systems enabling traceability across services; open satellite data for soil use; data-driven local logistics loops

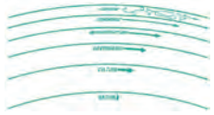
Financing
Ecosystem services compensation; venture capital for new food; total budgeting for healthcare savings; new business models

Policy
Joint policy-making between school agency, food agency, land-use, and local municipalities; aligning EU agricultural policy context

Law
School law changed to incorporate food as education; new food definitions within law

Platform layers within missions

Similarly, zooming in within a mission, or draft mission, we can also see the value of articulating system layers that broadly span across several prototypes and demonstrators. This indicates the principle of nesting within a portfolio. Even at the early stages of identifying angles, there are likely to be insights emerging into these required capabilities, assets, approaches and legal frameworks. They will be expressed as enablers or blockers, sitting underneath the expressions of desired outcomes. Workshops can ask these questions directly.



Fast learns, slow remembers. Fast proposes, slow disposes. Fast is discontinuous, slow is continuous. Fast and small instructs slow and big by accrued innovation and by occasional revolution. Slow and big controls small and fast by constraint and constancy. Fast gets all our attention, slow has all the power.
—Brand, S. (2018). *'Pace Layering: How Complex Systems Learn and Keep Learning'*. MIT Journal of Design and Science.

Example retail prototypes—demonstrators

Malmö downtown | Dalarna rural | Göteborg suburb | Umeå campus

Emerging food mission system environment

Cultures and capabilities
Data science within municipal and regional planning teams; new procurement; shared logistics planning; plant-based food trends

Standards and guidelines
Food traceability and carbon accounting standards; e-cargo bike charging standards; in-street refrigerated delivery hub standards

Data, code, and services
Shared databases for local organic suppliers and retailers; open data systems enabling public transport to carry food supplies

Financing
Pooled investment for local delivery hubs based around emerging Street mission model; appropriate taxation on e-commerce

Policy
National food labelling policies; nationally-coordinated e-commerce delivery policies; local street governance model

Law
Consumer protection law; postal service regulations; license to operate based on SDG-oriented policy agreements

Patterns and types

The distilling of multiple forms of knowledge—from workshops, discussions, research papers, first-hand experience—into actionable insights is a form of pattern recognition. Much strategic design practice is this activity: listening, learning, observing to enable sketching, synthesis and proposition.

For Kees Doorst, this aspect of design is the key hinge within his 'frame innovation' theory. He describes the development of **fields** (expanding a challenge area to include broader societal context) into emerging **themes**. These elements emerge in activities such as Actors Workshops. The subsequent process of assimilating, unpacking, and clustering enables **framing** (*"identifying patterns in the themes to create frames"*) and **futures** (*"exploring the possible outcomes and value propositions for the various stakeholders"*). This interplay between themes, frames and futures

involves sketching, discussion, further research and so on—but essentially boils down to an acute focus on pattern recognition.

In a mission-oriented process, with a need to engage in highly participative processes and develop tangible yet systemic social outcomes, place-based patterns tend to leap off the canvas. This enables frames replete with multiple kinds of value, co-benefits produced by single integrated interventions. (Caroline Whitbeck described how designers are typically, and perhaps relatively unusually, looking for patterns that might "satisfy *potentially* conflicting considerations simultaneously." Elizabeth Swain calls this approach **multisolving**).

Place-based types are powerful patterns. They are specific and adapted, yet are also generic and scaled. Hence types of patterns such as streets, schools, shops, forests, squares, housing and so on. This approach draws from precedents like Christopher Alexander's *A Pattern Language*.

Taking mobility as an example, themes relating to the street emerged repeatedly (around slowing down traffic, increasing active transport, assessing the impact of e-commerce, autonomous

logistics, changing working patterns—all play out on the street).

A related theme emerged under the heading *'lagom mobilitet'*. (Lagom is a relatively untranslatable Swedish word approximating to *'just enough'*, *'just the right amount'*, *'perfectly adequate'*, *'not great, not bad'*). This theme captured the sense that a street might have mobility dynamics and characteristics which are shaped to that specific spatial context, and in real-time: the lagom speed, size, noise, presence, flow, access, availability, or the mildly happy compromise between individual and community and city, and so on.

The **futures**, in Doorst's process, emerging from this are easy to imagine—in fact, they are co-produced in the Design Workshop. Doorst suggests a kind of code-like IF-THEN dialogue occurring, to describe how futures can emerge from this collision of frames and themes. Vinnova workshops don't tend to formalise these futures as if code, but the invention occurring in this process has this characteristic.

In the food mission process, similar themes and frames emerged too, comprising repeated or distinctive patterns emerging from the discussions

and drawings. School food was a commonly identified element, working with themes and frames, and suggesting powerfully rich futures with diverse outcomes. In the Doorst approach, it would be:

IF *school meals were approached* **AS IF** *it is a problem of learning, sustainability and health* **THEN** *kitchens and cooks should be ...*

Beyond this stage, questions of transformation and integration are developed—how might change be enabled, by whom, what is required?. This stage simply surfaces and discusses the promising patterns. (See Simon Baron-Cohen's *The Pattern Seekers* for a broader discussion of human capabilities for pattern racognition).

Framing types

Doorst framework	Examples
IF	**IF**
The context was approached ...	School meals were approached ...
AS IF	**AS IF**
The opportunity can be seen as ...	It is a problem of learning, health and sustainability
THEN	**THEN**
The frame is ...	The school kitchen should be transformed into an open, creative and shared space with students, staff and cooks working together

Frame innovation

These are formal examples of the framing techniques which supported and analysed the Design Workshops. Practiced strategic designers use similar thought processes almost instinctively, yet Kees Doorst's framework helps articulate the process for others to follow.

In and around the workshops, an understanding of the context from system actors is translated into opportunities for action by locating them into various types. Doorst's 'frame innovation' process below was not used as a formula in the workshops in the way it is portrayed below.

Yet a modified version of it is reproduced here to indicate what is happening when discussing types, and how they are framed as innovation platforms. (This is a variation on the 'How-Might-We?' technique often used in design processes).

Using these techniques helps identify fruitful types— types that enable both local action and wider scaling—and opportunities for place-based interventions which can develop over time. As Doorst points out, strategic designers are experienced at locating these fruitful types.

IF	**IF**
The street was approached ...	Food delivery was approached ...
AS IF	**AS IF**
It is a problem of creating health, social fabric and biodiversity	It is a problem of creating a vibrant and sustainable environment
THEN	**THEN**
The street needs to reoriented around biodiverse and culturally diverse social spaces, as if a public park rather than a car park	In-street delivery hubs can be high-quality shared, safe, and secure social spaces, with pick-up, drop-off and recycling

Street mission design workshop #1
GENERATOR, STOCKHOLM, OCTOBER 2019

School food mission design workshop
GLOBALA GYMNASIET, STOCKHOLM, SEPTEMBER 2019

2–3

Design workshops

At this point, the overarching mission themes contain emerging missions. These potential missions are co-designed in design workshops with stakeholders and participants, such that both the narrative and the network is refined for delivery. This workshop also produces key insights for initial prototypes, in order to unlock meaningful learning and participation, and has a greater emphasis on decision-making and commitment to change.

Background

The output of the first phases of Actors Workshop, and subsequent synthesis, can be formed into a portfolio of loosely-defined Missions. Missions provide a clear sense of site or overarching vehicle for projects. They actually contain multiple projects, which a design process suggests are best articulated initially as Prototypes. Identifying the prototypes within a particular Mission is done in facilitated Design Workshops, with system actors and others engaged in more focused co-design sessions

These draft missions provide a site or vehicle for multiple prototype projects, which must be 'excavated' from the mission discussions, and framed carefully. These are done in Design Workshops, with participants who are often actors in the systems at hand, or at least close to the ground in meaningful ways. They are likely to have been involved in earlier stages of Actors Workshops or strategic dialogues, although this is not always essential.

As with other workshops, we are looking for a diverse, multi-faceted group in the Design Workshop. For instance, the Street workshop included the director of the national centre for design and architecture, an institution used to building discursive, rich, and complex engagement around public issues (ArkDes) as well as shared mobility companies (such as Volvo M and Voi), public transport operators (such as SL and Stockholms stad), tech companies (such as Ericsson R&D), infrastructure providers (such as Fortum), as well as academics (such as an air pollution expert from Karolinska Institute).

Workshop format

The Healthy Sustainable Mobility Design Workshop was based on a four-part process. The first two sections move from open exploration and discussion through to homing in on sketched interventions. The third section interrogates and explodes those proposed interventions using system layers, before the last stage closes back in on tangible next steps, existing projects, and potential collaborators.

For example, for the Healthy Sustainable Mobility design workshop, the four stages were these:

1 – Expand the group's concepts by completing an unfinished narrative of a future street scenario.

2 – In four groups, develop sketches of interventions for streets: for inner cities and for suburban streets.

3 – Overlay layers of skills, policy, design, infrastructure, data and legislation onto the sketch.

4 –Summarise key elements of the interventions, prioritise next steps, existing projects and other potential participants.

Some of these key techniques should be unpacked.

Open speculative narratives

The Design Workshops were primed with speculative yet open narratives in order to open up the discussion, push the perspective of participants into the future a little, and act as an early collaboration exercise.

A written **Speculative Narrative**→ format is used as this can be rather more 'open' as a form than a drawing or film. If you read the text "imagine a cargo bike carrying vegetables on a busy street at 7am", and we are all immediately imagining slightly different variations on that, based on personal perspective, experience, even ideologies. If that cargo bike at the crossroads is drawn, no matter how sketchily, the drawing narrows the participant's room for interpretation, and therefore the 'ownership' of the image.

Nonetheless, despite the brevity, a vignette can be used to stimulate discussion, publicly reveal some of these beliefs, assumptions and perspectives, and to get workshop participants' heads 'in the game'—it gets them speaking, and speaking constructively and critically. It allows contestation of a vision to emerge early, as well as a sense of consensus. (The scenario

Because narratives are powerful and processed differently than other forms of information, borrowing from the principles and foundations of storytelling (such as worldbuilding) may allow us to create and disseminate emotionally resonant images of sustainable futures throughout society. After all, it is through science fiction that society receives its images of the future, and leveraging worldbuilding practices to envision and bring about change may catalyze our efforts.
—Leah Zaidi, 'Brave New Worlds: Science Fiction and Transition Design' (2018). Available at SSRN

can be a somewhat sacrificial token in this sense—its job is to produce discussion rather more than agreement—and it is important that the scenario writer does not attempt to defend it too much!)

Clearly, not every participant will be a great storyteller, but usually everyone has something add, and there are usually some imaginative responses, as well as some funny extrapolations, which is extremely important in terms of getting the workshop into the right mode.

As an exercise, it might take 15 minutes or so, but works well as a warm-up. It gets every participant saying something to the room, usually creating a sense of camaraderie through completing a task together.

Yet it also moves the overall discussion in the workshop into a forward-looking mode, and exercises participants' synthetic muscles, rather than simply analytical. It develops a critical edge within the room, by asking participants to critique the narrative. Yet the critique takes the form of a contribution, rather than simple negation. And a story, written in multiple viewpoints, also enables a holistic vision, as well as a tangible, place-based approach.

Finally, of course, such narratives do describe a set of possible futures, no matter how open the format. Priming thinking in this way should be foregrounded, with clear explanation of the exercise and of the limits of speculative narratives. It should be pointed out that they are absolutely not predictions of the future. Rather, they are spikes of imagination to support a discussion that can prompt multiple scenarios and narratives about 'the futures around the corner', framed around transitions.

Speculative narratives will continue to be produced, through the prototypes and beyond, and using multiple forms of media, as resolution increases. They are tools for terms of engaging broadly, as well as articulating visions, helping frame prototypes, prompting discussion, debate and meaningful contestation and cultural exchange.

One advantage of an explicitly design-led process such as

As part of the output from Climaginaries research project, funded by the Swedish Research Council Formas, *Rough Planet: Notterdam* is a fake "tourist guide to an imagined coastal city in a decarbonised Europe circa 2045". Conveying some of the output of the EU Horizon 2020 project REINVENT, it uses speculative design and narrative techniques to describe possible ways of living in a successfully de-carbonised Europe.

The simple, honest truth is, if you're talking about what the world's going to be like 10 years from now, it's hard to know. The best focus for people is to make the transitions as effective and painless as possible as opposed to worrying about what the end point is.
—Michael Spence, economist

this, is that it produces multiple tangible scenarios and visions as it progresses. This is the necessary rejoinder to the earlier reference to Greta Thunberg's adoption of the phrase "cathedral thinking". Whilst one can, and even should, start building the foundations of the near future without knowing how to complete 'the roof', it is still necessary to produce sketches of the cathedral. The foundations are somewhat meaningless otherwise, and ill-defined, and there is insufficient motivation to construct something which takes effort, commitment and often no small sacrifice. In *Pilote de Guerre* (1942), Antoine de Saint Exupéry wrote:

> *A rock pile ceases to be a rock pile the moment a single man contemplates it, bearing within him the image of a cathedral.*

These images, as sketches, evolve powerfully as the building progresses through close contact with the site. Doing so necessitates an intimate proximity to the complex systems in question which makes them fundamentally different to policy roadmaps. Yet there is always a sketch to hand, as a way of coalescing competing visions into a series of decisions. The sketch can be drawn, or written, or produced in some other format. We have a preference for starting with words, as a common ground, and moving rapidly to drawings, which aid the progress to building 'sketches in reality' in the form of prototypes.

There is more on **Sketching**→ elsewhere, and the mission prototypes documentation shows various types deployed here, from animated videos for the School Food mission to architectural diagrams for the Street mission. The speculative narratives are an early part of this process.

Sketching interventions

Getting the groups discussing the issues is often easy enough. With a diverse mix of stakeholders, and sometimes citizens, the conversation tends to flow. Careful and engaged facilitation is required, in particular to safely encourage creative and respectful

There are more profound things than simply logic that guide the creation of the story.
—Hayao Miyazaki

Drawing … occupies the most uncertain, negotiable position of all, along the main thoroughfare between ideas and things.
—Robin Evans

challenges and confrontations, yet these groups usually have little issue talking about issues.

Yet talking is only one form of expression, and has some severe drawbacks. A group be dominated by particularly forceful speakers (and often, though not always, such roles and positions are gendered). Yet this can be handled with firm facilitators.

More fundamentally, conversations tend not to foreground decisions. In discussion alone, groups can all too easily end up agreeing on a lengthy 'shopping list' of interventions for a system, like a campus or a forest, in conversation, as it is difficult to convey mutually exclusive decisions, or properly indicate the impacts or implications of those proposed decisions.

Sketching is one way of forcing reality to the table, yet maintaining the synthetic, open, and propositional to-and-fro of the discussion. Again, it can take skillful facilitation to get the group comfortable with making marks on paper, but the output is far more useful. This runs alongside the conversation. It does not replace discussion. Rather, it forces discussion to be articulated in another way, adding a new possibility (*"What if this was located next to that?"*) whilst also addressing constraints (*"We don't have space for a swimming pool, a chicken coop, and a car park on that street corner!"*)

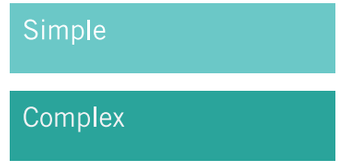
Equally, clearly many are drawn to visual representation as a way of communicating. The converse is also true, and the facilitator must carefully balance encouraging people to make marks—sometimes even subtly putting a pen in the hand of someone who is talking a lot, but not drawing!—whilst recognising those who really feel uncomfortable doing so.

Yet one way or another, most people can be convinced to make a mark, and the sketches that are left behind are both full of insight, and a visual record of the workshop participation.

Sketching workshops usually benefit from a pre-produced backdrop or canvas, and some pre-drawn elements that participants can assemble, or sketch over. Blank cards and shapes

also prompt customisation, as does plenty of space around the canvas. For both Street and School workshops, as well as ancillary workshops like Kalmar, the Vinnova team produced a pre-drawn 'kit of parts' that teams could use (these are available to download via the Vinnova website).

After the workshop, drawings should be photographed, processed and refined, as a way of collating and communicating results. For the Street mission workshops in particular, drawings were combined into a collage, capturing a sense of the proposals and discussion. In a sense, the drawings can continue to collaborate with each other after the workshop.



The mission statement is simple on purpose, for quick, evocative communication, whilst still providing a clear sense of ambition in a direction. The complexity is hidden 'underneath' in the detailed outcome metrics which track and articulate progress.

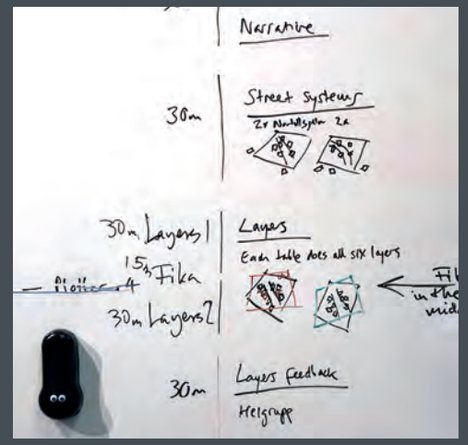
Speculative narratives

Short speculative vignettes can be used to prime a Design Workshop, opening up a sense of possible futures whilst also encouraging a constructive critical edge to the workshop—and acting as an early interactive icebreaker.

The narrative is usually written by the mission team, and simply produced to take both sides of an A4 piece of paper, in English and Swedish, and with a blank space at the bottom for the participant's contribution.

The narratives are carefully balanced. Advanced technology is usually present, as if an actor in the story—and sometimes it is represented as more advanced than may be realistic, in order to provoke a response. Yet it should also be recognisable in terms of everyday life as currently understood.

So whilst the usual tech clichés might feature—looking at you, drones—much of the narrative is people chatting in the street over coffee, or making a meal together, and so on. Or placing a drone next to a fox repositions the tech in a much richer context.



Narratives can be deployed at various points throughout a design process, and increase in relevance as projects develop, yet they can be a useful way of kicking off a design workshop, for numerous reasons.

This mental back and forth, zooming from age-old cultural interactions to a technology that is not evenly distributed yet, is important to locate the missions in today's everyday, our existing cultural and physical environment, whilst also making clear that the near future is malleable, full of choices and questions.

The way that the story is written defines not only how participants respond to the themes

at hand, but to the workshop itself, including the facilitators and other participants.

Participants can be gently encouraged to build on each others' stories or sentences, which is a useful dynamic for the subsequent activities. Facilitators should be briefly interjecting as participants share their ideas and comments, providing encouragement but already beginning to develop certain themes, by subtly linking ideas together.

This is also a small opportunity to create a collaborative environment crucial to any 'hybrid forum'. The experience is an important 'levelling' functions, subtly removing hierarchy. Shared jokes can be a small part of creating the right mood for creative work.

Take care to ensure character names are culturally appropriate, representing a diverse population. These choices can be used to subtly prick a few latent assumptions.

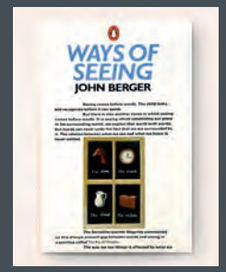
Getting the landscape, climate, and local history right also help places the future in context, as well as making the narrative approachable for workshop participants. Local details—a football team, a famous building, food delicacies—all help

construct a sense of place. They give hooks for people to build with, or react against.

The stories should be clearly unfinished, and the space at the bottom of the page is left open for participants' contributions. The workshop facilitator reads out the text to the room, occasionally pausing to note some of the points which are contain implicit questions or contentions, before asking the participants to take a few minutes to read by themselves, and then add the next sentence to the story.

Participants are encouraged to actively disagree with, or counterpoint, the narrative, whilst ensuring they offer some constructive alternative point. Or they can simply continue the story, pulling the thread a little further.

These additions are then shared with the whole group, with brief discussion coordinated by the facilitator.



The inviting phrase which ends each narrative, 'To be continued by the reader', is borrowed from John Berger's Ways of Seeing (1972)

A street in Stockholm

Mobility workshop, May 2019

Story

Early morning, around 05:30. The mist shrouds the street's lush trees and bushes, yet some early rays of sunlight pick out some ripe red apples amidst the leaves. Exiting stage right, a fox trots around the corner, heading for the park. A couple of cleaning robots quietly hoover up some broken glass from near the bike lane, as a small autonomous delivery truck slides into the street.

The delivery truck pauses in front of the clothes store on the corner, hydraulic arms carefully placing a large capsule into the shared delivery box. It then sidles up the street to place a waste capsule in the delivery box's place, the low gentle whirr of its electric engines barely perceptible over the swish of its damp tyres.

Slowly, the street wakes up. By 07:45 Jonas guides his nine year-old daughter Zoe towards the shared bus that will take her to school in a nearby district. Zoe doesn't really want to go with the bus, having recently learned how to cycle. She'd rather use a shared bike from one of the street's docks, but her dad says the weather isn't very forthcoming. Secretly, Jonas isn't that confident that Zoe is a good cyclist yet, and no matter how safe it is to bike to school, he flags the bus on his phone, ensuring that the small autonomous shuttle will stop near the dock on his street. The city's kerbside management system updates in real-time, letting other vehicles and services know that there will be a small bus on the street imminently.

Across the street, Alia rushes out of her apartment's door. She's heading for Centralstation to

Latent questions in the story

An early indication that this could be a lush green environment, with food grown in the street.

The interplay between the fox and the robots suggests new relationships with non-human nature.

Infrastructure for clearing elements like broken glass suggests a prioritisation of small wheels, whether bikes or wheelchairs or equivalent.

Physical stores remain in this vision, integrated with e-commerce logistics rather than replaced by it. What's the group's view on this?

Combined infrastructures of logistics and waste in one service. Who regulates for that, and coordinates it?

A new importance for environmental health aspects, such as noise, for human and non-human life. Yet tyres produce other environmental issues, such as micro-plastics. How might they be resolved?

Physical schools still exist, with a recognisable daily pattern. Will they?

Prioritisation of cycling, yet realistic recognition of weather conditions—and protective parenting. Within the group, how do parents and non-parents alike react to this?

On-demand autonomous buses may still need something like a bus-stop. Yet ridesharing does not, currently. What is the value of a bus-stop?

Software updates access across multiple mobility systems in real-time. Who runs this? To what rules?

Story continued

catch the train to Lund, but glancing up at the clock by the street's dock, she realises that she won't make it if she walks. She pauses to fasten her Hövding around her neck, and grabs a scooter from the dock.

She glides away up the street, along the curving pear tree-lined paths. Realising she's scooting past unripe fruit, and recalling the wild strawberry bushes planted next to the scooters in the dock, she realises how hungry she is, does some quick travel-time calculations, and slides to a brief halt at Akim's coffee shop on the corner.

Alia darts in to grab *kanelbulle och bryggkaffe*, hitting pause on the scooter. The scooter pings the dock its new location. The dock pings the city.

Eating her bulle, Alia sits on the bench outside Akim's place. The streets and buildings here are in fact covered with greenery. The absence of most cars, and all large vehicles, municipal and otherwise, has opened up the street to be intensively greened, softened. Large clear channels still curve through the middle of the street, meaning the street is still passable by the likes of emergency vehicles, small garbage vans, taxis, small buses, and the few shared cars that are often based here.

But most of the street has been remodeled for much smaller vehicles, like bikes, scooters and the cargo bikes that handle the majority of the deliveries in the city, and then for what seems like hundreds of other uses, largely decided by the communities in and around the street themselves.

Simple, robust plug-and-play elements, and a few digital service layers, enable everything from

Latent questions in the story

Name-dropping local brands makes the reader feel at home, and connect future with today (other helmets are available). Yet why are helmets still required in this future street?

Food in the street again. Within a hygiene-conscious governance culture, how is this achieved? And how are such shared gardens managed within a community? How will a changing climate affect what food is grown locally?

Referencing local food delicacies, or traditions, provides an opportunity to locate the story.

Basic Internet-of-Things chitter-chatter. Yet how does this work? What is 'the city' here? Municipally-run software platforms, or something more abstract? Equally, what character do these interactions have?

'The absence of x', where x is something considered everyday and pervasive, is always a good trigger word to generate discussion and flush out positions. Particularly if x = cars. Or meat.

Plausible reference to utility and service vehicles and other necessary actors in the street. The street feels like it is not built around them, but accommodates them. Is this different to today?

But still a significant shift in the dominant mobility types in the street. Stimulates discussion of how we get there, and the values underpinning it.

Reference to super-local participative decision-making, a key theme in public sector innovation, and thus missions.

A street in Stockholm
Continued

Story continued

street parties to football goals, food stalls to artworks, gardening to wildlife. The softer landscape is a kind of infrastructure, absorbing rainwater and providing shade in the increasingly warm summers, but just as importantly, the openness of the street is where the community happens.

Alia looks up, listening to the birds overhead, and then the faint sound of the building's solar panels adjusting their position to the sun, drawing down energy to recharge the bikes and scooters in the dock.

Henry, who retired last year, walks through the tall grasses and out into the street, and greets Alia before poking his head around the café door and shouts *'God morgon, Akim!'*. He once again clarifies for Akim that he can get better coffee at home. They both know this is really just Henry's excuse for a chat.

Henry loves to watch the street at this time of day, the straggly snakes of kids on bikes weaving up the street heading for school. He remembers what this time of day used to be like, when the street was dominated by cars, either parents driving their kids to school before driving on to work, or just cars sitting idly, lining both sides of the road, taking up most of the space.

Akim puts a steaming coffee on the table in front of Henry, who looks up in faux-surprise. Henry scrolls through the news, flicking past a report of last night's Champions League semifinal (*Hammarby 2, Ajax 0*).

Akim moves a few tables and chairs out further into the street, checking his phone to make sure that

Latent questions in the story

For some workshop participants, this will be redefinition of concepts like infrastructure.

Buildings charging vehicles, and storying energy there. Technically possible, but how could it happen legally, socially, commercially? And again, what character might these interactions have? Convivial and tangible, or simply 'plumbing'?

As well as a diversity of cultures, a diversity of ages. And elderly characters are useful narrative devices, as they can explicitly recall how things used to be. Thus they can represent a sense of change, which is a dynamic not often associated with ageing.

Football fans may recognise that this scoreline is clearly a joke. Using humour in stories is essential to engagement; though don't overdo it (humour is highly cultural!) Otherwise, motifs like football teams enable the story to have an easy yet meaningful identification with place.

Story continued

his reservation for this extra bit of space this morning had gone through. He has a book group coming in at 09:00. Again, the city's kerbside management system lets other vehicles know, and the lines of LEDs indicating bike paths shift slightly, to veer away from the café.

By 10:00, the other end of the street, towards the park, is largely closed off, as the local förskola has reserved a large portion of the street for morning activities, despite the light drizzle that has started to fall. The three cars in the car-share dock down there aren't going anywhere anytime soon, and so they feed a little of their stored energy back into the buildings around, to cover some of the washing machines in use during the day. They'll get reimbursed later.

To be continued by the reader

Latent questions in the story

Real-time micro-zoning; again, technically possible, yet all the questions are political, cultural and commercial. Who runs this, and what outcomes are driving algorithms?

The förskola (kindergarten) can close off the street. The narrative is implying an 8-80 Cities-like agenda for designing around children and elderly. Workshop participants are often likely to be between these ages, despite attempts to diversify. How does this feel?

In this near-future, the objects themselves are characters, with their own interactions, value-systems, and even economies. The questions triggered here include 'How does this make us feel' as well as 'What does this enable or limit'?

A recipe for school food

Food workshop, June 2019

Hannah squeals as the butterfly lands on her hand. She slowly rises, lifting her arm up towards the sun, standing up over Zandra, Lexie, and the wild strawberries and carrots. She smiles as the butterfly dances away towards the biowaste generators next to the barbecue pit.

Sandra, their teacher, beckons for the girls to join the rest of the class, who are carrying buckets of blueberries back towards the kitchen.

At the kitchen door, a smiling sous-chef gratefully receives the kids' harvest, chatting with a few of them about what to do with the kilos of berries. Jam for Saturday's community fair? A sauce for lunch tomorrow? Preserve for the winter? Behind the kitchen block, two cargo-bikes roll into view.

In the kitchen, the head cook's phone pings, as the bikes slide into small loading bay.

One bike is mainly vegetables, though with a few boxes of eggs and honey, cultivated on nearby rooftop farms.

The other bike's load is a refrigerated box, cooled via onboard solar panels, containing seaweed, algae, and salmon, grown in the fish farms on the edge of town.

Timo and Mo slide the boxes off the back of the bike, and walk around into the kitchen to chat with Tobias. The cook starts sorting through the veggies—today, tomorrow, next week—whilst his phone discreetly logs the precise provenance of all the incoming food, sensors chattering away silently; more quietly than Mo and Tobias, anyway, who are enjoying a quick slurp from the kitchen's playground-facing coffee stall, joking with a few teachers, whilst children run and play in the background, or form a messy queue to grab a glass of milk.

The bikes' batteries ping, over in the loading bay, to indicate they're charged up again, as if nudging Mo and Timo to finish their coffee.

Next to the bikes, two squat delivery robots sit silently. They'll charge all day, before unhooking themselves at 3AM, if they have been refilled of any waste that can't be used on the school's gardens or generators. They'll silently and slowly roll back to the depot seven kilometres away, before they are refilled with fresh food from the depot—principally with proteins like meat, fish, algae; things that aren't grown in the school's neighbourhood—and then they roll back to the school, returning by around 5am, part of the early morning school crowd, alongside the deer, foxes and rabbits.

As Timo and Mo glide out the school gates, they pass Josefin, a local resident, who is here to collect some compost for her garden.

She lives across the road, and she only needs a couple of small sacks for her roses, so she's using a bike for her trolley. She thought about signing up to the school's delivery service, but sadly her roses don't yet warrant that level of attention.

Josefin taps her phone on two barcoded rough paper sacks near the school's garden, and places them in her basket. She glances up to the rooftop of the large co-working space next door, visible through the trees, and stands for a moment watching a pair of drones tend to the thick crops of spinach sprouting upwards from the pitched-roof. She can see they're soaking the spinach's roots with precise doses of nutrients, presumably from the aquaponic array over the other side of the roof, before they fly off to do the same to a few other roof gardens in the neighbourhood.

She's still not sure of the value of the drones, but recognises that these old pitched roofs would not be accessible by human gardeners, despite the amount of sun and rain they can often get.

Still, it makes her happy to see that most of the roof is flat enough for what she calls 'a normal garden', and can see 5-10 people up there, half of them gardening, the other half sitting in the sun, or under parasols, face down in their screens.

To be continued by the reader

Malmö street market

Food retail workshop, May 2020

Xin swipes through a Rough Guide to Malmö one more time. She flicks past the main attractions—coffee labs, boutiques, co-working spaces—heading for the neighbourhood guides. She needs to file a report for head office on typical food retail in Malmö. A lab-meat pop-up in a 1930s kiosk does not count as typical. Instead, she grabs a shared bike and heads for Möllevången.

As Möllan approaches, Xin finds she can just follow her nose. The first thing she senses is the glorious smell of cooking, a rich stew of aromas from what turns out to be the street market dominating the neighbourhood's main square. As the COVID era of 2020-22 faded, it left the challenge of resilient supply chains, workers, and spaces. Many cities, Malmö included, built networks of smaller, local distributed markets, one in each neighbourhood, running daily, and connected to local food producers.

Xin circles the market on her bike, weaving through the lush green streets, dodging the many other bikes and an impromptu football match near the kindergarten. She notes a few of the bikes are cargo-bikes, pulling trailers of produce in and out of the market.

She slides past an autonomous delivery van, the digital sign on the side indicating the collection of retailers it's serving on this run (though the small truck seems to be run by the local municipality). A significant proportion of retail in Möllan has clearly moved to e-commerce, at least for the many products where the calculus of efficiency outweighs the value of physical experience.

That includes food, with much being handled online, whether vegetable delivery boxes from local farms or global produce. Carbon-based pricing affects what gets bought, and the speed with which its delivered—which means it's been a boon for local producers, as in other sectors. The delivery van docks in the communal boxes at the end of the street, their solar cells glinting in the sunlight, powering their refrigerators. The sign on the side updates with the local residents' names, with the queue scrolling up to indicate those in the next delivery window, in five hours' time (there's a maximum of four allowed per day, to balance logistics traffic and storage).

Food is one of the few sectors where physical and digital is balanced rather evenly. The market is buzzing with life. Although relatively small, with only a dozen stalls, it's full of people, noise, smells, with half the stores demonstrating cooking skills, or selling prepared food, as well as produce, ingredients, tools. It's clearly hygienic—again COVID's echo—but has the centuries-old atmosphere of markets common to all towns.

Xin slides her bike into the wooden parking bay at the corner of the square, where it starts slowly recharging. Browsing through the various stalls in the street market, Xin sees that in combination with traceable produce systems, people can pinpoint and direct value accurately across the supply chain. This means farmers, of various kinds, seem to benefit directly, as do locally-owned shops, delivery companies, and independent cafes and restaurants.

Support for such enterprises has transformed the retail scene, as engaged EU regulations enabled municipalities to reinforce local economies. That means a better understanding of the true value of each SEK locally, but also an inventive array of digital currencies across Swedish cities, enabling people to direct funds. Xin can see two or three different schemes advertised in local stores and throughout the market. She holds her phone over the various logos to sign up for a few. Many of them also cross-sell cooking classes, dinners, fermentation workshops, and many related shared systems.

Looking past the stalls, at the line of shops circling the market, Xin sees four specialists, two associated cafés, a restaurant, and a grocer open 24/7. A row of cargo-bikes sits at the end of the row, a shared delivery system for the shops. Xin wanders over and chats to one of the delivery team. She says Xin can order anything from the shops or market, and have it delivered wherever she likes later that day—within a 10km range anyway. It's coordinated by the kommune in partnership with the city's food stores.

Looking up, Xin notices the rows of vegetables and herbs lining the edges of all the post-car streets around here. They're grown and used largely by local residents and cafés. Letting her hand drift through the rosemary bushes, Xin moves back through the street market, noting the presence of fresh food with a strong Nordic flavour, as well as the usual global cuisine. Looking up, she realises that she's moved from market to supermarket.

The front of the store blurs into the street market, with stalls of fresh produce with informed and passionate vendors behind the counter. She recognises the successful Nordic franchise but the sign also states the name of the store manager first, as if a local shop, and the

architecture feels part of this neighbourhood, rather than the equivalent stores by the same brand she's seen in Oslo and Copenhagen.

Xin wants to know more about the tray of beans she finds herself in front of. Xin reads the elegant e-ink visualisation revealing that they're grown a few streets away. When Xin holds her phone over the sign, the whole supply and value chain springs into view: the name of the farmers, the type of farming, how the food got here (on a cargo bike in this case), how much is sold in the store and how much re-used elsewhere (and where it is re-used). Even the history of the bean, which is apparently being grown in Sweden for the first time in centuries.

She moves through into the store, noticing a cooking school run by the restaurant she'd seen outside. She's walking over a glass floor, which looks down into the underground vegetable and mushroom production, the eerie glow of the lamps lighting up fresh salad greens, and some arrays of aquaponics.

The food is not cheap, but it is good. Xin remembers the post-COVID rethink of resilience, generally, and how it had triggered a complete revaluation of basic living systems, with food prioritised alongside housing, health, environment, and basic services. Food was too valuable to be solely the province of the private sector, and so it had become the proving ground for new forms of partnership. It seemed more expensive to Xin, yet Sweden's strong principles of social justice ensured it was still accessible to all. Food's positive impact was valued by the welfare state, offsetting its cost by paying for prevention rather than cure. Everyone in the value chain got paid properly—yet it was affordable. Retailers worked closely with policymakers to ensure this 'middle way' model.

Part of the store's job seemed to be to explain and share these new systems and values as much as sell food. The entire supermarket seems organised around these principles. The front of the store has super-fresh, super-local food, with frozen global produce to the back. Each step in that direction seemed to represent a kilometre further away. Seasonality is also prominent, also directly affecting the store layout as well as the selection, and with significant care and attention paid to explaining what's in, and what's next. Xin's phone offers numerous ways of finding new foods, enabling her to browse the physical store in situ using augmented reality: search via occasion, ingredient, dish, culture, season, preference, carbon, health…

Xin notes that meat is not a big presence at all in the store, or in the market outside. This is no longer a surprise to anyone, but as a food researcher, she is primed to recognise the patterns. Meat is there, of course, but reflects its contemporary positioning, almost in

line with how it was in Xin's grandparents' generation; an occasional treat, something to be used resourcefully. Here, there seems to be an emphasis on care and wellbeing for animals as well as humans, and how livestock is seen as a necessary part of the food system. There's a brand of lab meat here, but most of the meat is the opposite: reared wild, organically and naturally produced, and carefully and resourcefully used.

Whilst some stores have gone to fully automated checkout, the emphasis on customer experience here highlights the value of physical interactions. If you were to automate the checkout and take the people away, thinks Xin, you might as well shift the whole thing online anyway. The value in the experiential model means the physical store, augmented by digital services, is more valuable than ever.

Stepping outside and wheeling over towards the end of the square, Xin pauses by the school entrance. The school kitchen is no longer hidden, but has been rebuilt as an open kitchen, almost restaurant-style, visible from the street. Signs show how surplus food from the market supplements the school kitchen. In turn, the school kitchen serves food for the local elderly too, as well as the very young at the kindergartens built into local apartment blocks. It becomes a street food kitchen in the evening, sometimes with residents cooking together in the summer. Xin speculates that some smart contract tech must enable all these local actors to effectively move food around their various systems. Thanks to YouTube, the school's chefs are local celebrities, with teams running cooking classes through the day in the supermarket whilst others are cooking in the school.

Xin turns to look back on the buzzing square. The street market with fresh produce, subtly blurring into the major supermarket, working with many of the same principles. The way that the systems of community garden, school, aged care, retail, and café all harmoniously feed off each other. The rows of communal vegetables, fruits and herbs lining the streets. The various delivery systems threaded through it. The way data and digital services underpin experience, yet physical, human, and natural interactions are to the fore. The way that food is sold, and grown, used, experienced, re-used. Most of all, how food is woven into each corner of the tableau in front of her, in numerous ways. It feels like it provides the roots of a place. Which is exactly what food is, reflects Xin.

To be continued by the reader

In today's complex twenty-first century world we are all faced with a subtle challenge: we can either be mastered by our mental and structural silos or we can try to master them instead. The choice lies with us. And the first step to mastering our silos is the most basic one of all: to think how we all unthinkingly classify the world around us each day. And then try to imagine an alternative.

Gillian Tett

Islands like Gotland have been powered by the wind for centuries. What if Gotland could generate all its power needs locally via such renewable sources again, whilst linked productively to the mainland? Could it act as both a generator and battery for Sweden, as well as systems demonstrator of connected yet decentralised energy at regional scale? How does intrinsically linking it to systems of demand—mobility, housing, industry, farming—change the equations? How could local ownership work best? How would it diversify the local economy beyond eco-tourism, repositioning these old ruins within a more resilient future?

Sketching

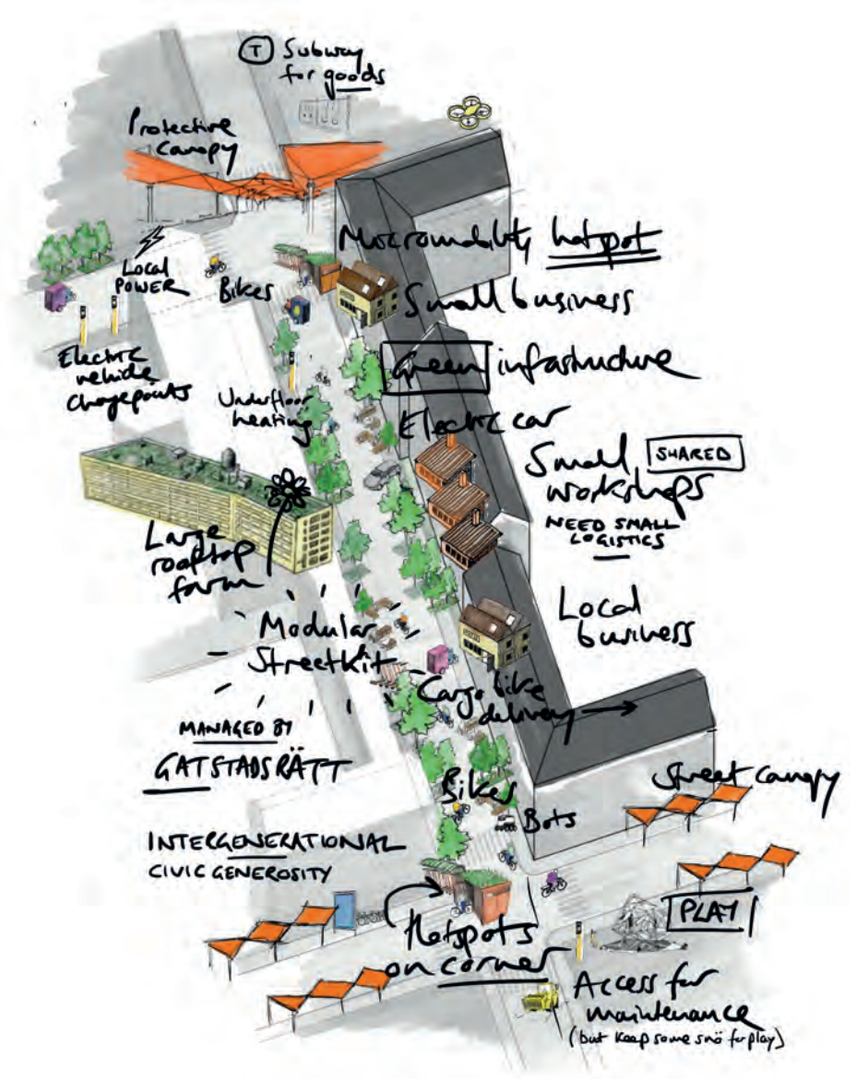
Producing a sketch is fundamental to this stage of the mission design process. The architectural historian Robin Evans once said *"drawing occupies the most uncertain, negotiatable position of all, along the main thoroughfare between ideas and things."*

This positioning between abstract ideas and 'things'—places and natural systems, people and technologies—enables a design workshop to move fluidly between two modes: on the one hand, high-level invention, social and cultural constructs, opinion and political positions, and on the other hand, to force the group conversation down to a more located, nuanced, and complex discussion, full of the trade-offs and decisions that must be made when making something in physical space or in real places and communities.

Whilst sketching in a workshop is a long way from engaging a real community in a real place, it nonetheless means the group has to confront 'thing-ness' sooner rather than later. Drawing as a

group, particularly on a realistic map or base drawing, brings forward questions of *"But how?"*, *"Will they?"*, and *"Why this and not that?"*, at least when well-facilitated.

Groups usually need encouragement to make marks on paper, which can sometimes involve literally, if subtly, placing a pen in someone's hand. But stressing that this is not an art show, and that need to see the traces of tangible ideas, usually releases the flow of ink.



Synthesised interventions and issues for a typical ‘knot’ of inner-city streets, produced by the Street Mission design workshop participants.
GENERATOR, STOCKHOLM, OCTOBER 2019

Mobility Design Workshop output

Typical Swedish inner city street

Two groups were asked to address a typical inner-city street condition, whereas the other two groups were presented with a blank suburban street condition. Using supplied system elements, such as greenery or bikes, as well as blank cards and freehand drawing and scribbling, the groups were able to sketch out a series of possible interventions on and around the street.

Both of the groups addressing the inner-city street developed a series of similar interventions, comprising a more varied street space defined by various different traffic flows, micromobility hotspots, greenery, and diverse places to support social interaction.

Yet one group had an increased emphasis on local production spaces (workshops and farms, supported by lightweight logistics and off-peak tunnelbana for goods), and forms of community coordination (such as a form of super-local ‘gatstadsrätt’ forum, coordinating civic, shared and intergenerational living).

The other group focused more on shifting traffic patterns via bikes, micromobility, e-bikes, shared cars, and infrastructures to support these modes—covered bike racks, street canopies, underfloor heating, chargepoints, slowing traffic flows—enabling diverse uses, such as play-streets, green and blue infrastructure, energy generation, and so on.

Synthesised interventions and issues for a typical inner suburban Swedish city environment, produced by the Street Mission design workshop participants.
GENERATOR, STOCKHOLM, OCTOBER 2019

Mobility Design Workshop output

Typical Swedish suburban street

The other two groups were asked to address a typical Swedish suburban street condition.

This resulting sketches shared many of the elements found in the inner-city street described previously: bikes and active transport, intensive planting of vegetation, shared vehicles, cargo bikes for logistics, reduced traffic flow via geofencing and street redesign, micromobility hotspots, and so on.

Yet both groups placed greater emphasis on imaginatively modifying the buildings on the street, and opening up new relationships in the spaces around the buildings, and thus the street.

These might be the typical Miljonprogram-era apartment blocks retrofitted to open up ground floors to more diverse use. Or market halls and local farms generating heat for the street, as well as cultural activity or food production. Or major co-working spaces reducing unnecessary commuting into the city centre. Or school buildings being re-used after school hours as logistic hubs.

These changes radically alter the buildings' relationship with the street, with both becoming more fluid, open, and porous, and with more intensive, diverse use, as a result.

Layers, levers, and lenses

In these Design Workshops, the group are continually assessing the question of the mission, but with a strong focus on where to start, what to start with, and how outcomes might evolve. Although there is discussion of the overall mission framing, this proved to be hard as a collective exercise, as described later. Instead, the expertise and diversity of the groups in Design Workshops was better deployed on questions of action. Where can this mission be best exerted, and in what way.

This question was addressed through different **Lenses**→ by having relatively diverse groups in the room. The subject was not addressed from the school chef point of view, for instance, but seen through multiple lenses, from farmer to student. These voices were in the room and encouraged to convey their perspective. (The strong emphasis on creating participative and adaptive prototypes means that Lenses will play out most powerfully in reality—on the street, in the school—rather than in a workshop).

Layers→ are evaluated in these Design Workshops too, as we will see, in order to ensure that a systemic approach can be taken by the mission, and baked into the prototypes.

Finally, identifying **Levers**→ is perhaps the core goal of these Design Workshops. Usually found amongst the angles, levers can be thought of as existing infrastructural elements which can be powerfully exerted in different directions, taking the re-scaling sensibility described earlier. Using an understanding of **Types**→, such elements can be re-scaled, producing different forms of value framed by the mission theme's North Stars. Yet as they are likely to exist in highly distributed form, the mission can also start small, and soon.

For the missions themes in question here it had become clear that both streets and schools had these qualities of a lever: existing at scale, effectively pre-scaled; highly distributed; relatively well-governed but optimized around certain outcomes; capable of producing systemic ripple effects. Crucially, each can also be grounded in particular places and contexts, meaning

that each instance of the type will be reimagined. This unlocks diversity at scale: in some ways, each school is completely different; on another, all schools have similar characteristics. The lever can be exerted to transform all schools, in time, yet each is transformed differently, based on local context and ownership of a participative process.

Some levers are built of discrete instances of common types. These types are often managed and articulated in similar ways—such as parking spaces or school restaurants—and so starting with one instance, no matter how distinct and located, can have the DNA of the wider system, indicating the potential for scale. A half-step can begin to quickly transform such instances.

The workshops also revealed that within each, following the nested principle, there were other levers—on-street parking spaces; the school kitchen—which would enable a quick start, a **half-step**→ towards the larger goal. The lever concept triggers an imagination of the potential scale of change lying around us.

Not everyone readily thinks like this, particularly in a relatively 'siloed' context where a parking space is seen as a question of traffic management, rather than a public space with the potential to be reimagined. The Design Workshop's job is also to reframe these possibilities, to suggest that these levers not only are 'hiding in plain sight' around us, and relatively easy to access, but that exerting them differently can produce markedly different results.

Mission statements

In the drive towards mission definition, the Design Workshops can also pose the question of mission statements.

Unlike some other mission-oriented innovation approaches, in this process the mission statements emerge approximately halfway through the process. The logic here is that the mission should be collectively arrived at, and so the early processes of network forming are preparing the ground for the mission, as much as they are about deriving discrete insights. The participative approach is about building momentum and concensus about a mission, in order to build a network for delivery, rather than it simply being imposed from above.

The mission will be refined by the design processes here and afterwards. It can continue to be refined based on feedback from prototypes and demonstrators. Thus, the mission statement should be thought of as in flux (as noted earlier, it can be

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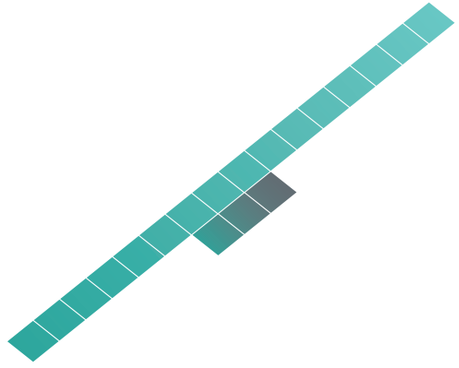


A parking space

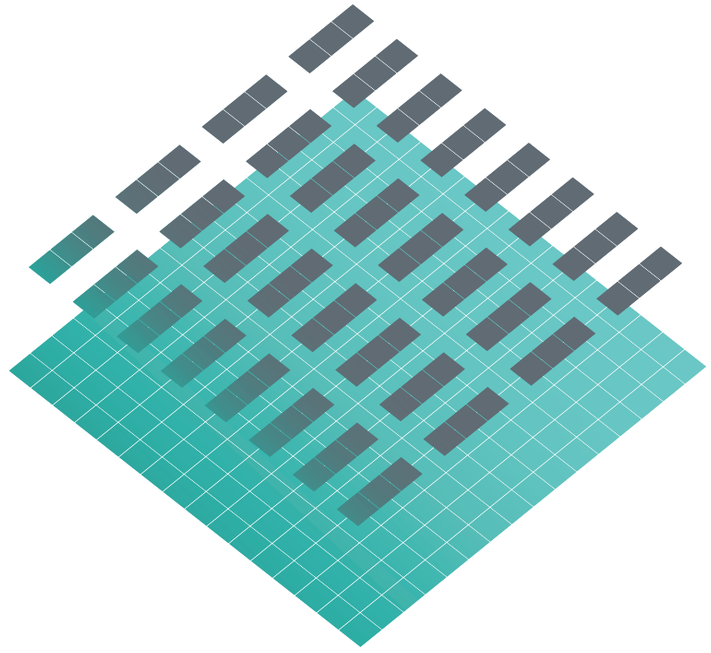
A street

A school

A school kitchen

Neighbourhoods
Addresses all streets, schools or not, but also explores the interplay between schools and streets, and the systems they articulate.

3



All the streets in Sweden
At 40,000km, the largest urban development project in Europe, transforming numerous interconnected systems via a massively diverse re-imagining of streets on the ground.

All the schools in Sweden
Transforming the entire Swedish food system via the interconnected systems in and around our schools, using the distributed and diverse network of schools as intervention points.

advantageous as aspects of the statement can flex in response to insights derived from delivery. A mission is something to actively run, not simply to fund).

However, arriving at the mission statement, and locking it into place, can be powerful. It should be the phrase used most frequently to articulate the mission—with stakeholders, politicians, citizens, media, and others. As a result, it is not easy.

In the Vinnova-facilitated process, we tested creating a mission statement at various points, and in various formats: at the beginning of workshops, and at the end; in plenary in large groups, and in small groups. Either way, the 'word-smithing' required does not appear to lend itself to group-work. In the end, we took all the inputs from these processes, and after transforming the angles through a series of principles described here, we ended up crafting the mission statements in-house, and with the tightest members of the mission consortia.

Those mission statements, around the two first mission pilots of Streets and School Food, follow at the end of this section. Each word within them is unpacked in detail, describing its purpose within the overall sentence. They are deliberately short, snappy sentences, conveying both a strong ambition—an entire system in play—as well as a sense of the outcomes involved. They are not detailed on purpose, and precise metrics are placed elsewhere.

Targets and timelines

Precise metrics must exist, where appropriate, but not within this concise, high-level phrasing. Given the systemic nature of these missions, there will be *many* metrics, of various kinds. They will be best derived from the value models behind each mission, discussed as part of prototyping, and in the definition of **North Stars**→.

This North Star statement should be separated from detailed, interdependent metrics. The North Star, which serves as the mission statement, provides a direction, in order to stimulate and motivate action. The metrics themselves can be pinned

around outcomes, around impact, derived from this action. The value model is a cloud of metrics, providing detailed stories of impact, enabling coherent steering towards the North Star. The mission statement itself provides a high level version of this set of complex relationships, but must be 'short and sweet' enough to be instantly communicable, and tangible.

This cloud of metrics emerging around the mission begins to describe a systemic approach; at least more than is usually embodied within our current governance. The metrics conversation can be another form form of 'glue'.

The target date for the mission is likely to be revised numerous times throughout its evolution. Prior examples like *Vision Zero* indicate this pragmatic approach: at each point, there is a clearly communicable target, yet the target can be revised based on progress. This allows for greater ambition, in fact, allowing a mission to move more quickly, based on progress.

Such policy-making should not be a guessing game, or a case of blithely setting immovable targets that cannot flex to reality. Instead, they can be meaningful deadlines which provide impetus yet respond to progress. Again, understanding how these dates might flex requires a deep level of engagement with activity within the missions. Innovation management must be far closer to the ground than is usual in these contexts.

Small groups

The focus on smaller group interactions in the Design Workshops reflects a different stage of the design process. This is on the ‘downward slope’, towards tangible prototypes. Refining options, whilst adding detail and insight, is required at this point. This is best done in a series of smaller groups of five to six participants, running in parallel.

New ideas can still emerge, and are captured, and the groups must still be diverse, representing multiple views of the same object. Yet the dialogue is different. The Actors Workshops are generators of ideas; each is faithfully recorded, and each is not mutually exclusive of others. This Design Workshop stage requires more subtlety, nuance and diplomacy, however, as it includes editing.

This draws from the Bohm Dialogue model, proposed by Bohm, Factor and Garrett (1991)

describing a free-flowing dialogue process amongst small groups. *“Each listener is able to reflect back to the speaker, and to the rest of the group, a view of some of the assumptions and unspoken implications of waht is being expressed along with that which is being avoided ... Participants find that they are involved in an ever-changing and developing pool of common meaning. A shared content of consciousness emerges which allows a level of creativity and insight that is generally not available to individuals or to groups that interact in more familiar ways.”*

Culture change

Anja Melander

Anja Melander is part of Vinnova's strategic design team and Innovation Management department. She works at the intersection of organisational culture, communication and psychology. She has previously worked at Fotografiska, the Stockholm School of Entrepreneurship and Gather Festival, and holds an MSc in Management from Stockholm School of Economics and an Msc in Strategic Communication from Lund University.

It's easy to underestimate the power of organisational culture. In contrast to its more popular sibling, strategy, culture appears invisible, abstract and unconscious, even to the people creating it. Yet culture, as Peter Drucker famously said, *"eats strategy for breakfast"*. It is something all organisations have, but few understand. Which is why it is so hard to change. But it can be done.

What is organisational culture?

Sometimes, it's easier to define it by what it's not: ping-pong tables; corporate values; a nice feeling. Rather, culture is the water we swim in, the way we do things and the shared assumptions that drive our everyday behaviour. It's an organisation's collective identity; formed through a life of struggle, failure, crisis and success. Culture is, in other words, the glue that keeps the organisation humming along. Which is great—until for some reason you need to pivot.

A century ripe for transformation

The complex challenges facing us in the 21st century gives us no choice. They require that we learn, work and adapt together –that we collaborate across sectors, domains and nations. And if we want our organisations to pave the way for a more resilient society, we must shift our underlying assumptions: from control and predict to observe and evolve. We must embed the values of emergence, presence and diversity—fundamental principles of nature—into our ways of working.

Unfortunately, change is messy and uncomfortable; it requires courage and commitment. But change is also how we grow and develop our resilience. It's the nature of evolution. And although societies adapt slowly, people's minds can change in a second. A slight shift in language— the reframing of a question—can lead to a whole new way of seeing.

How do you change culture?

Behaviour change is tricky, and without a clear goal and a conscious process, dabbling with culture can be like playing with live ammunition. Here is a good place to start:

— Map your current culture: First, by observing the organisation's behaviour over time, you will uncover underlying assumptions and learn how the system works.

— Articulate a desired future: Then, by developing a desired culture that aligns with your overall organisational strategy, you have something to aspire to.

— Experiment and scale what works: Now, running small agile experiments across the organisation, you will be able to try out new structures, iterate, and scale what works.

Note, make sure that your experiments properly align structure with mindset and purpose. Otherwise, you might miss the target.

Some examples from the real world

If you want to create a culture of transdisciplinary collaboration, it's not enough to simply put diverse experts in a room together.

Hands-on advice for culture change

Get leadership onboard: Don't outsource your culture to HR. For real change, leaders must be actively committed ambassadors of the new culture.

Make it easy: Work with, not against, our psychological wiring. Drop unnecessary hurdles and incentivise the behaviour you want to see.

Establish new norms: Other people's behaviour impacts our behaviour the most, so make sure to celebrate actions that align with the new culture.

Pay attention to power: Who has the most to win and to lose? Listen closely. This will help you avoid seemingly quick fixes.

Give people time to think: To be creative in uncertainty, we need space to think alone and reflect together — foster a sense of 'Triple loop learning'.

Bring in experts: Involve external perspectives to help you bypass your own biases and see the system from the outside.

Keep going: A culture is never finished. Just like with any other living system, it is in constant flux and requires time, care, and attention to thrive.

You have to build rapport and purpose, engaging them in solving a common problem. You must nurture a belief in the power of diversity and learning by doing. One example is IDEO's Innova Project, where a diverse group spent months together building a scalable school system for the Peruvian middle class.

If you want a culture of commitment, it's not enough to give people autonomy. You need leaders who are visibly committed to higher-order goals, and who show a sense of direction and humility through their actions. You also need strong feedback loops, allowing information to travel freely and quickly throughout the organisation, enabling for nimble course correction, and reinforcing the belief that people can be trusted.

An example can be found in the House of Beautiful Business, a decentralized global movement powered by passionate participation, responsive curation and a hybrid media platform.

If you want a culture of experimentation, you need to go way beyond the suggestion box. You must create space for apparently wild ideas, a license to dream. Learn from organisations as disparate as ARPA-E, Google X or the Bauhaus, and how they all developed capabilities for running experiments at the margins in wildly different ways. Within the public sector, we must go even further; creating meaningful public dialogue around possible directions for society, inviting all citizens to become active shapers of our future.

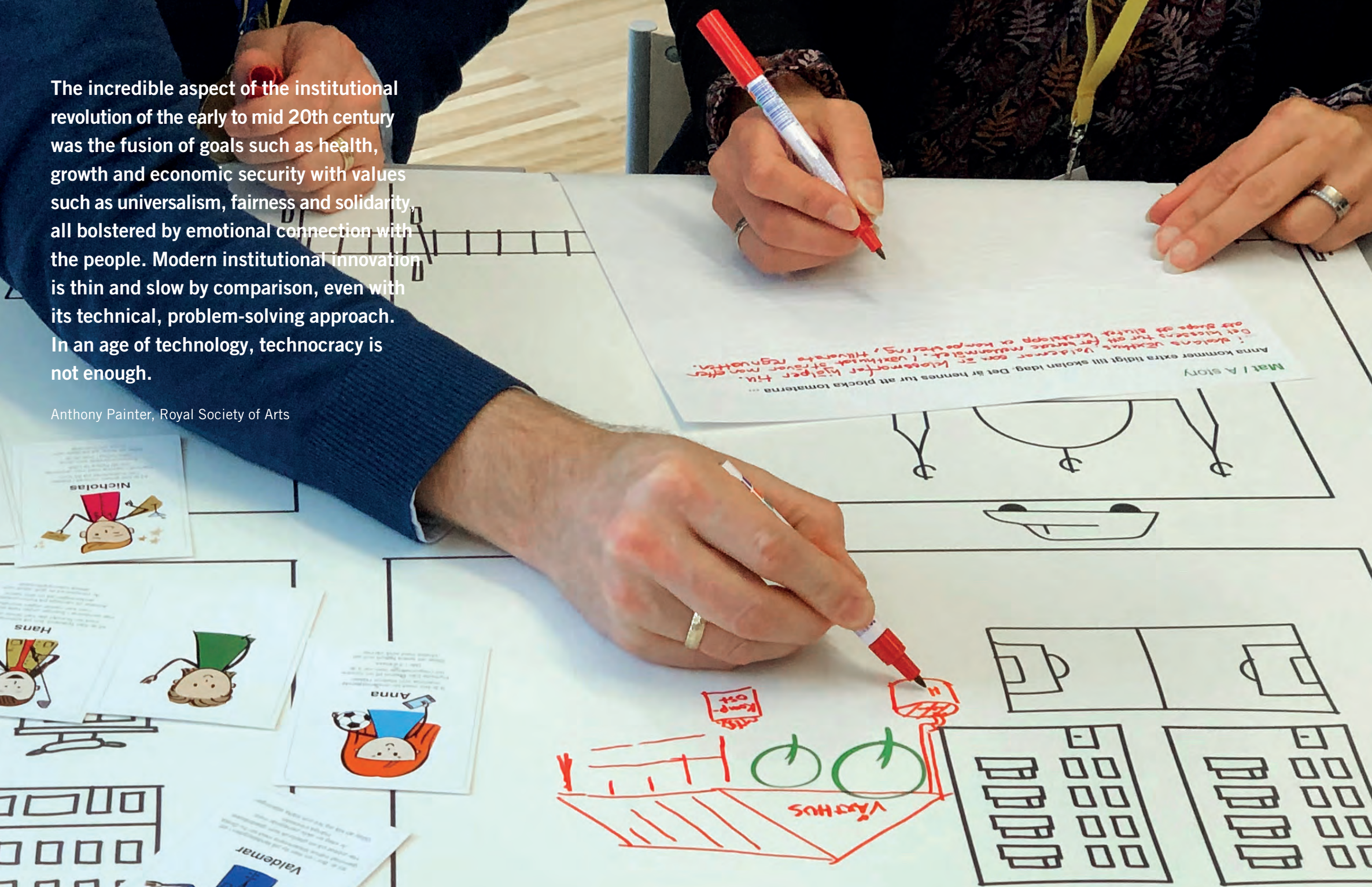
Evolving beyond our comfort zones

This may all sound like a bit much. But rather than passively waiting for 'disruption', our global challenges might push our

organisations to become capable of their own transformation. And if those of us in the public sector can explicitly recognise that we are in the business of culture change, we might conjure a spirit of learning by doing, demonstrate a concern for the long-term, and revel in the humility of not-knowing. We might even evolve and adapt beyond our comfort zones, before the place gets really uncomfortable.

Learning from the great systems theorist, Donella Meadows, we might explore how setting bold and audacious missions can give us a way to actively engage with systems rather than pin them down, not killing them with calculus, but dancing alongside their ever-unfolding mystery.

> *The future can't be predicted, but it can be envisioned and brought lovingly into being. Systems can't be controlled, but they can be designed and redesigned. We can't surge forward with certainty into a world of no surprises, but we can expect surprises and learn from them and even profit from them. We can't impose our will upon a system. We can listen to what the system tells us, and discover how its properties and our values can work together to bring forth something much better than could ever be produced by our will alone. We can't control systems or figure them out. But we can dance with them!*
> *—Donella Meadows, 'Dancing With Systems' (2001)*



The incredible aspect of the institutional revolution of the early to mid 20th century was the fusion of goals such as health, growth and economic security with values such as universalism, fairness and solidarity, all bolstered by emotional connection with the people. Modern institutional innovation is thin and slow by comparison, even with its technical, problem-solving approach. In an age of technology, technocracy is not enough.

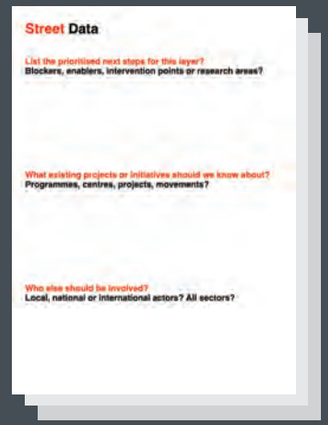
Anthony Painter, Royal Society of Arts

Platform layers

In Design Workshops, the sketching and narrative process is supported by exercises which explore the systemic relationships in a little more detail, and in structured fashion.

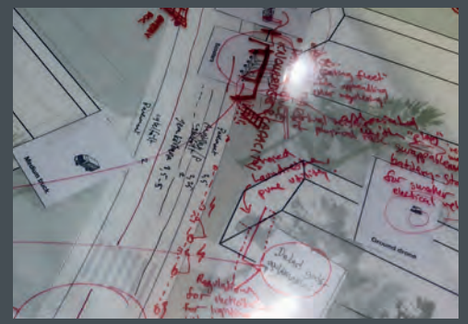
As the **Platform**→ strategy is core to a systemic change approach, it makes sense to bring it into the prototype design process as early as possible.

The platform is articulated as a set of layers, running from skills and cultures, through to policy and law. It quickly enables the concepts in question to be addressed in terms of what may be common, translatable, and shareable in terms of practices, services and standards. Equally, it explores what must be broadly consistent and equitable, in terms of policy and law, and within which jurisdictions or ambits.

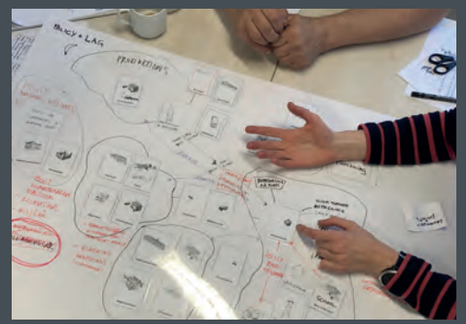


Variations on these simple templates (left) are used in workshops to capture the results of the sketches and canvases in a different form. Transcribing ideas from drawings into words in this way reveals more information, and variety of expression. Blockers and enablers can be articulated specifically. Separating out the idea across the different layers also forces different reflection. They can also be used to capture further 'leads'—potential actors, future collaborators, relevant projects and places that we should know about. Overleaf, see an example of the platform layers articulated per idea.

Alternatively, plastic sheets representing different layers can be overlaid onto drawings and canvases (below).



Participants from Stockholms stad, Voi and Ericsson comparing notes across platform layers in a Street Design Workshop.



A 'Policy and Law' layer being discussed in a School Food Design Workshop

Place types

Developing a place-based approach, for both Actors Workshops and Design Workshops, simple typologies of places can be used as triggers for conversation and collaboration.

These simple sets of types of place can unlock surprisingly complex scenarios. They can be at the level of elements, as per the types on the right, or more abstract, like ‘housing’, ‘street’, ‘library’, ‘port’ or ‘forest’, as overleaf.

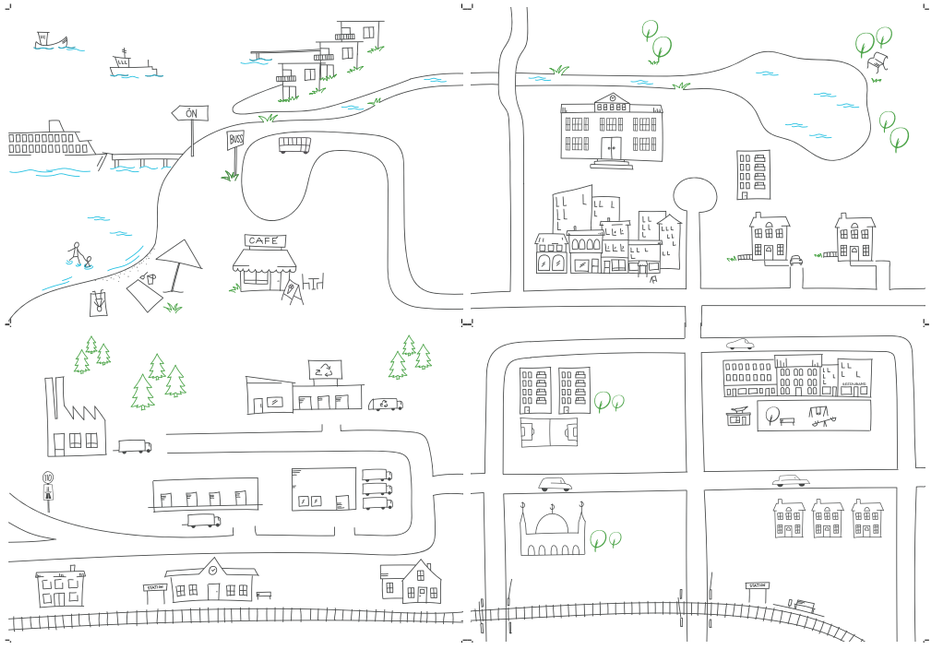
In a workshop, participants take the mission theme, or mission, and play that out, devising scenarios that use these elements.

Types are a powerful technique within design practice. They ask what is specific and unique, and what is generic and transferable. A market in Madrid is quite different to a market in Shanghai. Yet at some level they are both markets. The differences between are crucial to understanding the super-local and distinct, and what might be scaled across environments.

These simple sketches of types of place, cut out as cards, are enough to prompt participants to think and discuss in more tangible terms. They suggest activities, experiences, localities, and prompt discussion of systemic relationships i.e.

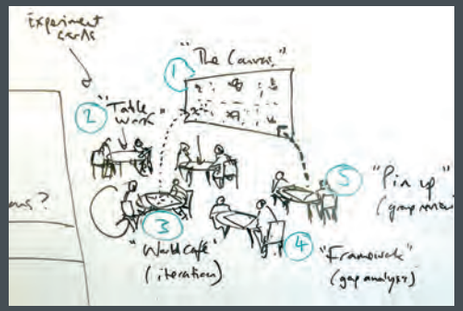
Municipality + Large school + Aquaponics = ?

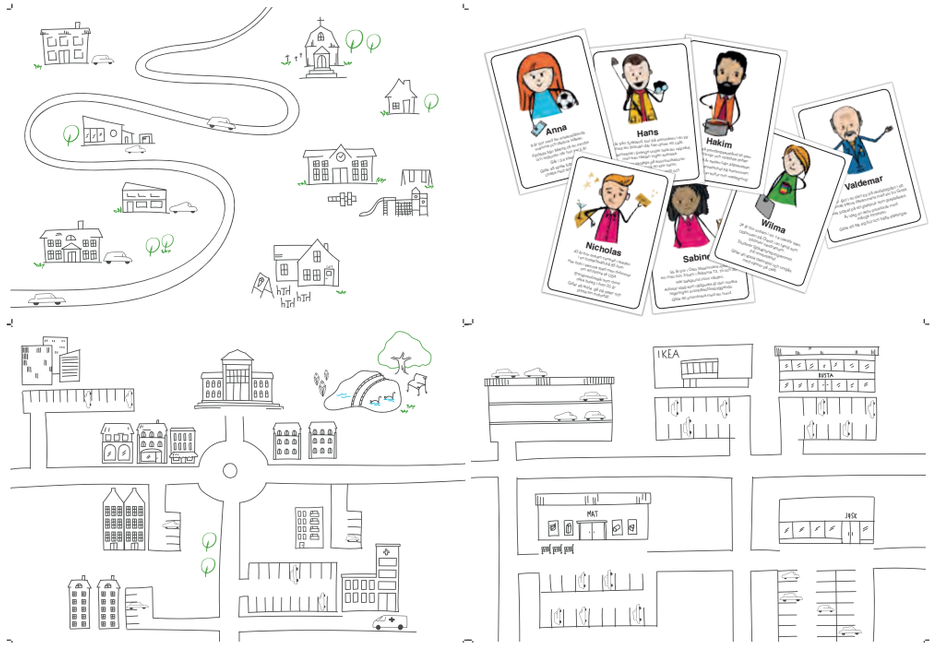
Wherever pre-drawn cards are used, blank cards are also supplied, and participants are encouraged to suggest and scribble their own interventions.



For a workshop in Kalmar, associated with a visit of the Prime Minister's Innovation Council (Innovationsrådet), Vinnova commissioned a series of boards comprising sketches of typical urban elements (loosely framed on Kalmar's context). These boards could be re-assembled by the group and drawn upon, serving as a backdrop for proposed system changes; yet crucially, always located, lending a sense of place.

The cartoony aesthetic makes the boards approachable. People feel more comfortable scribbling on it, less likely to feel constrained by their drawing skills. The drawback of the aesthetic is that it can make the exercise seem frivolous or facile, so careful facilitation is required to ensure that the conversation can be precise, detailed and informed by deep expertise. This requires facilitators to be well-versed in the systems in question.





The boards are usually deployed following a Speculative Narrative exercise, which unlocks a sense of possibility imagination whilst cultivating a constructive critical mode. In some cases, a set of persona cards is produced, providing further sense of context. These are simple on purpose, as these workshops are merely about finding initial angles; it is stressed that any policy development should be based on research.

The boards, and the persona cards, are available as PDFs for free download via the Vinnova website, along with a basic 'recipe' for these kinds of workshops.

Many thanks to Caroline Sellstone who produced the drawings for Vinnova. Many other forms of cards exist for workshops like this e.g. methodkit.com produces many varied sets of cards.

North star*

Our North Star is a fundamental component of mission-oriented innovation practice. It is the celestial alternative to the moon in the moonshot, yet alludes to a guiding light that people have steered with for millennia.

A North Star cannot be enforced, 'top down', say as a lighthouse can be placed somewhere and controlled. A North Star is a construct, created by both rigorous scientific mapping and instrumentation combined with cultural storytelling and folk myths. Hence its power in the popular imagination, as well as its utility to a sailor drifting in a featureless ocean. It is something to build and maintain.

Within mission-oriented innovation, the North Star enables clear directionality. It provides a constant sense of direction, and ambition, yet crucially, in Vinnova's methods, it is also out of reach. This implies that missions are ongoing pursuits; one can have a direction, and there are

The North Star has particular cultural resonance in northern sea-faring countries like Sweden. Since its founding in 1872, the Swedish newspaper for American-Swedes is called *Nordstjernan* (*The North Star*).

regular checkpoints along the way, each with a sense of achievement.

Yet learning from previous Swedish missions like Miljonprogrammet and Vision Zero indicates that such ventures are never done. They require constant glances up at the North Star, frequent adjustments based on compass readings and maps. An approach to place-based missions means that systems like streets, school food, forests and ports are never 'done'. They are constantly evolving.

This complicates the rhetoric around missions, no doubt. Yet it suggests a dynamic that is somehow both realistic (streets and school kitchens and forests are operational entities) and more ambitious (streets and school kitchens and forests can always get better).

This is in line with Thomas Kuhn's understanding of scientific progress, leaving us open to the possibility of revolutions in knowledge fundamentally shifting the way we see such systems,

continually addressing them, never pretending things are resolved forever.

Metrics are readings from the environment around; they help stay the course, yet they are not goals in their own right. This is crucial, as often metrics can inadvertently become goals; they have their own misleading magnetism, which can lead to an optimisation of one sub-system whilst neglecting the primary agenda. With missions, metrics are the equivalent of shifting weather and changing temperatures, ticks on a clock, the quiver of a compass arm.

Yet they are not the point of the journey. Metrics can also change. With Vision Zero, we see the target year for zero deaths and accidents shifting over time, based on feedback loops from culture, technology and politics. This is realistic, rather than a criticism. We also want to be open to the possibility of bringing a target forward, too. Whilst many deadlines discussed in our workshop have a natural tendency to settle on 2030—due to the influence of the Global Goals—it could be that social movements and technological advances, enable goals to be brought forward.

Equally, and awkwardly for those wedded

to prognoses and roadmaps, many theorists of change note that only so-called Black Swan events produce the significant transformative change that we now need. It could be argued that the Covid-19 pandemic was such an event (though some climate scientists and epidemiologists say it was entirely predictable).

These things can shake targets fundamentally. The only way to deal with that is to remain in the data, as Nicholas Nassim Taleb would suggest, and take frequent measurements, making course corrections as required. This requires a particular set of capabilities, and a culture attuned to this level of agility.

As other ways of measuring become available, other metrics can come into play. Equally, some things are best left un-measured.

The North Star can be framed early. In workshops, a draft can be tested upon participants, and insights will emerge. Yet it is hard to write by committee. A mission's North Star requires clarity and brevity, whilst also conveying a sense of inspirational scale and societal outcome.

It should be an everyday statement. We use the Bus Stop Test: can you imagine saying it to

someone at a bus-stop and them responding *"That makes sense. And that sounds great!"*. (Equally, one might think of this as the Politician Test, as politicians will need to describe missions succinctly yet ambitiously).

This is another reason to separate detailed metrics from the North Star statement. Obviously, sustainability and health, never mind social justice, can be expressed in incredibly complex metrics. A Street mission can affect both particulates per million of carbon and likely incidence of social mobility, along with hundreds of other measureable outcomes—and we wish to unlock all of them. Yet a view of the North Star would become clouded by all data-points. So we explicitly separate these aspects, by having an approachable North Star statement supported by detailed models comprising metrics.

The North Star also needs to be powerful enough create a pull for numerous projects. As well as from JFK, we might also learn from Doug Aitkin's work on Airbnb's 'Purpose': *"It should be enormously ambitious. It should be exciting enough to get out of bed for, and inspirational enough to keep you going through the tough times … The*

best Purposes seem impossible to achieve. But in actuality, they are improbable, not impossible … Purpose should be grounded in an everyday reality, but be able to stretch to an improbable goal."

Describing this ambitious sense of purpose gives us a way of addressing core paradigms. This is the deepest leverage point in Donella Meadows's systemic change model. A North Star must somehow capture that essence, making space for all Meadows's other types of leverage point to play out in projects on the ground.

Ensure that every street in Sweden is healthy, sustainable and full of life by 2030.

Ensure as opposed to “enable”. As Mariana Mazzucato often points out, policy language is full of well-meaning words like “enable” and “shape”, which do not tend to drive commitment. Ensure is a commitment to make not just something happen, but this particular mission happen, as in a contract.

Every street addresses social justice, ensuring that all streets are transformed, for everyone. This draws inspiration from the Vision Zero programme, with its ethical approach to target setting: no death or serious accident is ‘acceptable’. Similarly we cannot make some streets healthy, others sustainable. We must do both, everywhere. When redesigning a street, a systemic approach to co-benefits addresses health and sustainability (and many other things) through linked interventions. The definition of street is open too, in order to encourage a non-technical debate about what ‘street’ means; as a space we live, work and play in, supporting a potentially rich stew of diverse activities, usually with some level of density, no matter how mild. Many have an instinctive idea of what a street is, as compared to a freeway or country lane, implicitly defined by interacting systems.

Healthy is left without detailed definition at this point. There are many supporting metrics which will pin it down more clearly. Yet here it is left in ‘common sense mode’, in order to drive a direction of change: is this street healthier or not? These statements must be explained at the bus stop or in a podcast, with no time or space for footnotes. At a basic level, a common understanding of a healthier direction is something to build upon.

Sustainable has also suffered decades of debate about its definition. Whilst we have a series of supporting metrics for its different aspects, the word is left at high-level, on purpose, in order to drive mainstream discussion about direction (*“Does this change make the street more sustainable, and how?”*). This is a good debate to have in public; the debate itself helps move the needle.

Full of life is perhaps the most qualitative of these qualifiers. It captures a sense of rich diversity of life—which could be butterflies resting quietly on a leaf or a cluster of busy bars on a Friday night. Both are full of life. A place could be buzzing with people, or with bees—or both. There are quantitative measures here, but this is also deliberately subjective, beyond a simple technical exercise and into the point of places.

2030 may be too ambitious in terms of ensuring that every street in Sweden is healthy, sustainable and vibrant. Yet missions should be bold, in order to motivate change. And it is theoretically possible, at least, and the target addresses both UN SDG timeframes and the advice of IPCC, as well as existing city-level carbon neutrality commitments within Sweden.

Ensure that every student in Sweden eats healthy, sustainable and tasty school food by 2025.

Ensure as opposed to “enable”. Ensure is a commitment to not simply hope that the mission happens, having laid the groundwork, but to make something happens, through continued engagement. Moreover, it is to make this particular mission happen (whilst remaining adaptable to changing contexts).

Every student immediately addresses the social justice aspect, meaning every student has access to healthy, sustainable school food, regardless of social background and context. Equally, it implies the full range of students, from kindergarten through to university and beyond. It could even reach into lifelong learning context of further education.

Eats very simply aligns with the previous point, meaning that it must be affordable, not simply accessible. If every student eats school food, it must be made available to all in terms of cost. Equally, it implies that food is tasty, desirable, and well-served. It helps build a sense of ambition akin to Microsoft’s old ‘a computer on every desk and in every home.’

Healthy is left tightly undefined on purpose There can be detailed supporting metrics, yet here it is left in ‘common sense mode’, in order to drive a direction of change: is this school food healthier or not? These statements must be understood in the canteen queue, or in a newspaper article, with no time for footnotes. As the mission evolved, the word healthy was removed, as Vinnova’s partners thought it was implicit within the word sustainable.

The meaning of Sustainable is also tricky to pin down in a single word, yet it is left at high-level on purpose in order to drive an accessible discussion about ongoing development (*“Does this change make this aspect of school food—which could be eating, growing, recycling etc.—more sustainable, and how?”*). This can then supported by numerous discrete metrics, technically.

Tasty is the most qualitative of these qualifiers. Everyone knows what it means, instinctively, yet its subjectivity makes it impossible to regulate for. A proxy could be take-up of school food (even the amount left on the plate or in the kitchen) whilst qualitative assessments can also be run, yet it is clearly a difficult metric to manage in a traditional sense. This is the point, in order to drive innovation activities towards a comfort with ambiguity, subjectivity, and the qualitative—in other words, qualities of people and place. It means the mission has to work hard to find new ways forward (there may be parallels with education models that emphasise well-trained teachers rather than quant tests).

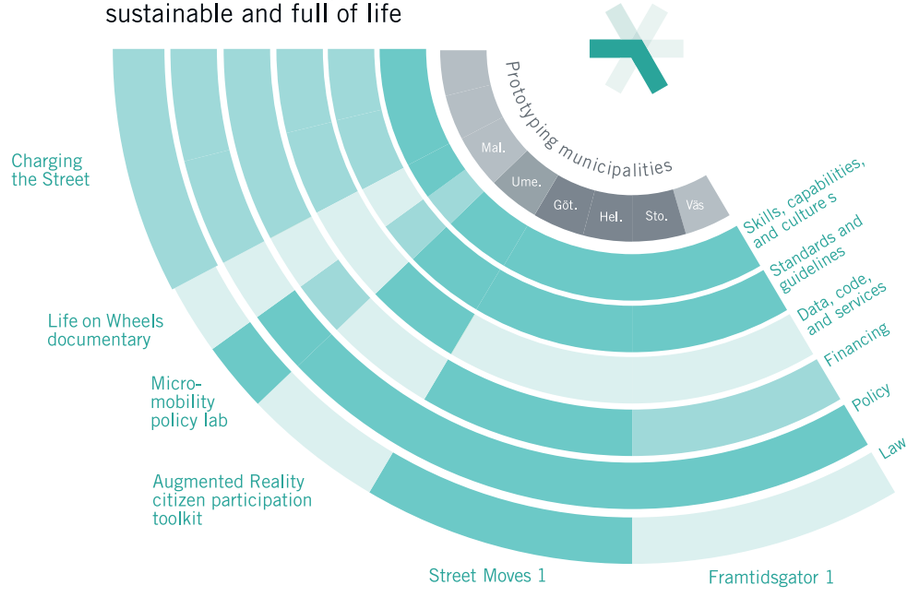
2025 is at this point a notional target, derived from a sense of ambition garnered from participants in the Design Workshops, and given that much of the school food system is in place. It implies immediate ways forward in terms of tuning and redirecting this system. It is theoretically possible, at least, falling within both UN SDG timeframes and ‘Paris 1.5’ goals.

Healthy sustainable mobility mission #1

Street

Ensure that every street in Sweden is healthy, sustainable and full of life

A visualisation of the Street mission in action, as an example



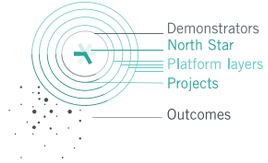
Although the original Mazzucato model (overleaf) also works perfectly well for describing the missions here, a revised notation adds some key aspects. These are primarily:

1) an increased emphasis on systemic change by explicitly describing how a portfolio of projects covers the platform layers that enable equitable scaling;

2) An articulation of a portfolio of place-based Demonstrators in which systems exist, as opposed to sectors;

3) Indicating that a mission addresses a higher-level North Star which is achieved via a portfolio of multiple missions.

These points suggest how missions can work together as systems of systems, as portfolios of activities. There is an emphasis on movement and relationship—on continuously tracking platform layers and demonstators holistically, marking the scale and stage of various activities, and the relationships between activities. The visual language of the arrow indicates that missions encompass multiple activities, as if an umbrella or container, but with a direction, as if a snowplough, making space for action. This arrow motif is also quick to draw, and when combined with the arrows of related missions, forms the North Star.



1 A mission emerges as a leader, developing whilst others are being designed

The engagement processes carried out—Actors and Design Workshops amongst others—are likely to indicate that a North Star requires multiple missions, developing different perspectives. It will make sense to start developing one mission initially, beginning to active systems and start demonstrating action on the ground. This will also suggest and refine actions required of related missions.

System layers have multiple stages of engagement

Each mission may focus on a few layers to begin with. Over time almost all layers will come into play, including connections between missions.

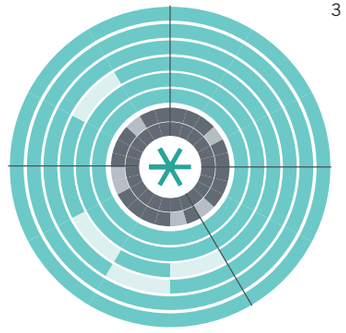
2 Some missions start maturing, whilst others are just starting

Multiple missions have started by this stage, with some well developed and delivering demonstrators in multiple places. Others are being initiated in action.

It is suggested that this portfolio is seen as a living diagram, updated as missions develop, enabling at-a-glance assessement of progress towards a North Star, across different system layers and places.

Demonstrators are how the North Star is articulated

Prototypes and demonstrators in multiple places emerge and mature as missions progress.



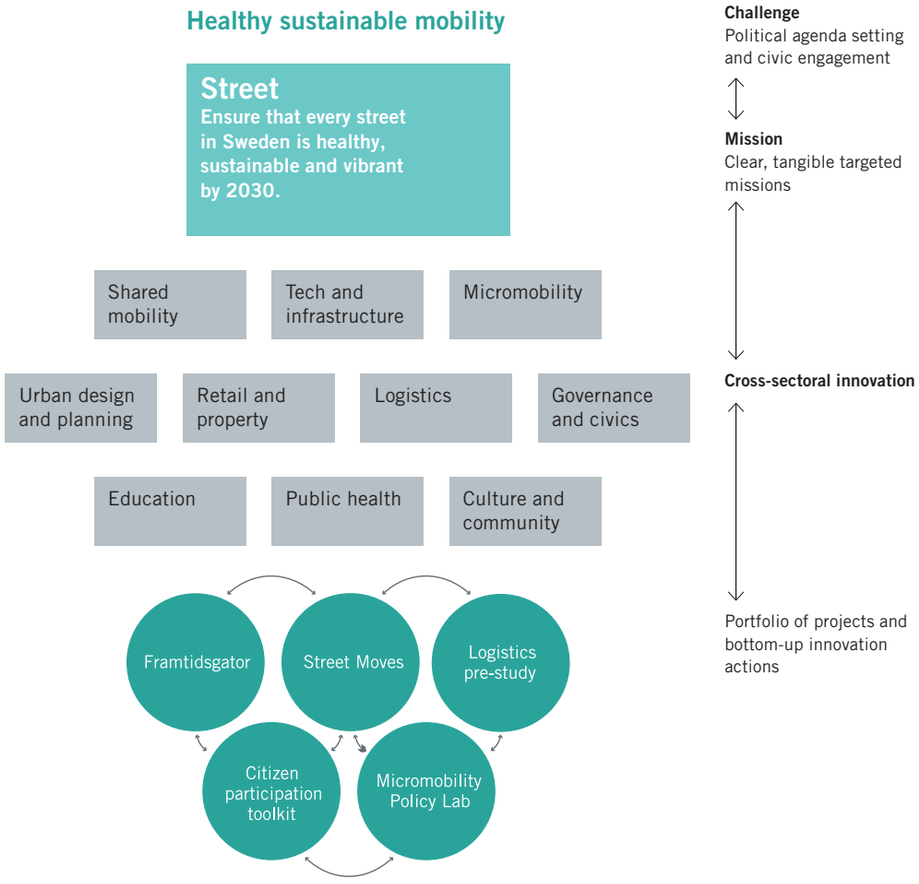
3 Missions begin achieve significant systemic change

At this point, all missions are in play and significantly developed, addressing the North Star from their different perspectives. Multiple demonstrators are active.

Some of the missions developed initially are ready to reboot, enabling a changed landscape to be reassessed, developing new angles, reconsidering what needs to happen next.

Missions move together, towards a North Star

Missions align around a North Star (1) and move towards it (2) increasing in depth (3) until they form and embody the North Star in practice (4).

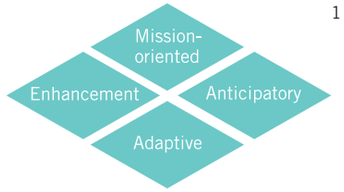


The basic structure of mission-oriented innovation, as a roadmap proposed in Mazzucato (2018, 2019). Grand challenges are addressed by missions. Missions combine multiple sectors, and align portfolios of projects, which work together to produce systemic change, towards a coherent direction. Some of these project activities will already exist—the mission 'umbrella' enables them to be aligned with new activities.

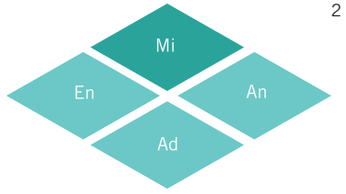
OECD Innovation Facets model—an alternate take

Throughout this work, the Vinnova team has checked with OECD's Observatory of Public Sector Innovation (OPSI), to compare notes, gain feedback and develop joint understanding. The OPSI Innovation Facets model was a very useful early description of mission-oriented innovation alongside other forms of innovation.

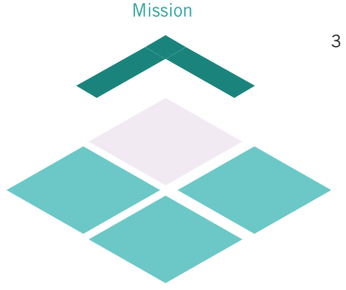
The design-led Vinnova approach to the mission pilots aligned forms of innovation, however, as portfolios of multiple efforts. Here, the mission is working like an umbrella, providing shelter for various activities, or a snowplough, clearing the path for them. The mission provides a unifying sense of direction—the North Star—for numerous innovation actions of different type.



1 The OECD OPSI Innovation Facets model combines four main forms of innovation, each of which could look quite different and can involve very different things with differing aims. Enhancement incrementally improves existing processes. Adaptive asks how we might adapt that to new situations. Anticipatory freely asks what's next? Mission-oriented suggest driving towards a goal, instead.



2 However, the pilots for the mission themes of Healthy Sustainable Mobility and Healthy Sustainable Food took a portfolio approach, using all these forms of innovation. Enhancement and Adaptive forms were a strong theme, using the principles of Levers→ to work with the existing systems. Anticipatory was at work, via speculative narratives and design-led processes. And Missions provides direction and a different dynamic of motivation.



3 So perhaps the Mission works best as an umbrella over multiple forms of innovation, providing a direction given conditions of uncertainty, aligning efforts to transform existing systems (budgets, capabilities, governance models, infrastructures). It remains transformative, producing drive and motivation—snowplough is an apposite metaphor too, creating new paths for innovation—yet it is not an alternative to
the others, but the glue between them.

Sweden is using its installed base of schools, and its existing school food system, as a lever to transform public health, climate footprint, social justice, cultural interactions, local regenerative farming, environmental qualities, sustainable logistics, food start-ups, public sector innovation, local politics ...

Sweden is using its installed base of existing streets, as a lever to transform public health, climate footprint, social justice, cultural interactions, local politics, environmental qualities, biodiversity, sustainable maintenance, logistics, mobility start-ups, public sector innovation, circular building materials ...

2 Developing missions

Summary

2 Developing missions

Summary

— The angles and insights produced from the first phase of engagement must be refined into missions.

— Use various methods and formats for this refining. There is no ‘silver bullet’ or single method that is guaranteed in advance. Try several, approaching the question from different sides, with different people.

— As with the first stage, practicing codesign will help diversify inputs, mental models and positions, helping hone the thinking but also building networks for action along the way.

— The is about framing and re-framing. Systemic and strategic design methods can help with this, synthesising possible outcomes with rich insights drawn from the participants’ context, and already
— identifying potential touchpoints.

— Some of the techniques would include speculative arratives, reframing exercises, co-design workshops based around collaborative sketching exercises, field research, drafting portfolios and platforms, identifying possible leverage points and prototypes …

— The participation model is still stakeholder-based but it is beginning to tilt towards citizens, as it starts identifying everyday prototyping opportunities.

— Host public events around these emerging themes, as this practice of building networks, along with identifying research questions and mapping ofsystems and cultures, is ongoing.

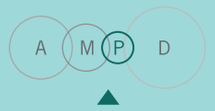
— Surface the missions from this work, articulating their outcomes as well as their portfolio of place-based starting points.

I don't think there are cheap tickets to system change … You have to work at it, whether that means rigorously analysing a system or rigorously casting off paradigms. In the end, it seems that leverage has less to do with pushing levers than it does with disciplined thinking combined with strategically, profoundly, madly letting go.

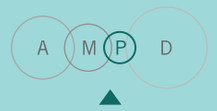
Donella Meadows

3

Developing prototypes



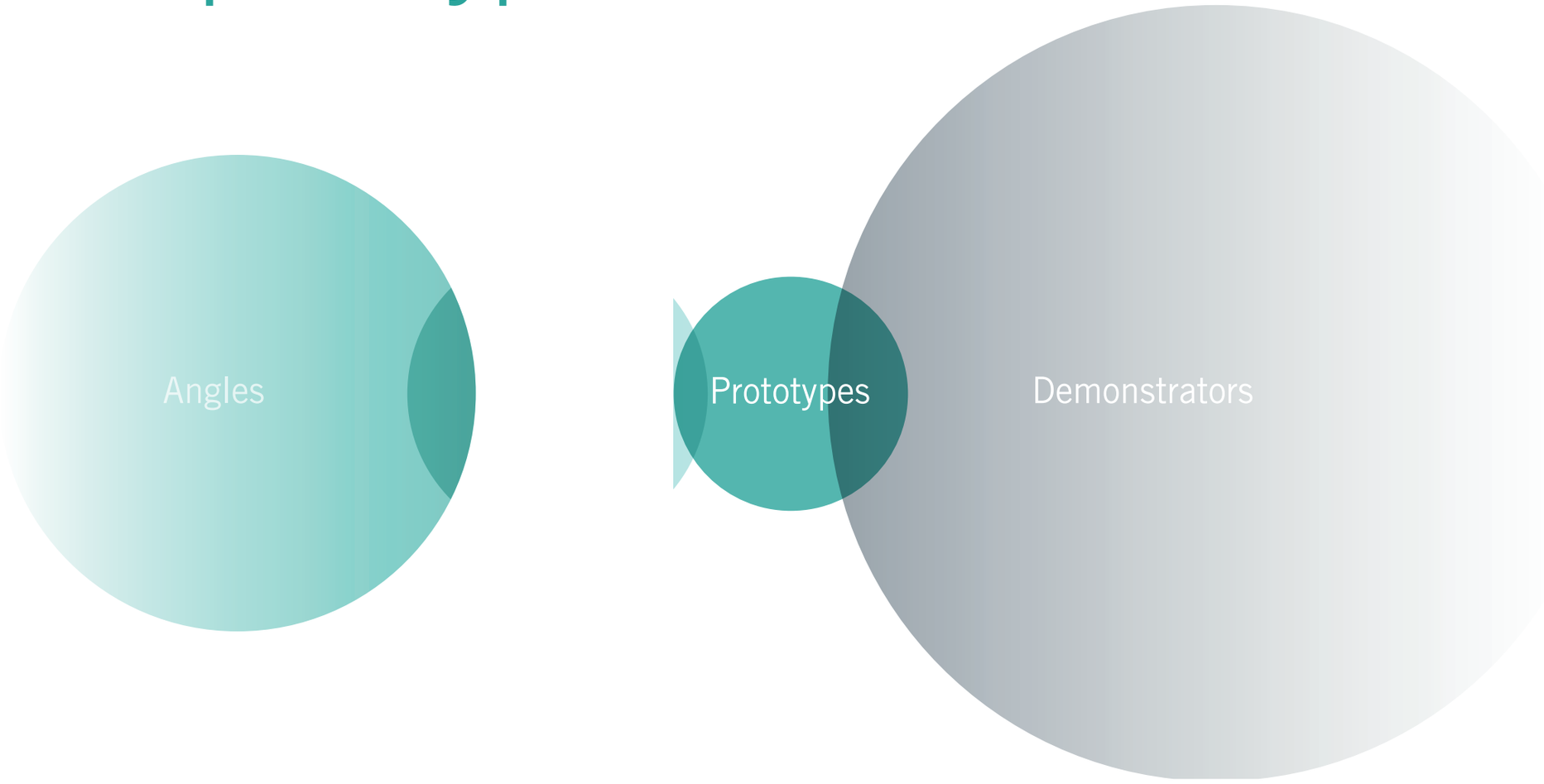
In which diverse groups work together to design and deliver participative prototypes for the missions, engaging with systems in action, and preparing the ground for demonstrators.



3 Developing prototypes

From analysis to synthesis, from talk to action. Whilst the previous stages have been firmly oriented around collaboration—drawing on co-design activities, being ‘in the field’, uncovering possibilities together—now is the time for missions to raise their head in public. All that behind-the-scenes work has been tilling the soil for a first set of seeds to be planted and nurtured. The trajectory of the missions is now a boldly sketched pencil line. They are oriented towards a North Star that may seem a long way away but is shining brightly nevertheless. In front of you are the first waypoints, your crew around you. You can ‘smell’ the projects lying within the missions quite clearly, and have some sense of where to start, what they look like. But now comes the difficult part: that confident first step. This is where an ill-defined ‘risk’ often stops projects dead. That four-letter word alone is enough to kill the buzz. Yet just as an architect puts a scale model in front of the client and community before committing to construction, prototyping is here to move things forward, pushing out into public in exploratory mode. The game is on.

3 Developing prototypes



3–1

Designing prototypes

A design process moves concepts towards prototypes as rapidly as possible. Only when something can be meaningfully articulated, discussed, and tested can effective learning occur. This is why architects build a model, car designers build a concept car, web designers a clickable prototype. Equally, citizen participation may be most meaningful when confronted with a tangible intervention, with something to interact with, to discuss and decide.

Prototypes over investigations

The phrase prototypes over investigations is borrowed from the practice of Malmö Civic Lab, the in-house innovation team at Malmö stad city government.

"In order to have a fact, you need two things: data, and an interpretation of that data … Common talk imagines facts to be things like barcodes that you can read off a thing: they are self-evident. But a scientific fact isn't self-evident. That's precisely why you have to do an experiment, collect data and interpret that data."
—Timothy Morton, *Being Ecological* (2018)

Given challenges without clear precedent, policy makers often reach for *the investigation*, as a way of formally reducing risk or uncertainty. However, as mission-oriented innovation engages with unpredictable complex systems, and with an emphasis on participative decision-making and ambitious risk-taking, there is a preference for prototypes over investigations.

Prototypes are tangible, often rapid and low-cost interventions, designed to interact with complexity through multidisciplinary perspectives. They aim to create meaningful engagement, and generate and articulate multiple types of insight for policy-making and delivery. They exemplify simplified versions of the systems in question. In a sense, they are akin to the 'concept cars' made by automobile companies; they are never sold as such, but they are placed in public. They are used for testing a potential product or idea, technically and culturally, as well as stimulating discussions and positioning an organisation or point-of-view.

When you make something, no matter how simplified a version of the real thing, you flush out assumptions and derive insights, ultimately helping you to make decisions, whilst also creating a platform for ongoing engagement and learning. It is a form of thinking through making, policymaking through design.

Background

The formal investigation is a traditional tool of policy makers, in response to new or imminent challenges which are without clear precedent or analogue, or in which the government needs to understand an emerging area which may cut across several existing jurisdictions or ambits. The investigation is usually framed as an expert-led process which attempts to reduce risk by generating knowledge through a set of deliberative processes: roundtables, conferences, white papers, surveys, desktop research, sector analysis, and so on.

This typically involves creating an expert group, who investigate and discuss emerging or unknown circumstances before

making recommendations to ministers or equivalent. This emphasis on 'expertise working with expertise' is vulnerable to complex environments, as described previously.

The mode of inquiry of these investigations is usually that of a committee format. It is limited to discussion, often focused on bringing together existing knowledge framed around the positions of the committee members. Although it can commission processes to generate new knowledge, and challenge assumptions, this is not done as a matter of course. This process of deliberative yet often dislocated research and discourse leads to a set of recommendations, which then land at the feet of policymakers, or ministers and politicians. The investigation thrives on what Marco Steinberg calls *"document knowledge"*, in that they draw from documents and produce documents in turn. This is a particular form of knowledge—neither good nor bad, but certainly not the only form of knowledge.

Whilst the investigation has clear value, and with a strong track-record within Swedish policymaking in particular, they are rarely well-suited to complex systems. Complex systems cut across expertise silos, and produce unpredictable feedback loops by definition. They change form 'under the microscope', and sometimes as a result of the enquiry itself. They constitute, and require, different forms of knowledge, produced through different formats—well beyond that which can be captured in 'document knowledge'. The duration of the investigation is typically two to three years, rendering it unsuitable for fast-moving and constantly evolving issues that require a certain agility and immediacy, as well as deliberation.

Mission-oriented innovation, in common with contemporary design practice, necessitates participative processes, in which concepts emerge, are framed, and are shaped through interaction. This emphasis on engagement and participation suggests concepts have to be tangible, meaningful, and articulated in terms of the systems of everyday life—otherwise engagement will not happen. Hence the prototype.

The prototype as sketch of tomorrow

The most important things about these prototypes we've made is that they could all be the wrong thing. (Their real function is) to allow us to have a conversation about the future of streets with passers-by, people in the area, with school kids who hang out on them, people with electric bikes and scooters and so on.
—Kieran Long, Director of Ark-Des, quoted in 'Make Way for the 'One-Minute City', Feargus O'Sullivan, *Bloomberg CityLab* (5 January 2021) discussing the Street Moves prototypes.

The prototype reduces risk through engagement and participation, by placing questions in public in ways that allow testing, feedback, data gathering and insight—as well as behaviour change. The prototype both *researches* a context, and *changes* a context. It prepares the ground for a meaningful, considered, and committed version of intervention in this way, by both producing insight to help design the greater intervention of the **Systems Demonstrator**→, and potentially smoothing its uptake and ownership amongst citizens, businesses, public and third sector organisations and other stakeholders.

The prototype is also a fundamental component of forms of participatory design practice. In essence, if the first part of the mission design process here engaged stakeholders, by drawing the *System in the Room*, the prototypes put the ***Room in the System***, by placing questions directly in their 'real world' context. It is a necessary evolution of the design process, and the discussion it hosts, and begins to unlock far deeper, richer levels of the stakeholder- to citizen **Participation strategy**→ described earlier.

You actually need a culture that tolerates not just failure but the process of exploration. This is especially hard in metrics-driven cultures, which most companies pride themselves on being these days.
—Ev Williams, founder of Medium, former CEO of Twitter

The prototype is predicated on often cheap and lightweight interventions, working as *sketches*, literally or metaphorically, of interventions that directly and indirectly address contemporary challenges. These interventions may be policy changes, infrastructure and buildings, products or services, places and spaces, new forms of organisation, incentive schemes or business models. In short, they describe elements that comprise the next version of everyday life.

As well as producing insight, risk is reduced through this low-cost and lightweight approach. Prototypes are inevitably always 'wrong' in some way, for all that they also reveal promising ways forward. Its role is to enable learning from these unwitting mistakes or flaws, before committing to a more realised proposition. If the prototype is successful, the data generated through this ongoing engagement will help shape this 'real' version to rapidly follow. The prototype also helps clarify the question we

are addressing with the missions, enabling us to constantly reframe the strategy, and the mission itself, based on real world feedback and insight.

Limitations and possibilities

A prototype is not long-term. It must be capable of being removed or stopped, relatively quickly, easily and cost-effectively. It should be clear that a prototype is a prototype and not the real thing, even if, to all intents and purposes, it acts like a 'quick and dirty' version of the real thing, and interacts with real-life processes and situations.

The communication process around the prototype must be detailed, engaged and continuous, to manage expectations as well as garner insights. These might be raised expectations, not understanding that a prototype must disappear at some point, or dashed expectations, as a prototype, by definition, may often have failings.

Equally, as noted, by existing in the real world—rather than the report, whose natural habitat is the shelf or *Documents* folder, they change the world. Whilst this may be simply be articulating a more sophisticated understanding of research—that all research changes its subject—it does mean particular care and attention is required. Prototypes, engaged in questions of social change, could clearly set back the possibility of transformation, if ill-conceived, overly contentious, or left to rot. Whilst their job is to stimulate debate, even contestation, doing this in public, as a public agency, needs careful stewardship.

In some environments prototyping will clearly be more hazardous, and so great care must be taken in execution and communication. If in the street, safety issues are paramount, no matter how temporary. Accessibility issues must be adhered to. If in a healthcare context, some things simply cannot be prototyped, for ethical reasons. At a school, childrens' health is paramount.

Gaver, W.W., Dunne, A., & Pacenti, E. (1999). 'Cultural Probes', *interactions* vi(1), 21-29

Yet prototypes are there to provide a way of managing risk. They allow a *reasonable* level of experimentation, a *reasonable* level of deviation from orthodoxy. That sense of 'reasonable'

What you see there is something we think about as a dark matter probe. It's an artifact from a plausible future that helps us have a more articulate conversation ab out what we want to change today. Simply making the prototype forces all kinds of difficult decisions – which in turn ask difficult questions of the next iteration. Making is a way of flushing out the necessary details, preconceptions, attitudes. Prototyping gives us a form of articulating and testing hypotheses that can be iterated in response to feedback – we're interested in whether this can apply to governance models and cultures as much as code.
—Bryan Boyer quoted in, 'Yes, in My Backyard! Meet Brickstarter, the Kickstarter of Neighborhood Projects', *Wired* (2012)

When I first said 'minimum viable product' I never had to repeat myself. The words went viral right before my eyes.
—Frank Robinson

is of course subjective, and must be tested during discussion with partners. But equally, it must be also recognised that all innovation requires doing something different, or something new for the first time. The innovation agency's role can be to host the conversations that open up this space of experimentation, and to carefully push the boundaries in such discussions. Other agencies will be there as a homeostatic balancing force, pushing back against experimentation. Out of this dialogue the space for prototyping emerges.

Research alongside the prototypes should be quantitative and qualitative, balancing data from digital product and service aspects with ethnographic or user research principles. The practice of design probes (sometimes, 'cultural probes') is relevant here, describing a user research process in which an object—a diary, camera, map—is given to participants, who use it to capture their thoughts and feelings about the project. This idea was extended to seeing the prototype itself as a form of kind of *"dark matter probe"*.

The prototype has clear relationship with the 'build, measure, learn' methodology of much contemporary business practice, particularly in the startup world (see the hugely influential *Minimum Viable Product* idea, a core component in a broader lean startup innovation culture).

Yet its roots run much deeper within design practice. Consider how architects use models of buildings to test ideas, induce feedback from clients, and provide insights for subsequent detailed designs. Industrial designers use 'concept designs' in the same way—to suggest possible futures, demonstrate technical advances, whilst garnering feedback and stimulating demand. This symbiotic interplay between testing supply-side interventions and building demand-side interest can be powerful. The model is part of this.

Design brings form to ideas in this way, whilst also forcing difficult mutually exclusive or zero-sum questions onto the table i.e. in a drawing of a house, the stairs can go here or there, but not everywhere.

Often, policymaking, existing largely in document knowledge, can leave important details unclear, unresolved, meaning eventual delivery does not have the information required to enact the true vision behind the policy. It is what a coder might call a 'lossy process', losing information along the journey from policy discussion to delivery.

Le Corbusier said *"I prefer drawing to talking. Drawing is faster and leaves less room for lies."* That spirit of **sketching**→, which is faster, information-rich, and tangible, forcing questions of implementation and impact into the visioning process, has proven itself repeatedly in other fields.

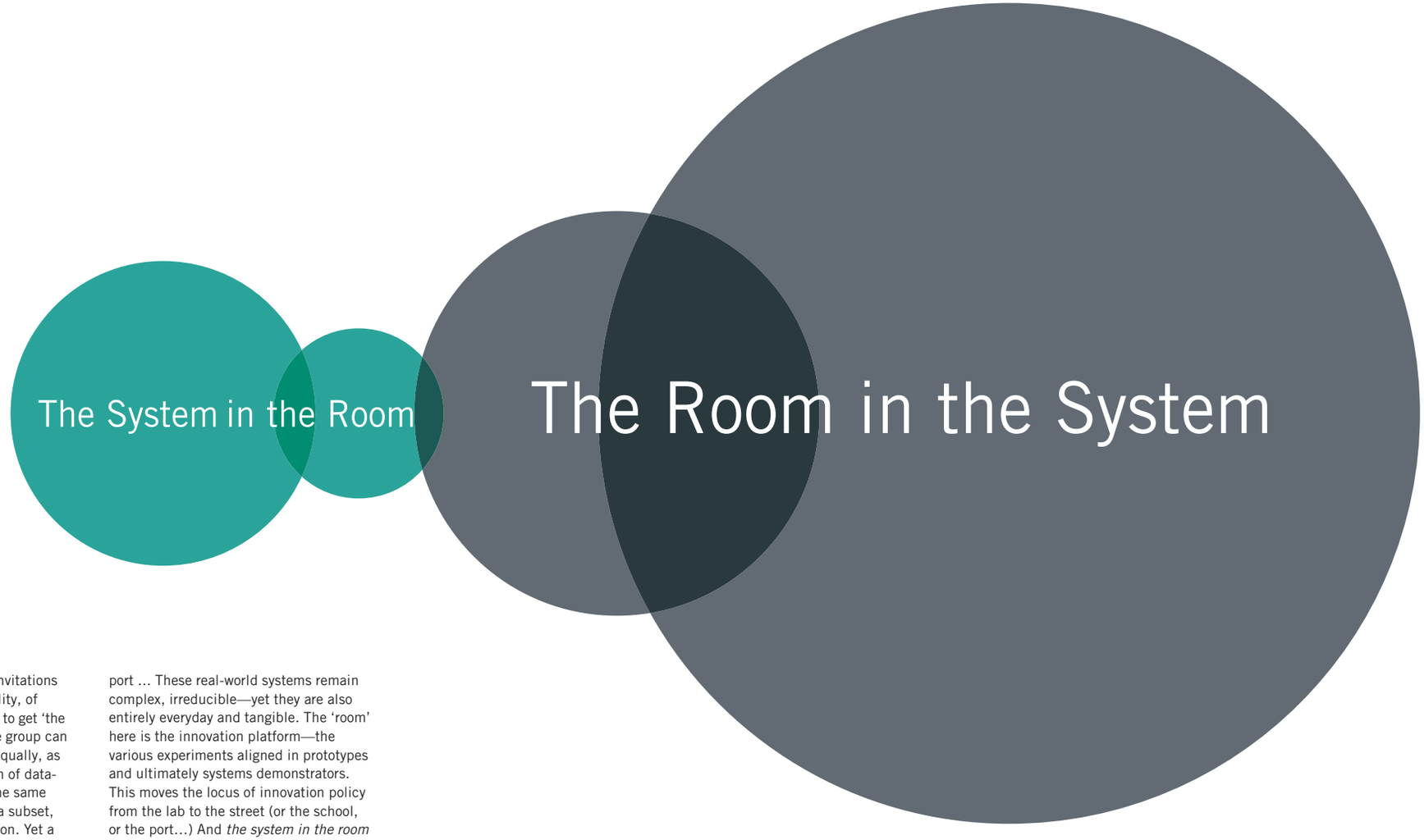
With contemporary policymaking—whether for innovation-oriented policy or otherwise—there is a similar opportunity for 'build, measure, learn', connecting policymaking and delivery into a continuous sequence of iterative learning loops.

Collect as many free non-lottery tickets (those with open-ended payoffs) as you can, and, once they start paying off, do not discard them. Work hard, not in grunt work, but in chasing such opportunities and maximising exposure to them.
—Nicolas Nassim Taleb, *The Black Swan: The Impact of the Highly Improbable* (2007)

Mission-oriented innovation, with its emphasis on complex systems, multidisciplinary perspectives, and participative engagement, will tend to reach for the prototype over the investigation. However, the latter can be a supporting process, emerging as part of the necessary governance for missions. Investigatory committees could be deployed as a way of assessing the outcomes of prototypes as they are evaluated. They could provide a necessary distance from prototypes, working as an objective sounding board.

In a mission-oriented process, the prototypes are there to inform the design of **Systems Demonstrators**→, which are more fully-realised versions of the concept. In this sense, they are part of an ongoing process of design and delivery. If they keep producing positive results, they continue and spread. If not, they are revised accordingly.

Each mission will tend to use multiple prototypes to test ideas and produce multiple forms of knowledge, as well as engaging in and stimulating cultural change along the way. A portfolio of prototypes sits within a mission, just as a portfolio of missions can address a grand challenge.



No matter how inclusive the invitations to workshops might be, in reality, of course, it is not really possible to get 'the system in the room'. A diverse group can be assembled, but no more. Equally, as described previously, any form of data-driven analysis suffers from the same problem—it can only ever be a subset, a highly selective representation. Yet a strategic design approach, predicated on prototyping in real-world environments, is able to reverse this, putting 'the room' of the innovation questions, or the mission at hand, directly into 'the system' in reality—the street, the school, the forest, the port … These real-world systems remain complex, irreducible—yet they are also entirely everyday and tangible. The 'room' here is the innovation platform—the various experiments aligned in prototypes and ultimately systems demonstrators. This moves the locus of innovation policy from the lab to the street (or the school, or the port…) And *the system in the room* of the early stakeholder engagement flips inside-out, with innovation activities manifesting themselves in the environments and systems that the mission concerns: *the room in the system*.

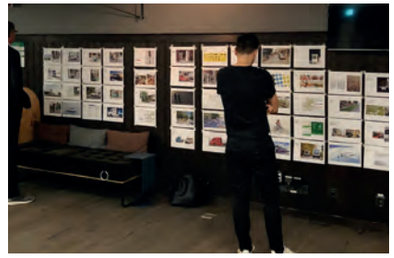
Concept design leads to prototypes

In order to have a fact, you need two things: data, and an interpretation of that data … Common talk imagines facts to be things like barcodes that you can read off a thing: they are self-evident. But a scientific fact isn't self-evident. That's precisely why you have to do an experiment, collect data and interpret that data.
—Timothy Morton, *Being Ecological* (2018)

Linked concepts emerge from the **Design Workshops**→, and from the surrounding interviews, desktop research, and conversation.

Taken as a set, they provided seven key acupuncture points for the Street and eight for School Food. They can all impact positively upon each other as a connected system, yet each can also be coherently pursued as a project, or clustered together in smaller groups.

These concepts suggest clear next steps in terms of research and action, and their connectedness enables an integrated approach to prototypes. They also provide 'sockets' to related missions within Healthy Sustainable Mobility and Healthy Sustainable Food themes.



The back wall of the Street Design Workshop was used to display a set of prompts and cases comprising old and new innovations. As a form of 'physical Powerpoint', they helped shape concept development, whilst remaining open.

Overleaf, the initial design concepts that emerged from the initial Design Workshops around Streets and School Food. These helped refine the prototypes that followed. Also presented, the concepts from two further workshop series around retail, which featured as an angle in both mobility and food challenges (as e-commerce and food retail, respectively). These were also conducted with networks of stakeholders.

As supporting research, and to provide prompts in the Design Workshops, a dossier of examples was produced, comprising old and new innovations from urban design and strategy, social movements, and mobility. These case studies built on knowledge and experience within the mission teams. They were further augmented by strategic dialogues throughout the mission design process, and shared with partners.

Concepts allow this research to be aligned with key questions. They are a way of clustering patterns, and maneuvering towards prototypes.

Unpacking concepts

'Fixation and creativity in concept development: The attitudes and practices of expert designers', Nathan Crilley, Design Studies, *Volume* 38, May 2015

The diverse groups gathered for the Design Workshops, bringing together various positions and perspectives, also provide a unique forum for refining these concepts whilst they are fluid. No matter how much learning, reflection, and critique is placed in and around a design process, there can be a tendency to 'fix' on concepts once they are in the pipeline of a development process.

There are simple techniques to deploy during a workshop in order to force an unpacking of emerging concepts. For a higher-level **Actors Workshop**→, a basic blockers and enablers format can be used. After some time for discussion and invention, build in a segment which asks groups to identify, describe, and discuss *blockers* that might prevent an intervention from happening, or achieving the desired results. This can be quickly followed by the question of what *enablers* might be put in place to address those blockers.

These simple question-and-discussion formats work surprisingly well, in terms of a higher-level group exercise. They can uncover new interventions, as well as beginning to force the deliberate unravelling of connections and relationships that interventions will actually involve.

Screengrab from a digital whiteboard session, held as part of an actors workshop in and around Borås, a town in Western Sweden. The yellow sticky notes are interventions produced by the teams. Red notes are blockers, and green notes are potential enablers that might address or mitigate blockers.

This simple exercise is enough to catch ideas early. It reinforces the point that the collective generation of ideas is both fundamental, and a little too easy. It challenges groups to consider why systems don't transform themselves—even if the idea is apparently self-evidently good. Active facilitation

Street Concept design

Garden

Green and blue infrastructure, incl. management and maintenance, with sustainable urban drainage, canopies, heating, gardening &c

Parklet

Modular, scalable street furniture for existing kerbside and parking spaces. Open systems specified, built, and operated by citizens themselves.

Socket

Integrated digital/physical/legal public infrastructure, esp. for energy and civic sensors, supported by data, networks and other infrastructures.

Hotspot

Consolidation points for micromobility and active and shared transport, comprising parking, charging, data, and maintenance.

Conductor

Orchestration, governance, and management, real-time and otherwise.

Janitor

Maintenance, scheduling, and operations, real-time and otherwise

Delivery

Coordination and operation of commercial and residential delivery infrastructure, including scheduling.

Shop (e-commerce) Concept design

Local chains

Coordination and operation of commercial and residential delivery infrastructure, including scheduling.

Online store

The design of omni-channel stores (digital and physical) that make it easy for consumers to choose sustainable and circular purchases and logistics by default

Package

Decreased, and better designed, packaging can significantly contribute to better material use, volume utilisation, experience, product protection, and recycling/reuse

Delivery

A balanced people- and place-centered approach to delivery options, offering variable delivery times, places

Hub

Coherent, effective, convenient, and satisfying pick-up and drop-off points, adapting to needs of people and place, and related services

Distributors

Coordinated and shared distribution to hubs in both urban and rural places, utilising existing capacity and flows where possible.

District

Joined-up urban planning at the scale of the urban district (or rural area) integrating spaces and services for delivery points, ware-housing, waste etc.

Return

A way of bringing products back into the value chain and achieving circular and sharing economy models, via logistics reduction, digitisation, and integration.

School food Concept design

Farm

Local producers produce for and deliver to schools, integrating farmers into education. Produce food around school premises, with shared logistics.

Pantry

Provides prerequisites for Cookbook and Meal, with ingredients shaped by a 'budget' for health, sustainability and taste, underpinned by the Database.

Database

Free and open database, plus tools, to access traceability of climate and health impact of different food, meals and processes. Shaped by Contracts and Forum.

Cookbook

Using Pantry, Cookbook enables chefs and students to cook tasty, healthy, and sustainable food, and integrate food into education across the curriculum.

Kitchen

Kitchen spaces and equipment which provide open kitchen-like access, enhancing learning, cooking and discussion, including amongst community.

Meal

Enhanced meal experience via new spaces, cultures and formats, to improve take-up rates, health, social interaction, learning outcomes.

Forum

Governance entity that enables systemic view for procurement, comprising students, parents, cooks, teachers, farmers, municipalities etc.

Contract

New forms of agile procurement and contracting, for key outcomes. Managed by the Forum, it stocks the Pantry and shapes the Kitchen.

Food Retail Concept design

Label

Reduced, sustainable often re-usable packaging is also the key informational touchpoint to build literacy about traceability, enabled by Fingerprint.

Hub

Small-scale, highly distributed food drop-off/pick-up points, integrated with simple social spaces, and store-like features. Possibly automated/mobile but also social.

Fingerprint

Traceability across continuous set of touchpoints, from production through to re-use, oriented on key outcomes (CO_2e, health, seasonality, economy, identity &c)

Market

Reorienting physical stores purely around social experience: understanding, growing, cooking, re-use and re-cycle; Also, shopfronts for local farmers selling direct.

Compost

Removing waste via re-use, for consumers, retailers, schools, care homes, company canteens etc) via new store-related services and infrastructures.

Farm

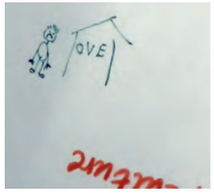
New food production technologies and techniques, in more diverse use of cultivable space, for local production and linked retail.

Delivery

Step-down, *'lagom'* logistics chain —boat to train to truck to van/shuttle to bike. Connected systems across multiple users. Often automated.

Forum

Governance entity bringing together retailers, producers, municipalities, consumer groups, unions, logistics, and government agencies.



In a Design Workshop for the emerging Street mission, the protagonist from the popular novel *En man som heter Ove* was found scribbled in a corner of a worksheet for the Culture layer. 'Ove' appears to be predictably unhappy with the direction of travel towards a sustainable street, perhaps. A small protest from a workshop participant, or a warning about a demographic to address? Such a flexible format provides numerous ways of capturing issues to be addressed!

encourages these blockers to be diverse too; they can be behavioural, cultural, political, financial, technical, organisational, and so on. Of course blockers cannot be predicted quite so easily—hence the forward momentum to prototyping, which truly begins to reveal hindrances—yet it is better done here than not at all, or too late.

Equally, enablers are easier to conceptualise once given a framework of an intervention—with its promise of outcomes—and an array of blockers to address. These enablers obviously help frame prototype design, but they often provide immediate insights for many participants in the process.

This is worth reflecting on: the value of this work is not simply at the end point, when assessing the outcomes of demonstrators. It produces results from day one. In our experience, bringing the 'system in to the room', within this framework, starts creating new relationships and productive insights right away. Some of these are being acted upon, peer to peer, as participants are wandering out of the workshop room, or close the Teams meeting window only to start messaging in another.

Addressing concepts with a platform strategy

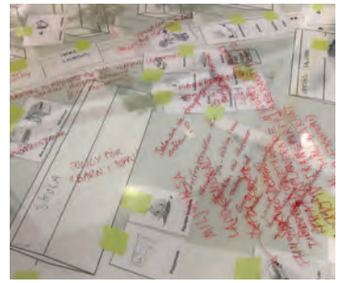
A next level of collective interrogation is to throw the system logic of the platform layers model at the concepts. This is done best in the more involved environment of the **Design Workshop**→, given the more focused conversation and its dynamic of moving towards discrete concepts rather than opening up a canvas, as per an Actors Workshop.

It runs as an alternative to the 'blockers-enablers' session, and is best done when given more time to do so. It requires a deeper interrogation of the subject. In essence, they enable early concepts to be deconstructed and assessed from different perspectives of the **Platform**→ model. Asking these questions, in this form, helps round out the concept. They reveal aspects of 'dark matter' not immediately tangible otherwise.

Within the Healthy Sustainable Mobility mission theme, we asked the Design Workshop participants working around what

would become the Street mission to address a set of questions arranged over the system layers.

Similarly, in the Healthy Sustainable Food mission theme, a Design Workshop around the emerging School Food mission assessed interventions across different layers. The format involves the participants identifying and discussing what could—or *should*—be shared, common, or transferable, versus what is highly specific to a particular context.



Transparent sheets can be overlaid onto canvases in the workshops, allowing participants to build up a sense of systemic connections, or for each sheet to articulate a particular platform layer.

For a workshop with multiple municipalities for the Viable Cities strategic innovation programme, the platform layers presented a way of connecting initiatives across different cities, as well as helping each city to develop its strategy. For a workshop with Ericsson One around street retrofits, the platform layers were used as a sense-check at the end of the invention process, and as a way of assessing which capabilities the organisation can bring to the table.

In each of these examples, a simple variant on the platform layers was used. In workshops that involve drawing interventions onto contextual backdrops, transparent plastic sheets can be overlaid for each layer, enabling participants to build up a sense of complex interacting systems. In other workshops, the platform layers can be a separate exercise, following invention and discussion, using simple templates.

These platform layers help shape the thinking about prototypes. They stress-test concepts immediately, as they are emerging. The cogent questions about the specific *(What within this concept is unique to a place?)* and what is general *(What within this concept could be shared, consistent across Sweden and beyond?)* can quickly suggest a more strategic approach. Participants immediately start framing the work at different levels and contexts, enabling both a zooming into a place as well as back out into broader systems.

Platform strategy

Templates for unpacking prototypes

System environments

Place-based physical, digital and social experiences

System layers

Cultures and capabilities

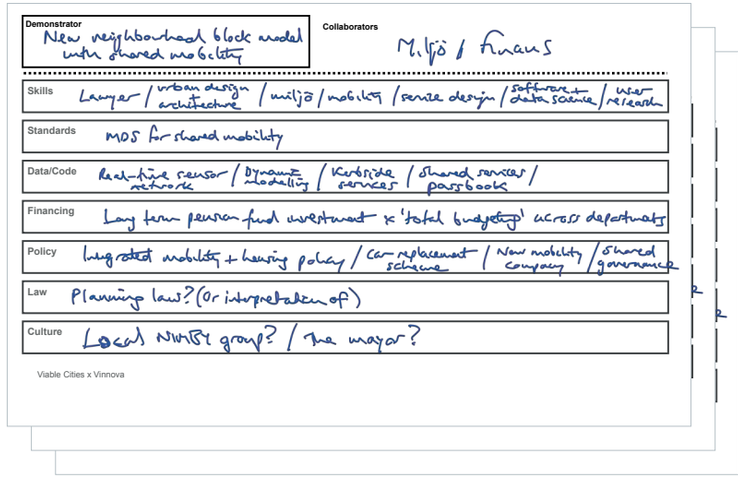
Standards and guidelines

Data, code, and services

Financing

Policy

Law



Prototyping principles

The point of missions is systemic change for societal outcomes. Their various initiatives must be carefully framed in order to maintain a multi-perspectival approach, producing multiple shared outcomes from interventions, and building both infrastructural and cultural change alongside other enabling conditions.

Prototypes must embody these principles, even at this early stage, to ensure that they can truly 'write the brief' for the subsequent Systems Demonstrators. This checklist helps sculpt prototype design, unlocking systemic change by impacting on data, scale, regulation, capability, culture, and engagement. These principles may be key to building a scalable prototype, but aid learning; they suggest what to look out for. If this seems a demanding list, the half-step technique makes it easier to get moving.

1 **Outcomes**
Indicate how it delivers against, or refines, core shared outcomes, and agreed mission trajectories.

2 **Scale**
Initiate and nurture interaction or impact at next scales above and below (scale can be organisational and spatial).

3 **Lever**
Indicate what existing and widespread system elements can be incorporated as the vehicle for exploration and change.

4 **Data**
Create new strategic data for shared impacts and value, whilst building new capacity for managing such data.

5 **Conditions**
Uncover, articulate, and initiate necessary changes in conditions like regulation, policy, financing, and incentives.

6 **Capability**
Develop skillsets, perspectives or organisational cultures necessary for the mission in question, and other missions.

7 **Engagement**
Use citizen-facing formats to articulate intent, co-design action and outcomes, and stimulate discussion.

8 **Agility**
Describe an adaptive strategy for delivery, indicating how it is able to react to changing conditions.

The Half-Step

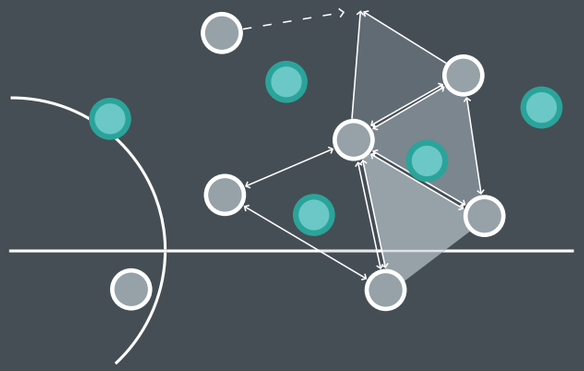
The half-step technique can kickstart transformation processes. Although the long-term goal of the Streets mission, say, may be a thorough and systemic transformation of multiple streets, this level of ambition in itself can prevent the first step being taken. It is too challenging to commit to, for both citizens and stakeholders. It can also lead to homogenous, compromised solutions, as it seems impossible to enable complexity and diversity all at once.

A shorter step is simply easier to sign up to. This half-step still has direction, and is challenging enough. But, as with the prototypes that it is composed of, it can be withdrawn, modified or adapted based on feedback. This enables a learning process that can diversify potential, increasing the possible next steps rather than limiting them. The half-step should take a situation which has become static and homogenous and move it forward towards greater diversity and possibility—an increasingly open system—as well as greater potential value (and diverse value, as per the framing of the mission).

The half-step also produces energy. By being a small step, it can overcome the resistance to the larger step, yet still moves in that direction. Creating movement, at least carefully, is in itself a useful act.

Drawing inspiration from progressive football tacticians like Pep Guardiola and Jürgen Klopp, Carl Mossfeldt has said that, with many complex systemic challenges, *we just have to get the ball moving*. In doing so, we create possibility, we reveal new angles, we generate energy and momentum, we draw out a response from possible opposition. Moving the ball rapidly over short distances, with intent if not yet guaranteed results, is a necessary precursor to further movement, and ultimately the goal. Football theorist Jonathan Wilson, describing this advanced form of the game played under Guardiola in particular, suggests that *“the focus was on the creation and exploitation of space”*, but always with strategic intent: as Guardiola said of his teams’ style of play, *“The intention is not to move the ball, rather to move the opposition.”*

The intention with the half-step in the Streets mission is not to install a parklet, but to radically transform the street, and then a city. The intention



These short passes are typical of the *tiki-taka* style (although Guardiola disowned the name, as it implied it was passing for passing's sake, not intentional enough). They are honed in training ground rondos, rapid triangles of probing passing, constantly looking to open up forward movement, keeping the opposition moving (and guessing) and generating potential energy. A key exponent, Xavi, described the rondo: *"They taught us to know who was around us before the ball arrived and to be prepared to use a flick or a cushion or a volley in tenths of a second to keep the circulation of the ball flowing"*. He captures this balance of engaged improvisation and constant forward movement in half-steps.

with transforming a single school kitchen is not to shift a school, but entire ecosystems around food.

But the sheer scale and complexity of these larger goals actually mitigate against action. Equally, given the importance of social and cultural change to contemporary missions, we must produce discourse and friction, drawing out 'the opposition' onto productive terrain.

Hence the half-step. This 'gets the ball moving', and towards the goal, but it is a first easy step to take.

A similar strategy can be seen at work in ELEMENTAL's 'Half-house' model, which enables a positive half-step to occur, by building the first half of a house in a location within which it can add value.

Drawings by ELEMENTAL for housing in Chile indicate how half the house is left open for subsequent iteration. The architecture has to be carefully designed to adapt.

The initial half-house (left) is filled in over time by its occupants (right), as financial value increases along with greater insight into particular needs. Over time, the row becomes diverse, half-shared and half-distinct.

Greater insight into particular needs and desires, as well as greater value, is derived from that half-step. Taking the full step—the whole house—would mean compromise in both value and diversity. The half-step enables the subsequent steps, as well as better informing them, by increasing the sense of possibility.

This requires, of course, the ongoing engaged form of innovation stewardship described earlier: iterative and adaptive **Design Principles**→, and the **Snowball**→ approach to creating change. A half-step not followed by subsequent steps may change little in itself.

As these steps progress, innovation shifts in tenor from the half-step—activity, energy, early insights—to scaling steps, captured in different metrics with different sensibility. These must not

be confused. Writing in *Harvard Business Review*, Scott Kirsner describes the problem of using later-stage outcomes—often financial metrics—to understand and manage these initial stages.

With a perhaps unfortunate metaphor of getting concept cars onto the road, he writes: *"To build a durable engine of innovation inside your organization, you need a reliable transition phase between that garage and the highway. That means you need be able to change what you're measuring along the way, going from early metrics that show progress to a more defensible set of metrics demonstrating the impact and value you're creating."*

For Kirsner, these early stages are about *"activity metrics"*: creating movement, energy and learning. Later stages can be more *"business-focused"*. Kirsner suggests many innovation projects fail as they apply these later metrics too soon, inappropriately.

Half-step for Street mission

With the Streets mission in particular, the half-step can be seen at work in the successful initial deployment of the first modules, setting up a movement towards transformed streets that was otherwise not happening in Swedish cities, or at least not rapidly and thoroughly enough.

The increasing diversity of activity on these streets is captured in the Streets Functionality Index, which begins to capture metrics for the next stage. The Value Model project can then develop these more profound outcome metrics—health, carbon, safety, conviviality etc.—as it begins to scale.

But the half-step gets things going.

In an unstable complex system, small islands of coherence have the potential to change the whole system.

Ilya Prigogine

3–2

Delivering prototypes

Prototypes are always wrong, inevitably—but wrong on purpose, to enable maximum learning from minimum means. That learning only occurs in implementation, and there is an art to coalescing motivation, absorbing risk, aligning interests and building reflection into the prototypes as rapidly, yet thoughtfully, as possible. The Streets and School Food prototypes were immediately powerful learning vehicles. Streets moved more quickly; School Food more carefully. What happened?

Healthy sustainable mobility

Street

Ensure that every street in Sweden is healthy, sustainable and full of life by 2030.

How can we rapidly demonstrate how to transition our lifestyles, industries, infrastructures and politics to clean, healthy and just outcomes? How do we ensure that people and place are at the centre of this change? How might we use the existing streets in our towns and cities as an innovation platform for rapidly and powerfully addressing climate resilience, public health and social justice combined? How could this build new cultures of retrofit and retrofit, planning and participation? What new value, or values, are lying latent within our streets?

There are approximately 40,000 kilometres of existing streets in Sweden. That's around 600km^2—or six times the size of Paris. In Sweden, we have built 50m^2 of parking space per person, yet only 44m^2 of actual living space per person. In most cities, streets typically comprise around 25% of the urban space. But more potently, streets are where all urban systems tend to converge. If one could imagine a mission addressing all this space, it would instantly be the largest urban development project in Europe. In a sense, it's a single system. And yet it can start right away, at the scale of a parking bay.

The street is the basic unit of the city—it is where the city comes together. It is where the city happens. It is where much of society happens. Even distant communities are systemically connected to the micro-interactions at street level in Sweden's towns and cities.

Yet we have allowed the street to be defined by one system: traffic. And within that, car traffic in particular, with logistics a close second. Contrary to this orthodoxy, the street is not about traffic; it never was, nor does it have to be. Streets were originally defined by exchange, cultural or commercial or convivial, and so they were defined as social spaces, the little knots of interaction that make up a genuine neighbourhood, that can actually speak to and articulate the local communities they sit within.

The built fabric for this exists at scale, yet is generally not managed with this broader idea of urban life in mind. Indeed, there are approximately 40,000 kilometres of street in Sweden, across all towns and cities. Most of the street system is already built for the next decades, and a retrofitting approach—using the street as a lever, in missions language—enables us to explore the street as a platform, as a way of running new or different applications on the existing hardware.

We desperately need to. Some estimates indicate that there is more parking space constructed than there is residential space in Sweden. Whilst it is broadly understood that North American cities like Houston have allocated over 60% of their scarce real

estate to vehicles, it is perhaps surprising to note how car-centric Swedish cities can be. Yet by 1955, Sweden had become the most car-dense country in Europe, and the patterns of the 20th century continue to shape Swedish cities, despite the huge strides taken towards healthier, more sustainable forms of mobility—whether active or collective.

Yet given mobility's impact on health, carbon, and social justice, we can use this existing system of the streets to shift the mobility system, in a way that produces co-benefits across many others simultaneously.

Somewhat like art, the street is technically hard to define—yet we all know what it is when we see it. It is the space threaded in-between the places we live, work, and play, where a little density and diversity, no matter how small, forms a place. It's much of the space between buildings, and so it shapes, or enables, much of the life between buildings. It is not a country lane or a service lane for an IKEA, nor is it a 'state road' or motorway.

Given mobility's dynamics, however, those systems are also shaped by what happens at street level: change what happens on the street, and that will ripple through to affect motorways and beyond.

In recent years, numerous tactical urbanism approaches in cities all over the world have begun to transform streets, such as the parklet and PARKing Day movements, or municipalities allowing community groups to paint new public space onto the street. Some of these actions have been incorporated into

more strategic responses, such as New York City's reclaiming of Times Square or Barcelona's Superblocks, which aims to *"give back to people"* around 60% of the city's streets currently defined by cars.

Paris's '15-minute city' strategy places the transformed street at the core of wider urban transformation, predicated on streets defined by slower active mobility, over shorter distances, supported by mass transport for wider connectivity. These streets become greener, softer, more convivial places, with greater benefit for communities, businesses, and culture. Oslo and Helsinki have similar ambitions to largely remove the need for cars, just as Copenhagen and Amsterdam have done for decades. The COVID-19 outbreak has accelerated many of these approaches worldwide.

Yet there are still numerous conflicting tensions happening on the street, including in these well-governed European cities. The move towards a post-car ownership model seems inexorable, yet is happening slowly, and generating significant political tensions, predicated on questions of social justice as much as technological innovation. The shift to electric mobility is also happening slowly, and not yet connected to the need to reduce overall levels of car ownership (or 'traffic evaporation', as researchers call it).

It could be. Achieving significant mode shift towards bicycles is also slower than it needs to be. Equally, the tech-fuelled micromobility revolution has been a hugely positive addition in many cities,

yet has also generated significant tension. The energy grid to support all these needs is not optimised at street level.

The shift from bricks-and-mortar stores to e-commerce, for much retail at least, has meant increased logistics traffic into more residential streets, alongside empty shopfronts in more commercial ones, with hugely problematic outcomes in cities like New York, London, and Paris—and no doubt for Swedish cities too.

Our streets are still not defined around the true co-benefits unlocked by increased greenery and biodiversity, for health and wellbeing, for property value, commercial and cultural activity, enabling richer forms of maintenance and resilience, reduced carbon and increased environmental qualities, and so on. Diminished biodiversity and environmental quality is almost an existential question. Yet a street tree is still largely seen as a cost on the municipal balance sheet, rather than an asset.

Finally, who decides what the street is about? Fundamental questions of social justice play out on the streets. As Timothy Snyder says, *"Protest can be organized through social media, but nothing is real that does not end on the streets"*. The Black Lives Matter protests of recent years inevitably manifest themselves on the street, as did Covid-19's 'flattened curves'. Yet who decides what the street is, and who it is for? For too long, streets have been governed by technocratic planners rather than citizens.

The Street mission changes all that.

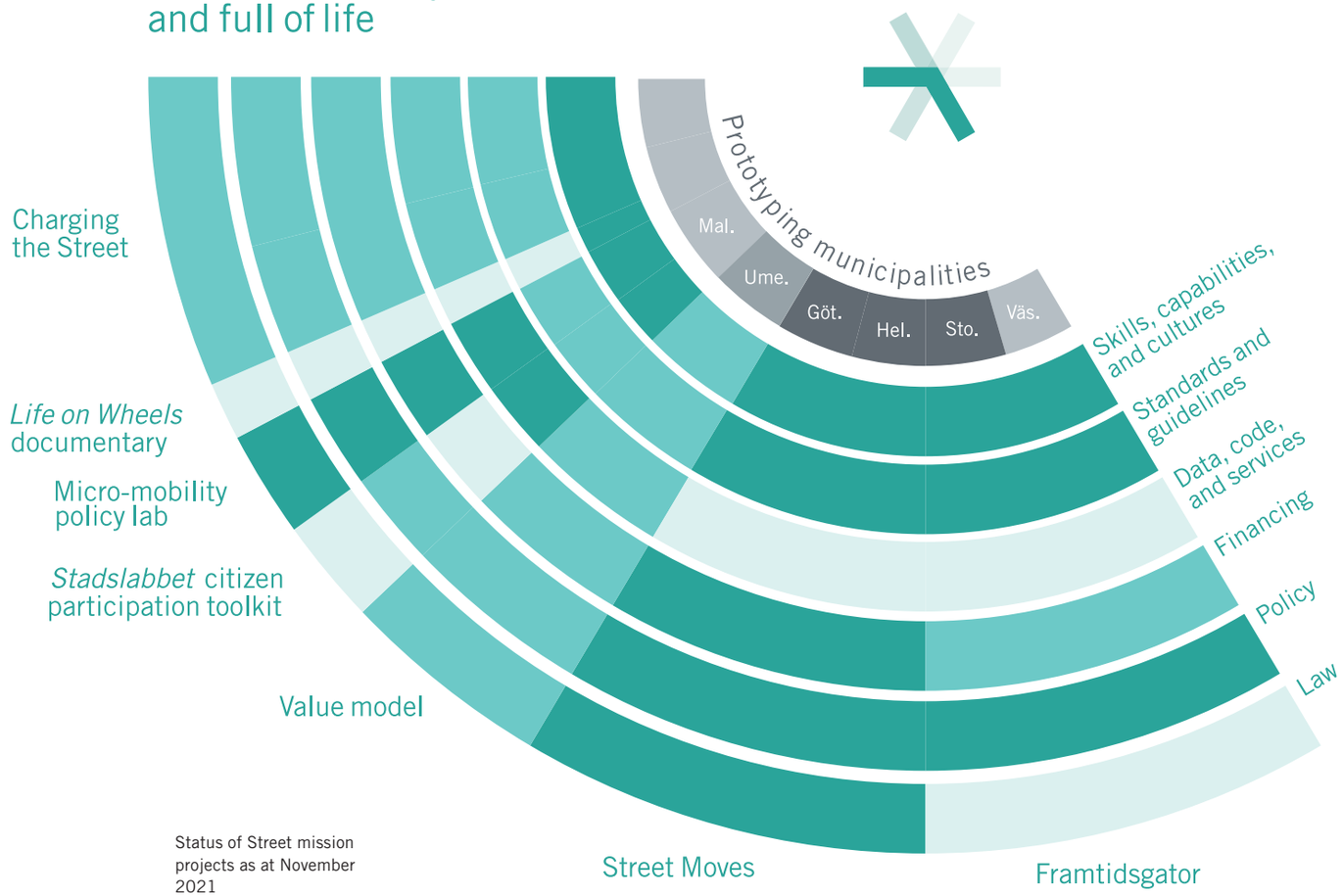
Grid

Shop

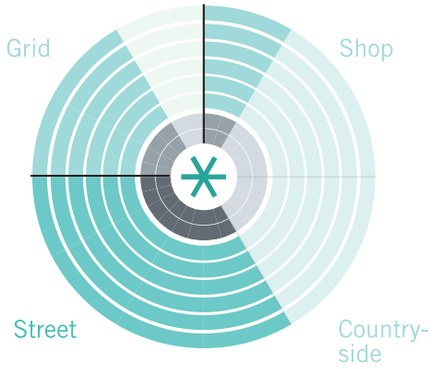
Healthy sustainable mobility mission #1

Street

Ensure that every street in Sweden is healthy, sustainable and full of life



Status of Street mission projects as at November 2021



Countryside

Street

Ensure that every street in Sweden is healthy, sustainable and full of life by 2030

Existing academic research underpinning these likely outcomes is listed at the end of this section (expressed as a value statement). New supporting research will be identified, developed, and commissioned as the project progresses.

At the intersection of multiple systems, the Street unlocks a diverse array of co-benefits. Most of these co-benefits tend to be addressed by separate 'silos', such that they are rarely aligned, despite the potential of integrated interventions. Or they are barely addressed at all, due to the dominance of some metrics, such as traffic speed or safety. Finally, enablers (like traffic, or buildings) are often mistaken for outcomes (like trust, or health), and mismanaged accordingly. Yet an integrated approach means an array of simple, holistic interventions could deliver the following outcomes:

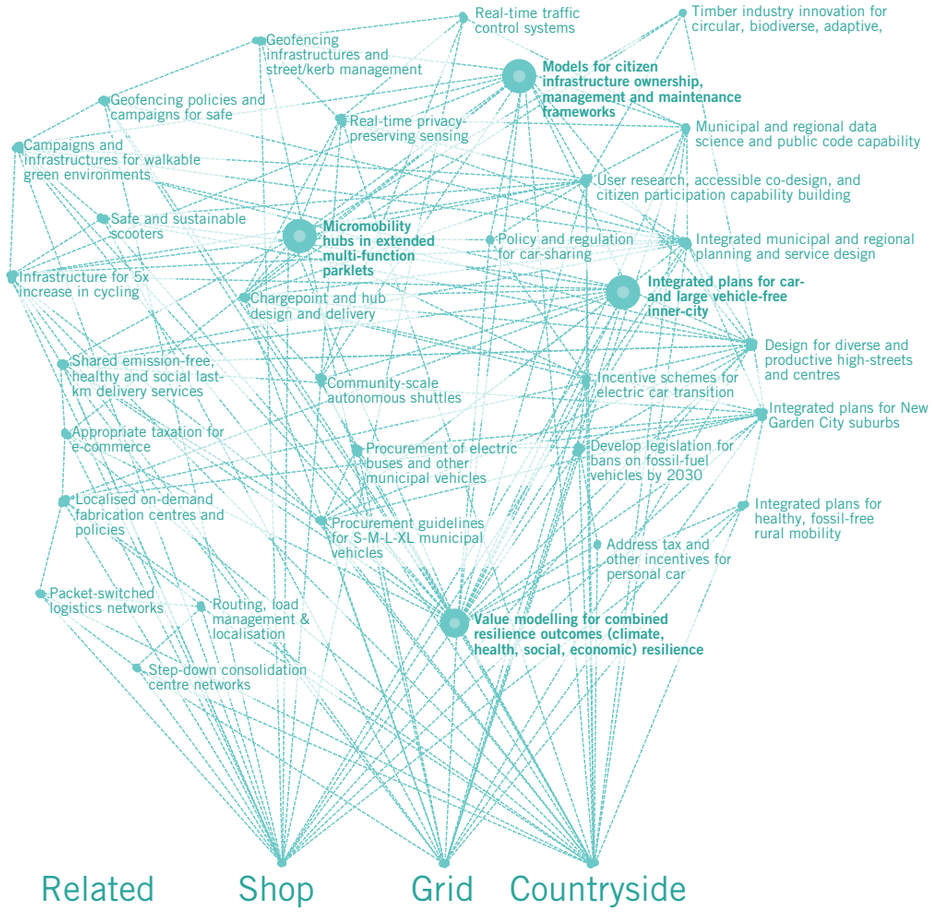
+ Increasing

Local property value, retail spend, social interaction, mental health and wellbeing, physical health, safety, biodiversity, cultural production, local food production, democratic participation, public transport performance, air quality, water quality, soil quality, stormwater mitigation, climate resilience, adaptability, business performance, trust

– Decreasing

Maintenance costs, flooding, respiratory illnesses, cancer, diabetes, social care costs, healthcare costs, heat island effect, CO2, NOx, embodied CO2, vehicle crime, property crime, violent crime, road traffic accidents, food waste, loneliness, parking revenue, racist attacks, stress

Living system diagram for Street mission



A design strategy for the Street mission

Using the toolkits of tactical urbanism within a coherent strategy, the Street mission will design an infrastructure that can progressively and iteratively reclaim street space, right across Sweden, in order to produce streets that are healthy, sustainable, vibrant, and just.

It works with the fact that streets already exist, at scale, everywhere. Their coherent governance enables them to be addressed as a single system deployed into numerous diverse places. They are a lever that can be activated to redirect the entire mobility system, and many other urban systems, towards sustainable and just goals.

By taking this approach of 'running new applications on the existing hardware', the mission can move from discrete prototypes in places to scaling across all streets.

The Street can be used to align multiple systems, including shared governance between citizens, organisations, municipalities, regions, and national agencies. Similarly, it can align, and in some cases integrate, existing projects from multiple players, at all levels. The Street can encompass complex technologies, like machine learning, internet of Things, energy microgrids, micromobility and shared mobility, as well as enabling both active transport and public transport.

More fundamentally, the Street is a place of social life, cultural production, production and consumption, a site for politics and social justice.

Participative design and governance models ensure that citizens can make meaningful decisions about their own streets, by building with a reconfigurable, modular 'kit of parts'. By developing adaptive, modular systems, as repeatable and editable typologies, street interventions can be adopted and adapted by the community of the street, and thus become part of its particular fabric, speak of its particular place. The kit is designed to enable healthy, sustainable outcomes, and yet is accessible and customisable by communities. An analogy can be found in open source software, like Linux, where a library of

I am extremely interested in the idea of indeterminate space. Everyone should be able to recognise themselves in it … I believe that the word calle in Spanish does not hold that same meaning that somehow is contained within the English word street. The word calle in Spanish evokes a certain elegance; street, in contrast, evokes a certain idea of informality. It makes reference to something that is not totally finished, something that is still emerging. The idea of street, understood in this sense, is very important.
—Saskia Sassen

standard elements can be drawn from and deployed for local applications. Any learning and development from this process is drawn back up into the core library. It's easy to imagine a national library of street elements, which can be highly adapted, customised and reinvented locally.

The street is full of complex adaptive systems yet it is immediately understandable and tangible. On the street, new approaches to policymaking and delivery can be tested and refined, addressing complexity and ambiguity on their own terms, rather than deploying a false solutionism of 'pre-determined fixes'. It provides a platform for gradually and carefully resolving uncertainties, through iterative learning, sense-making, adaptation, engagement, and collaboration.

Prototyping and participation is key to this. It enables rapid learning and refinement, managing risk whilst testing invention in public, and with the public, before forming more complex system demonstrators in place, and scaling these retrofitted streets across Sweden.

Given the systemic approach, the street enables an integrated approach for producing co-benefits. Holistic interventions at street level, when delivered well, can simultaneously unlock richer forms of value in health, sustainability, resilience, culture, and social justice.

A new value model will be created, articulating the quantifiable elements of these public and private values, across all these domains, articulated as a toolkit for planners. It will address complex questions like the value of healthcare cost savings and increased mental health and wellbeing, as well as the more obvious reduced maintenance and increased retail and property value.

Due to its balance of universality and difference, the Street can integrate meaningful international partners, across government and academic partners.

You repeat a generic form like a street market in different places and circumstances around the city, and different kinds of street markets then evolve.
—Richard Sennett, *Building and Dwelling: Ethics for the City* (Allen Lane, 2019)

We've participated in numerous meetings and have come up with the idea that the best thing would be to carefully change things street by street. Make every street a success, and then celebrate the transformation. Success is totally dependent on the participation of shops and cafes—no-one will sit on a bench in an empty street.
—Beathe Radby Schieldrop, Oslo Handelsstands Forening

The Sidewalks of New York

Michael Sorkin

The architect Michael Sorkin's 2012 text is effectively 30 blocks of code. It comprises a set of protocols, rules and guidelines with which a street could be governed at the super-local scale of the Street mission. These excerpts give some sense of the kind of organising principles required—and importantly, their spirit.

1. The Streets belong to the people!

2. So do the Sidewalks.

3. A minimum of 50 percent of the Street space of New York City shall be taken out of the realm of high-speed and mechanical locomotion and assigned the status of Sidewalk.

13. All uses on the Sidewalk shall be public or accessible to the public.

16. The use of Sidewalks, other than for Passage or Assembly, including loitering and standing rest, shall be determined by Block Committees which may assign rights to their use other than for Public Passage or Assembly. Such subsidiary public rights shall be assigned on a rotating basis.

17. In no case may more than 5% of the area of any Block be occupied by a use that requires direct payment by the public to access its benefit.

18. Fees from the assignment of public rights shall profit the Block from which they are derived except in the case of High-Income Blocks.

19. A High-Income Block shall be understood to be a Block on which revenue from fees shall exceed by more than 50% the median fee collected from all Blocks, city-wide.

20. 25% of the revenues from High-Income Blocks shall be tithed to the Block Bank.

21. The Block Bank, the directors of which shall be composed of representatives from the Block Committees, shall make Block Grants for improvements to Blocks that do not qualify as High-Income Blocks.

22. Permitted uses shall include sitting, the playing of games and miscellaneous other recreational activities, gardening and agriculture, the storage of bicycles, the capture of rainwater, the care of children, the management of waste, the planting of trees, public toilets, and the sale of books, journals, newspapers, and snacks.

28. Street Trees shall be planted such that they shall, withing five years of their planting, provide adequate shade over the full area of the Block during the months of summer.

29. The location and species of these trees shall be established by the Department of City Planning with the advise and consent of the Block Committees.

30. Sleeping on sidewalks shall only be permitted by permission of the Block Committee on application no less than one day in advance of bedtime.

Excerpts from *'The Sidewalks of New York'*, by Michael Sorkin (2012), republished in *What Goes Up: The Rights and Wrongs to the City* (Verso 2019)

Concept design for portfolio of prototypes

The participants in the Design Workshops helped articulate various different components involved in a street retrofit mission, ranging from landscaping to governance and infrastructure. As described previously, subsequent synthesis by the Vinnova team, chunking and identifying patterns and types, led to a portfolio of concepts, with which to organise and shape initial prototypes. These prototypes are designed to run alongside each other in a portfolio, testing similar aspects of the Streets model yet in different ways.

They are supported by an array of related projects and activities, which Vinnova coordinates in a wider portfolio. The first iteration focused on key urban design and planning elements. The next iterations will add the technological aspects of Delivery, Conductor and Hotspot. Additionally, at this first stage, a 'pre-study' desktop research project concerning logistics and retail (Conductor and Delivery elements, below), was conducted by RISE.

Garden	Parklet	Socket	Hotspot
Green and blue infrastructure, incl. management and maintenance, with sustainable urban drainage, canopies, heating, gardening &c	Modular, scalable street furniture for existing kerbside and parking spaces. Open systems specified, built, and operated by citizens themselves.	Integrated digital/physical/legal public infrastructure, esp. for energy and civic sensors, supported by data, networks and other infrastructures.	Consolidation points for micromobility and active and shared transport, comprising parking, charging, data, and maintenance.

Conductor	Janitor	Delivery
Orchestration, governance, and management, real-time and otherwise.	Maintenance, scheduling, and operations, real-time and otherwise	Coordination and operation of commercial and residential delivery infrastructure, including scheduling.

Prototype #1

Framtidsgator (Future streets)

This project is led by urban design firm Spacescape, with White Arkitekter and Sweco alongside researchers from KTH. The key public collaborator is Stockholms stad. It addresses the complex interface between school and street. An existing Vinnova-funded project was extended to incorporate the ideas emerging from the Street mission design process. This indicates how missions can realign existing projects, rather than simply create new ones, enabling steering across a portfolio.

Framtidsgator Future streets	Parklet — Integration of Street Moves 'boardwalk' modules	Hotspot — Basic active transport integration	Garden — Simple green infrastructure
	Conductor — Led via co-design process with adjacent schools		

Prototype #2

Street Moves

This side of the mission is run by ArkDes, the national centre for architecture and design, and funded by Vinnova. ArkDes coordinated the design and build of a 'universal kit of parts' to deploy into cities for participative design, procuring Lundberg Design for the initial prototypes. The first outcome is a set of reconfigurable and modular building blocks to support multiple applications in the street, providing the core physical infrastructural for the Street mission. It is being prototyped and tested in public, through 2020, across multiple cities.

Street Moves	Parklet — Extensible and modular system for existing streets	Hotspot — Bike, cargo bike, scooter, shared car parking/charging	Garden — Modular approach to light 'green and blue infrastructure
	Conductor — Modular 'kit of parts' enables citizen-led	Janitor — Maintenance issues considered early and evaluated	

01 Garden

Description

Intensive introduction of green and blue infrastructure into streets, including management, maintenance, and integration with urban infrastructures such as sustainable urban drainage, street canopies and heat island effect, vegetation and urban food production, biodiversity, air and water quality, mental health and wellbeing, and so on. High impact on health and environmental agendas, but also on social justice.

Research questions

- *Aligning green and blue infrastructure with other street elements*
- *Existing and new health, environment and social research for green/blue streets?*
- *Flexible/light versus fixed/deep green and blue infrastructure*
- *Best practice for management and maintenance*
- *Streets as part of local food systems*
- *Moving from hardscape streets to 'softer' all-year-round landscapes, framed by indigenous practices*

Examples

- Paris Objective 100 Hectares
- Paris Champs Élysées plan
- London National Park City
- Sheffield Grey to Green
- Barcelona Superblocks
- Melbourne Urban Forest Strategy
- Oslo 100,000 Trees initiative
- The Edible Bus Stop, London

02 Hotspot

Description

Creation of micro-mobility and active transport consolidation points, comprising more coherent parking, charging, data, maintenance, and other core infrastructures, capable of fitting alongside associated amenities such as landscaping, social spaces, logistics drop-off etc, as well as other public transport nodes.

Research questions

- *Detailed behavioural patterns and perceptions in micromobility*
- *Generic Hotspot design versus specific place-based design*
- *Services, amenities and infrastructures integrated with Hotspots*
- *Location of Hotspots, aligning with other transport and nodes*
- *Relevant legislation, policy, and practice*

Examples

- Oslo Bysykkel
- Voi prototype scooter stand
- Arup parklets, Liverpool

03 Parklet

Description

A form of modular, scalable street furniture/amenity that fits into and scales from existing kerbside and parking space. They are capable of being designed, built, and operated by citizens themselves, with attendent health, environment, and social fabric benefits. As an open system, they can be modified and extended, and customised to local conditions and needs. Crucially, includes the participation processes which enable them to be 'owned' by 'the street' itself.

Research questions

- *International Parklet programmes and fit with Sweden?*
- *Best practice for Parklet manuals, support, and advocacy*
- *Stimulating citizen participation in Parklet programmes*
- *Existing research into beneficial social and cultural fabric*
- *Existing programmes in cities that Parklets can build upon*
- *Parklets enabling the delivery of Hotspot, Garden, Delivery etc.*
- *All-year-round and all-weather models for Parklets*

Examples

- San Francisco and Los Angeles parklet programmes
- PARKing Day global movement
- COVID-era street adaptations, globally
- Arup parklets, Liverpool
- Vestre Parklet 2.0
- Michael Sorkin's 'Sidewalks of New York' model
- London Low Traffic Neighbourhoods
- Milan (and elsewhere) Covid-era street retrofits

04 Socket

Description

Integrated digital/physical/legal public infrastructure to plug things into: energy, data, software, equipment and fittings for commercial and community activity, and so on.

Research questions

- *Adapting energy regulation and legislation*
- *Bidirectional power, enabling vehicles to act as temporary batteries as well as being charged*
- *Diverse local energy generation*
- *Standards, data formats, protocols, legal entities, universal joints*
- *Integration with Parklet, Hotspot, Garden etc*

Examples

- ElectriCity project
- Virta, Finland
- Street market fixtures and fittings
- Tier proposal for on-street scooter charging

05 Delivery

Description

New approaches to local logistics in streets, for both organisations and individuals, which respect and enable environment, health and social justice—taking a lagom mobilitet approach—whilst coherently supporting local activities. Should be for delivery and collection (and so including circular aspects, like waste).

Research questions

- *Existing logistics landscape for individuals and organisations?*
- *Off-peak delivery and collection, including use of existing resources such as schools, transit etc?*
- *What data sharing and traceability?*
- *Circular logistics?*
- *Optimal balance of human and autonomous delivery systems?*
- *Street guidelines and legislation to revise?*

Examples

- Utrecht urban logistics policies and practices
- Tokyo small vehicles for logistics
- Urban ICT Arena prototypes

06 Janitor

Description

A system that supports the engaged management, care, and coordination of the street, by 'listening' to the street via safe, secure, legible and public real-time data collection and engaged public services. Balance of sensors, citizens, and public servants, with legible, well-crafted interfaces and devices. Shared care and maintenance models.

Research questions

- *Data for coherent, careful coordination of the street*
- *Privacy-preserving citizen-centric civic data*
- *Legible public data collection and participation interfaces*
- *Alignment with GDPR and equivalent*
- *Data and protocol standards, balancing local implementation with global exchange*

Examples

- Urban Infrastructure Partners, Oslo
- Voi
- Urban ICT Arena prototypes
- Foundation for Public Code
- EU DECODE project

07 Conductor

Description

Coherent, open and engaged coordination of these diverse street activities, as a form of super-local governance which integrates with wider urban systems. Includes elements of licensing as well as geofencing and real-time space management. Develops policy framework for healthy, sustainable, and social outcomes. Citizen participation cultures, tools and models.

Research questions

- *'Gatstadsrätt' model for super-local street management by the street itself*
- *Interfaces for participation*
- *Geofencing and kerb management for dynamic healthy, safe, sustainable and vibrant streets*
- *Fluid licensing of activities, for healthy, sustainable, vibrant, and just outcomes*
- *Local decisions impact upon wider urban spatial and mobility systems*

Examples

- Open Curbs, by COORD
- Seattle On-Street Occupancy
- Mobility Manager, by Populus
- New Mobility, by REMIX
- LADOT tools
- Urban ICT Arena prototypes
- Foundation for Public Code
- Decidim platform
- Utopia Arkitekter Helsingborg prototype
- Spacescape 'Place to Plan'

Design principles for the street

Brian Eno

Brian Eno is one of the most influential artists, musicians and thinkers of our time. We asked Brian to suggest a set of design principles for rethinking the street, as part of the Healthy Sustainable Mobility mission. These principles subtly informed some choices made during the design process, such as the emphasis on gardening as an ethos—thinking more about the beginning of something than the end—or the more specific choice of wood as an approachable and adaptable material, as well as designing with the "very young" and a participation model based on "harnessing the intelligence" of a city's inhabitants.

Think like a gardener, not an architect: design beginnings, not endings.

Unfinished = fertile

Artists are to cities what worms are to soil.

A city's waste should be on public display.

Make places that are easy for people to change and adapt (wood and plaster, as opposed to steel and concrete).

Places which accommodate the very young and the very old are loved by everybody else too.

Low rent = high life

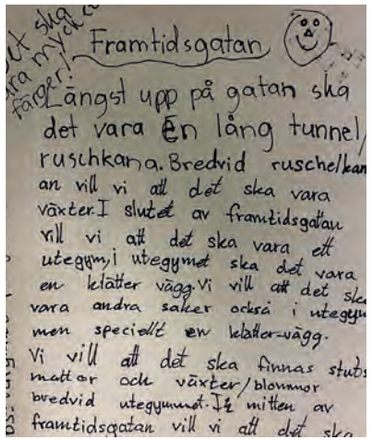
Make places for people to look at each other, to show off to each other.

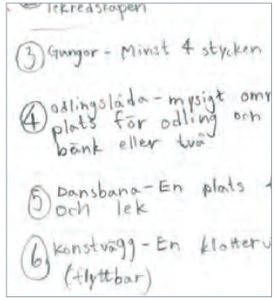
Shared public space is the crucible of community.

A really smart city is the one that harnesses the intelligence and creativity of its inhabitants.

Prototype #1

Framtidsgator (Future streets)

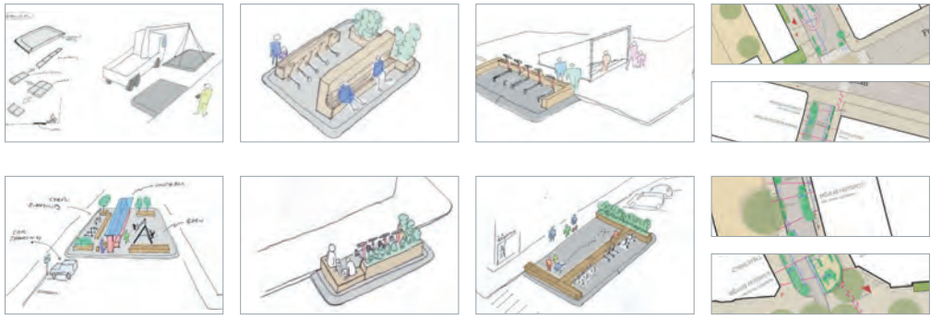




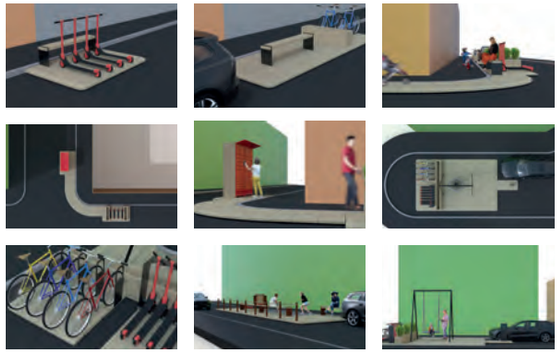
For the first stages of the prototype, Framtidsgator addressed the interface between school and street. Spacescape and White Arkitekter ran participative design workshops with schoolchildren at three schools in central Stockholm. The children used the same principles and tools as the stakeholder groups in the earlier Design Workshops. The childrens' designs for their streets were transformed into plans, and implemented by Stockholms stad during autumn 2020 and winter 2021. In planning Framtidsgator, the streets left a space for Street Moves prototypes, indicating how prototypes might begin to align.

Prototype #1

Street Moves



Original sketches by Lundberg Design indicate concept (above), and then subsequent product development (below, and facing pages), exploring different uses. Plans (top-right) show location of the first prototypes to be deployed into Framtidsgator. The design concept of the boardwalk begins to emerge, as a maintainable wooden structure, usable all-weather, flowing around landscape and traffic.

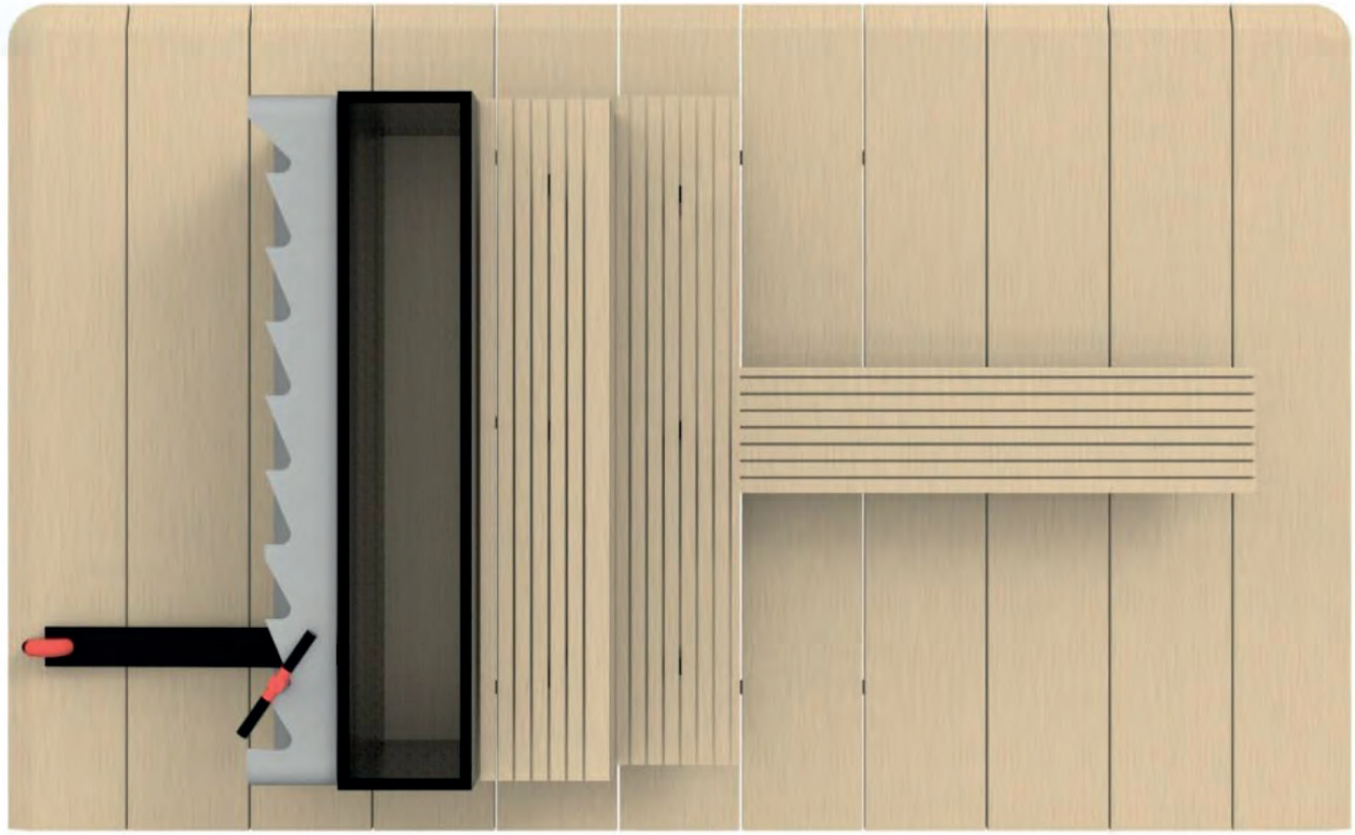


Systemic change implies designing for scale. Whilst scaling can take many forms—hierarchical or relational, upscaling or rescaling—the mission design should articulate scaling in both its organisation, and in the material realities of prototypes and demonstrators. Here (left) scaling is expressed in early construction drawings.

Whilst Framtidsgator indicates how an entire street can be retrofitted, Street Moves' first prototype, **Urban Boardwalk**, proposes a half-step, creating an adaptable 'kit-of-parts' that can be deployed into existing parking spaces or other street space. The Boardwalk is designed to be moved and installed quickly, yet be highly durable, and equally, after the street is slowed, greened, and re-oriented around people, place, and environment, the kit's job may be done, enabling a more bespoke retrofit.

Capable of doing multiple things, the intention is that the kit will be co-designed with residents and users of the streets. Using open source framework principles, applications can be created by people, and shared across the system. The street decides what kit is deployed: some streets may want a garden, outdoor gym and playground; others may want cafés, stalls, meeting spaces; all are likely to want some form of personal and shared mobility support, such as bike stands, e-bike charging units, scooter racks, car-sharing points, and logistics drop-off points/e-commerce lockers. As these prototypes develop, there will be increased emphasis on 'green and blue infrastructure', like vegetation, bioswales, and urban agriculture.

Whilst the decision-making is coordinated by the street itself, adapting building management practices, the municipality helps coordinate. It also owns the elements, in terms of capital cost, as per other street furniture. Maintenance could be shared by the street (daily tending) and the municipality (heavy lifting). Local timber manufacturing is used for construction, enabling rapid assembly and 'circular' material use for sustainability, as well as easier customisation and adaptation by the residents and users of the streets. The patina that timber develops will tell a story of its use.



Open-sourcing the neighbourhood

Saskia Sassen

Saskia Sassen is one of the leading urban sociologists of our time. She is the Robert S. Lynd Professor of Sociology at Columbia University and a Member of its Committee on Global Thought.

A good start would be to open up what are often closed systems of knowledge coming from the center or the top. Government agencies tend to verticalize their work, as do many leading urban civic institutions. Bringing these bits of street and neighborhood knowledge into standard knowledge systems would unsettle such organizations and open them up. Central city government agencies could learn things about the city they simply are not well positioned to access. Eventually this might enable at least some neighborhood users to develop versions, even if simple, of open-source technologies aimed at incorporating diverse bits of knowledge and diverse knowledge practices from even children, homeless people, or neighborhood grandmothers.

While none of them is an urban expert, each has specific knowledge about their place. All of this in turn might activate additional elements of both knowledge practices and technological practices, generate more engagement by city residents and more cross-neighborhood comparisons. Ultimately it can scale up to city level, but from the ground up, leading to exchanges and collaborations and on to a fully mobilized neighborhood and city culture.

Excerpt from Saskia Sassen, *'Open Sourcing the Neighborhood'*, Techonomy, November 2013

Building a wooden city

The material palette of most urban streets is usually variations on concrete and steel, almost as if built for a war-zone. Those materials are chosen for their long-term durability. They minimise the need for care and maintenance. They can be paid-for once and then forgotten. Their homogeneity is seen as a low-cost virtue. These utilitarian factors make sense, to some extent, if the operating principles for the street orient around reducing cost and financial risk.

Yet what if the value of the street is framed in terms of conviviality, cultural activity, biodiversity, public health, adaptability, accessibility, total cost over time, industrial innovation, aesthetics and equivalent? What materials can begin to address this more complex range of opportunities and possibilities?

Wooden furniture, Enskede Dalen, Stockholm

Many Swedish environments are dominated by wooden structures, such as these elements of furniture in a suburban forest 15 minutes from the centre of Stockholm. These simple structures are also durable, clearly. They are delightful, too,

Wooden furniture,
Enskede Dalen, Stockholm

and entirely approachable. They are safe, and work well in all seasons. They are largely circular products, if produced from Swedish timber. They reinforce local craft traditions, or indeed advanced computer-controlled design and fabrication crafts. That craft is self-evident through their joinery, subtly worn on the sleeve—machined or hand-turned—in a way that concrete bollards cannot reproduce.

The patina of wooden structures tell a story of use, of their local characters. They can be shaped directly by the street: either explicitly customised and located, or implicitly through the traces of wear and tear. Equally, as these images from the forest reveal, the patina means the wood begins to fade into its context somewhat, absorbing cues from its immediate environment.

The design principles that Brian Eno suggested for the Street project included a specific reference to using wood due to its approachability and adaptability.

Finally, wood requires maintenance. Could we reinvent that word to mean 'ongoing care'? Could we reverse the logic of reducing maintenance to instead purposefully create maintenance, in order to produce a culture of shared care? We might find it valuable to create elements that consciously require and

Wood can produce a different form of accessibility. In her book *What Can A Body Do?*, Sara Hendren describes how wood is used at Gallaudet University, a campus designed for deaf people, due to its qualities. Noting the choice of wooden seating across campus, she writes, *"The resonance of wood makes it reverberate when struck. Students sometimes tap or slap nearby surfaces to get one another's attention or to call a group to order, and materials like concrete or thick plastics tend to absorb the sound rather than scatter it productively."*

Wooden boardwalk,
Farsta Strand, Stockholm

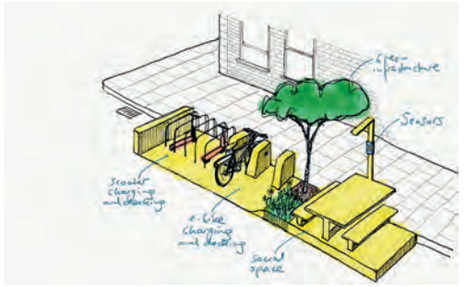
reward care from their neighbours. Clearly, this could only work in a highly participative mode, requiring deep sensitivity and engagement. Developing infrastructure in this form could create a culture of shared ownership and responsibility for everyday infrastructures, as well as shared value. Wood is a material that can engender these kinds of relationships.

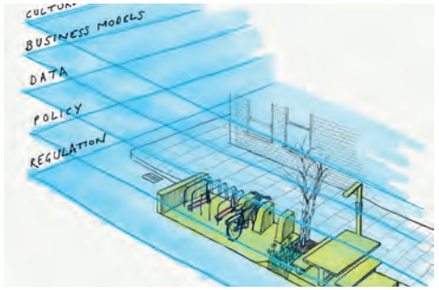
Around 1,300 years ago, the residents of Ise, Japan started rebuilding their wooden shrines every 20 years, in a process called Shikinen Sengu. Kenichi Suzuki, the Mayor of Ise, says, *"To maintain the Shikinen Sengu system you need to pass on and maintain skills, and a knowledge of natural materials. Communication and community is an important part of this. So maybe they were aware about sustainability at that time, even if the word didn't exist."*

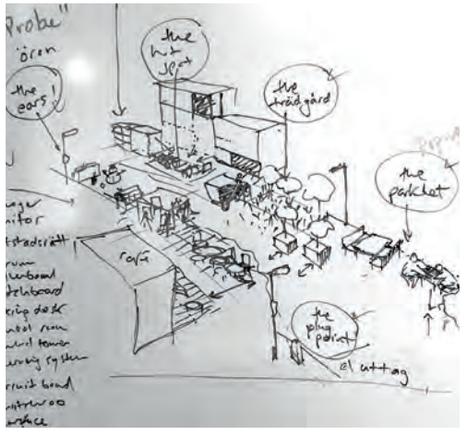
Introducing wood to the palette of the urban street not only softens the landscape, but stands for a form of sustainability—in ongoing care, as well as material production and adaptation—that current streets simply cannot exhibit.

Takeshi Nakatani describes the wooden temples at Ise: *"Wood ages and rots just like we do, and just as with the shrines which we rebuild every 20 years .... it's through this constant process of renewal that something lasts forever."*

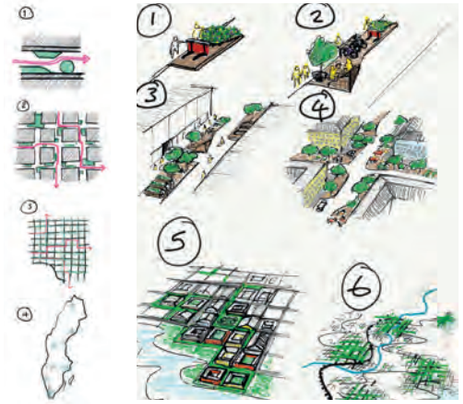
Prototyping
Initial Vinnova sketches







As early as September 2019, it was clear that the mission was heading towards a scalable version of a parklet module, capable of temporarily occupying a parking space whilst opening up different applications. These early sketches by Vinnova's Dan Hill, from September and October 2019, were used to communicate the core ideas. They already suggest the simple, modular and adaptable components that Street Moves would produce. There is a sense they might be created in wood. Conceptually, it's clear that the physical interventions are unpicking different layers of 'dark matter' (Hill, 2012). The whiteboard scribble (left) indicates how the modules, and the street, represent different functions within healthy, sustainable mobility, the mission theme.



These quick scaling diagrams by Vinnova's Dan Hill suggest that these super-local interventions might be able to replicate, though adapt, to cover streets all over Sweden. The 1-2-3 diagram on the left was produced in September 2019, whereas the six stage diagram on the right was produced in April 2020, in order to convey the scaling principles to ArkDes, Lundberg Design and Utopia Arkitekter.

Prototyping
Lundberg Design Street Moves mockups

Series of renders by Lundberg Design, from September 2020 onwards, indicating the potential of the Street Moves boardwalk elements for various Stockholm streets. By this stage, the first prototypes were already produced—the drive towards the prototype in this mission was so rapid that the physical production outpaced the renders. These images were useful for conveying the ideas with municipality partners as well as sharing media. The work of Daniel Byström, as the key project coordinator at ArkDes, was fundamentally important to this design work. Byström's own design background was a real asset, as was the linking with municipalities, in order to move renders into reality.

Combined prototypes deployed

Hälsingegatan prototype, September 2020

The first users of the first prototype were very small children at the Montessori kindergarten on Hälsingegatan, who used the Boardwalk for their morning tea.

The bike-rack components of the Boardwalk were being used within minutes. Switching this space from car-parking to more diverse, sustainable uses required no marketing. Below, kids also instantly knew what to do with these former parking spaces.

An initial impetus for the Street mission was the influx of e-scooters into Swedish cities from 2018 onwards. Whilst many found the scooters fun, useful, and sustainable forms of micromobility, others saw them as a nuisance, littering the street, too flimsy for the rough urban environment. So creating scalable, distributed and coherent scooter parking spots, integrated into other amenities, was an obvious first application. Insights from the micromobility firm Voi indicated that their riders would use parking were it available. The initial prototypes are testing how such scooter parking might work. Early observations indicate that it is being used—but not always. It may be that a discount is required too, although Voi's research suggested this was not necessary; perhaps the answer is clearer signage or industrial design. However, It turns out that childrens' bikes also fit these racks; a pleasant surprise.

Using wood as the primary material for the prototypes not only creates a different yet familiar, softer materiality to the street, but also enables circular re-use, adaptation and reduced carbon.

Stockholm's Summer Streets programme has run successfully for several years, as it has in other Swedish cities. Yet it disappears in early September, despite the balmy Swedish autumn appearing to stay around longer each year. The Street mission can test how to live in the street all year around. There's a well-known proverb, usually attributed to Sweden, which runs *"Det finns inget dåligt väder, bara dåliga kläder"* ("There's no bad weather, only bad clothing"). As the weather turns, the prototypes can help figure out what the 'good clothing' for the street is. Reflecting on Nordic cities, Gehl Architects David Sim argues in his book *Soft City* that *"Learning to live with the weather requires a sensitivity to change and a respect for nature."*

A Sunday afternoon, two weeks in, and a family and friends uses the lower Boardwalk section at Hälsingegatan for a picnic table, whilst they picnic on the beach and swingset opposite. This informal adoption and invention indicates the diverse possibilities of these new infra-structures.

As well as the built elements of Framtidsgator, the project explores how transforming the street into a canvas alters the perception of the space. Painting the intersection in bold patterns changed the feel of the environment either side, whilst potentially slowing drivers down. Lower down, chalk was left out for people to make their own marks on the street, reinforcing a sense of shared ownership.

Stockholm vice-mayor Daniel Helldén opening the street, with the schoolkids who designed it.

Using parking spaces to extend the street still leaves space for bikes and other vehicles.

Combined prototypes deployed

Tjärhovsgatan prototype, September 2020

The Boardwalk at Tjärhovsgatan provides some basic amenity outside a popular co-working space.

Perhaps bike-parking would be useful, alongside scooter parking. There is room to extend, here.

Removing, or reducing and slowing, motor vehicle traffic leaves room for people, and diverse modes.

Adding basic social infrastructure provides a public place for teenagers to hang out in the evening.

Combined prototypes deployed

Parmmätargatan prototype, September 2020

Parmmätargatan, adjacent to Eiraskolan, rolls down the hill next to stores, cafés and apartments. Within 30 seconds of construction finishing, people started using the boardwalk.

Within 30 seconds of construction finishing, people started using the boardwalk.

The Parmmätargatan prototype indicates how computer-controlled fabrication enables modular elements to be adapted to a particular landscape.

As with other prototypes, schoolchildren were ‘lead designers’, creating a small beach leading down to the waterfront, alongside seating and planters.

The angles across the seating generously lean back, encouraging a relaxed social setting.

The boardwalk sits over the camber of the street, enabling rainwater to flow underneath.

Wood, and standard components for bike-racks, enables rapid construction on-site.

Wooden offcuts from the fabrication process can be used to level the bike-rack fittings in-situ.

Seating faces the pavement. This is safe, but also suggests a ‘room’ between building and street, from which the stores and cafés should benefit.

The impact on local stores, like this bookshop next to the boardwalk, will be evaluated, testing the economic impact of increased access and activity.

Combined prototypes deployed

Gothenburg prototype, January 2021

The Gothenburg prototype pursued these ideas of creating small 'rooms' on the pavement, outside of shops and cafés. It provided new bike and scooter parking as well as social space, in the form of seating angled towards the café. (Photo by Lundberg Design)

The initial prototype was installed on Södra Larmgatan in central Gothenburg in February 2021. The municipality were extremely pleased with the reception and it looks like the prototyping will be scaled up significantly during 2021. (Photo by Lundberg Design)

Weather conditions—particularly wet weather—will be tested in extended Gothenburg prototypes through 2021. The municipality's cultural initiative Rain Gothenburg, part of the city's ambition to become *"the best city in the world when it's raining"*, will be involved in the development.

Even in a chilly Swedish February, the prototype proved successful in terms of creating a social space in the street.

Combined prototypes deployed

Helsingborg prototype, January 2021

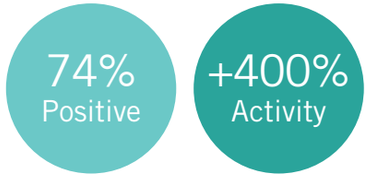
Each of the prototypes tests slightly different aspects of the emerging platform, as decided by the municipality involved, and determined by its context. For Helsingborg, the modifications to the prototype included increased capacity for planting and lighting under the seats.

Outside a gymnasium (school for 16-18 year olds) on Södra Storgatan, this glowing 'social infrastructure' fundamentally changes the street. For 2021's continued prototyping, Helsingborg will also focus on integration of shared car charge points.

Prototyping

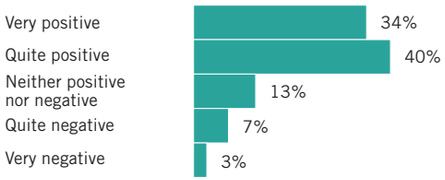
Follow-on research

As part of the evaluation of the first prototypes in Stockholm, ArkDes commissioned Novus, a research company, to conduct in-street surveys providing qualitative feedback from residents and users of the streets.

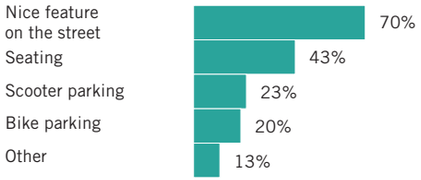


Overall feedback of the prototype core idea

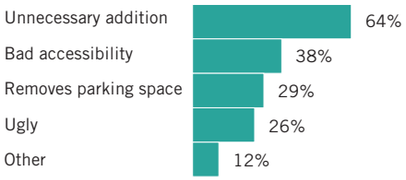
How do you see the idea of placing mobility hubs, similar to the one you can see in front of you, on different streets in the city?



If you are positive, what is it that you like?



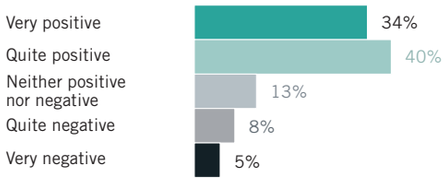
If you are negative, what is it that you don't like?



*Very low base

Hälsingegatan

How do you see the idea of placing mobility hubs, similar to the one you can see in front of you, on different streets in the city?



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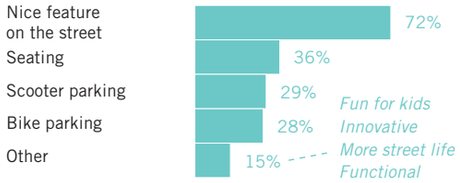

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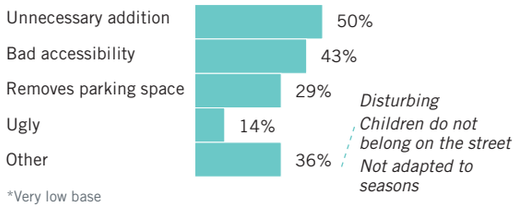
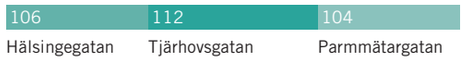


*Very low base

The survey was conducted on the prototype streets, and consisted of face-to-face interviews with passers-by (aged 15+ years). 322 interviews were conducted in total, on 8th, 9th and 12th October 2020.



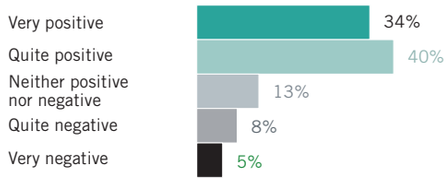
The key result from the survey is that 73% of the respondents thought that the prototype interventions were positive (either very positive or quite positive). Only around 10% were negative about the prototypes (approximately 3% very negative).

Given that parking space was being removed, it is highly unusual to receive such positive results. The interventions were communicated as temporary measures—on purpose, as per the half-step tactic—but the positive sentiment is clearly very strong. With change in mind, this is hugely useful, perhaps indicating the value of a participative approach led with some design intent, therefore that care and engagement is reciprocated. There are some variations across the streets (see overleaf).

Associated research by Spacescape indicated that there was a 400% increase in activity on the street, and from a more diverse population, in terms of age. It's worth noting that the surveys took place in October, which is already quite cold in Stockholm.

Tjärhovsgatan

How do you see the idea of placing mobility hubs, similar to the one you can see in front of you, on different streets in the city?



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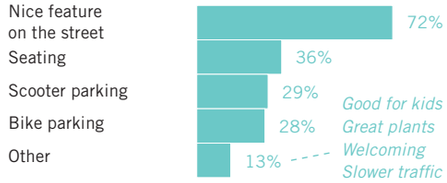
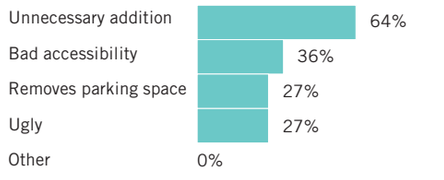


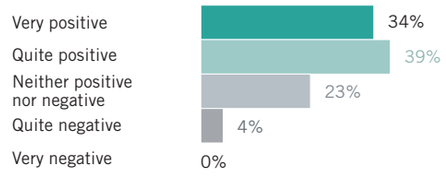
If you are negative, what is it that you don't like?



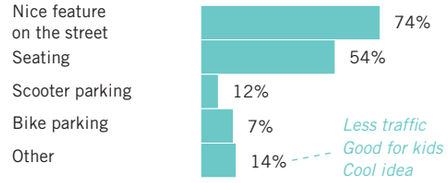
*Very low base

Parmmätargatan

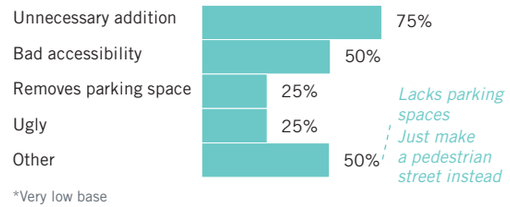
How do you see the idea of placing mobility hubs, similar to the one you can see in front of you, on different streets in the city?



If you are positive, what is it that you like?



If you are negative, what is it that you don't like?



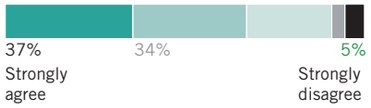
*Very low base

Note: Those who live on or around Tjärhovsgatan and Parmmätargatan, and walk through them most weekdays, are the most positive.

Margin of error for 100 interviews:
In case of outcome 20/80: +/- 7.8%
In case of outcome 50/50: +/- 9.8%

Hälsingegatan sentiment

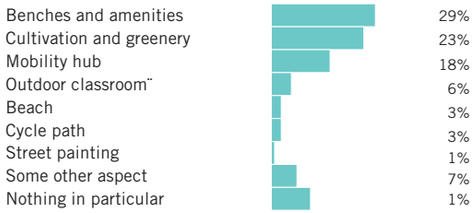
Is a nicer street to stay on after it is remodeled



Is a nicer street to stay on after it is remodeled

Hälsingegatan opinion

Which of the following aspects do you like the most?



Which aspects are least appealing?
Street painting, Beach, Cultivation and greenery

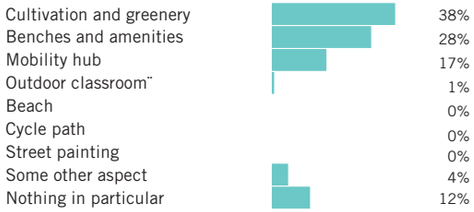
Tjärhovsgatan sentiment

Is a nicer street to stay on after it is remodeled

Is a nicer street to stay on after it is remodeled

Tjärhovsgatan opinion

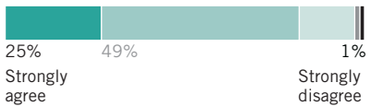
Which of the following aspects do you like the most?



Which aspects are least appealing?
Street painting, Cycle path, Mobility hub

Parmmätargatan sentiment

Is a nicer street to stay on after it is remodeled



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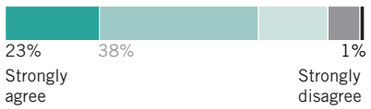

Parmmätargatan opinion

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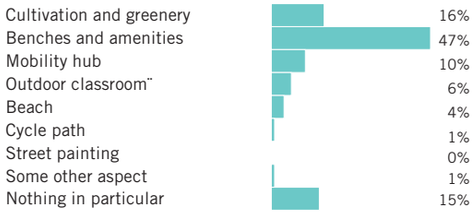


Which aspects are least appealing?
Beach, Street painting, Cycle path

Hälsingegatan interviewees

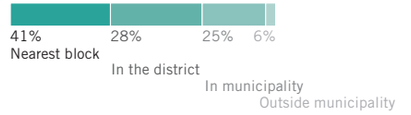
Gender

Age

Relationship with street

Frequency of visits to the street

Where you live



Tjärhovsgatan interviewees

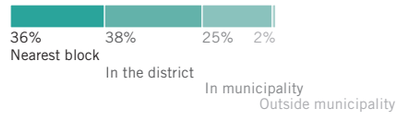
Gender

Age

Relationship with street

Frequency of visits to the street

Where you live



Parmmätargatan interviewees

Gender

Age

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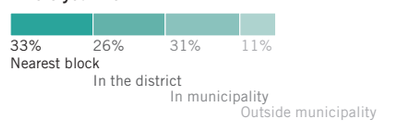


Prototyping
Follow-on research

Qualitative assessment

As well as the structured questionnaire, Novus also asked for more open feedback. Here are their selection of responses:

If you had to decide entirely what a street should look like, what features do you think there should be on a street?

"Outdoor seating, seating, car-free, buskers and cafés"

"Trees, flowers, separated for cyclists"

"There should be parking spaces, preferably some trees"

"More green, fewer parking plots, and that it feels safe"

"Parking but also that you hang out on the sidewalk a bit"

"Accessibility is important. Emergency services and other road users. Safety and security are key"

ArkDes ThinkTank surveys

The Vinnova and ArkDes team were both encouraged to carry out informal follow-on research, spending as much time as possible around the prototypes. Meetings were often held in the street. Equally, ArkDes ThinkTank carried out more formal surveys, capturing user reactions on film, both for learning and insight as well as sharing on social media.

Prototyping
Ongoing observation

Prototypes keep producing insights, and the mission team continued to make observational studies of the Street Moves boardwalk. Here, photos by Lundberg Design indicate the prototypes holding up well in the Stockholm wintry weather.

The Tjärhovsgatan prototype started picking up graffiti before the others. The photo on the right is taken in March 2021; to the left is April 2021. Graffiti is a form of community ownership, and a good development might be for school students to repaint the prototype as they see fit, to also lay a 'claim' to it. This is being discussed with ArkDes.

Although the Tjärhovsgatan prototype looked fine from a distance, even after the harsh winter of 2021, closer inspection revealed that the glulam wood was shredding a little at the edges by March. This deterioration was being investigated by Lundberg Design. Yet it also foregrounds the idea that prototypes are 'temporary on purpose', building in a sense of change.

Prototyping

Triggering movement, attention and discourse

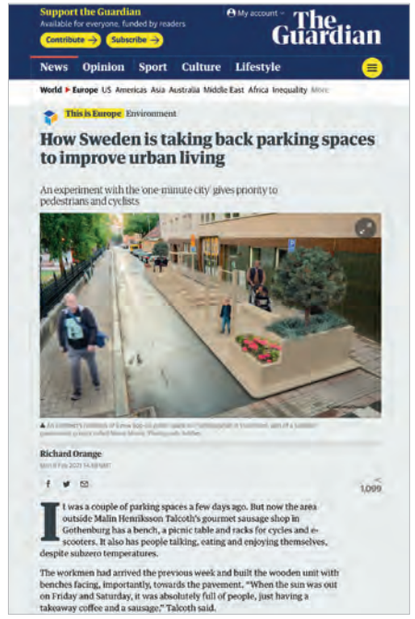
As per the Platform strategy, creating forms of social movement and cultural expression will be key to scaling missions. A pull from society generates the possibility of social change as opposed to simply technologically-oriented innovation, missions explicitly concern societal outcomes. Vinnova's approach to innovation explored how to nurture such a pull, as well as stimulating some of the necessary discourse around complex societal change.

Following the design principles (Tangible), do not talk about something before one has something to talk about. The mission is not announced during 2019. The first media starts emerging in the Swedish press, from both Framtidsgator and Street Moves projects, only in August and September 2020, to promote the launch of the first retro-fitted street. This makes the resulting discussion more meaningful, by pinning it around an experience that many people can actually visit.

Collaborators in the mission team—in this case Volvo M—also used their publicity muscle around the project.

The mission was picked by the European Commission programme EIT Urban Mobility, which featured both Framtidsgator and Street Moves projects on its YouTube channel. These videos do not get many views, but they help—and also provide useful assets for presentations. Video is the key media for missions.

The trigger for most media attention, however, was an in-depth feature in *Bloomberg CityLab*. Vinnova project team member pitched a journalist contact at *Bloomberg* in October 2020, and the story finally emerged in early January 2021. This coverage was not only high-profile; it also lent the project credibility with key audiences, stimulating much of the attention that followed. A key addition here is the creation of a clear and topical hook— the *'One-Minute City'*, riffing off Paris's 15 Minute City. This helped land the story with the journalist, and fuel its dissemination. The story also featured ArkDes director, spreading the attention across the mission's multiple partners. It is also essential to open up the projects to critical discourse, given a mission's likely complexity.



The *Bloomberg* article leads to *The Guardian* picking it up, which is crucial, as this moves it into more mainstream media. An hour-long conversation with a Malmö-based 'stringer' leads to a February 2021 article foregrounding the Gothenburg prototype.

Images of the prototypes began to spread rapidly across social media. As well as media created by mission teams, the prototypes being situated in everyday life means, of course, that people can make their own media, their own discourse.

Also following the publication at *Bloomberg CityLab*, as well as further discussion of the One Minute City thinking behind the project outlined on a team member Dan Hill's personal blog at Medium, *Fast Company* write an expansive feature, locating the project under 'World-Changing Ideas'. This helps make the case that the mission is taking an innovative approach, a case that still needs to be made in the context of innovation policy environments that are typically attuned to the lab rather than the street. *Fast Company* picking it up also implicitly suggests the project's business value, as well its social and cultural aspects.

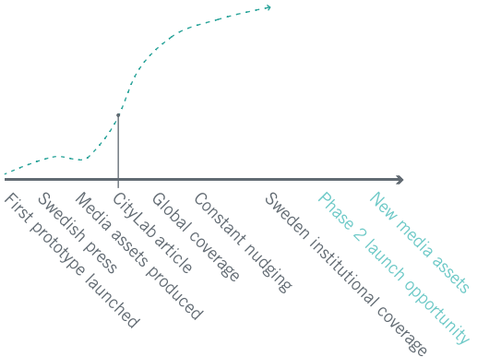
Good quality photos, drawings and video are necessary to feed media outlets, trigger social media reaction, and communicate the essence of the project. Visualisations commissioned from Utopia Arkitekter were key to describing the mission trajectory, whilst ArkDes produced several videos, designed for the internet. A short documentary-style feature captures project team/Mission board members talking about the project, whereas other short in situ clips, formatted for social media, helped capture and convey user reactions to the prototypes.

Prototyping

Cultivating social movement and attention

Having planted seeds in Swedish news, social media and a few influential publications, the story spread quickly throughout the first quarter of 2021, reinforced by the prototype rollout moving from Stockholm to Gothenburg and Helsingborg. The international attention was enormous, in some way relating to urban interventions made in response to Covid-19, even though the mission started well before the pandemic.

Continual updates across social media by mission team members, particularly at public-facing entities like ArkDes, Volvo M, Voi and Stockholms stad, as well as the design teams at Lundberg Design and Spacescape, ensured that the projects garnered significant attention. Yet equally, Vinnova team members also used their personal social media accounts to a far greater extent than is usual for a myndighet (Swedish government agency). This deliberate 'owning' of the project suggests the different form of innovation culture required of missions, with Vinnova as clear collaborator rather than simply funder. There are risks involved in such forms of communication of course, yet as per the mission-oriented perspective on risk generally, the risk of not engaging with innovation as an active collaborator may be greater than the risk of doing so. Learning from 'reactions', as per the LinkedIn notification from a Vinnova team member's feed above, can be profoundly useful.



On the evening of President Biden's inauguration, a meme of masked Bernie Sanders sitting in different contexts quickly started spreading across the Internet. The meme ended up touching down on the Parmmätargatan Street Moves prototypes, with some unknown Twitter user adapting a Lundberg Design photo. An early milestone in the process of creating a social movement may be prototypes as fuel for memes.

Cultivating discussion on social media means that key public intellectuals like Kate Raworth and Mariana Mazzucato picked up the project, helping disseminate the ideas and placing it in a broader contemporary discourse of economic value.

Making the interventions so material and tangible meant the mission communicated itself to some degree. On the facing page, a selection of media coverage is reproduced, from both global and local platforms.

Ideas for Good, Japan, January 2021

Architectural Digest, Mexico, February 2021

World Economic Forum, February 2021

Aspire, March 2021

Ultimately the discussion returns to Sweden. Technology aspects are picked up in related innovation programmes *Drive Sweden* and *Smart City Sweden*.

Built environment and urban development aspects are discussed by the likes of *Hållbart Samhällsbyggande* (sustainable society-building) and the *Ecowatch* website.

The project also appeals to Swedish tourism websites.

Helsingborg prototype is discussed on *Sveriges Radio*, before the first phase of the mission is discussed on the Vinnova website in March 2021.

Prototyping Framtidsgator and Street Moves
Working document

How are the Street mission prototypes addressing the prototyping design principles defined earlier?

1 Outcomes

Indicate how it delivers against, or refines, core shared outcomes, and agreed mission trajectories.

The prototype builds a 'value model' and planning tool which defines and steers the mission outcomes.

2 Scale

Initiate and nurture interaction or impact at next scales above and below (scale can be organisational and spatial).

Participants include municipalities, regional governments, and national agencies, as well as street-level intervention.

3 Lever

Indicate what existing and widespread system elements can be incorporated as the vehicle for exploration and change.

The prototypes deploy into the street, which is a lever across Sweden, and the transport regulator is on-board.

4 Data

Create new strategic data for shared impacts and value, whilst building new capacity for managing such data.

User research about impact and perception is being collected. In-street sensor kits are planned for the prototypes.

5 Conditions

Uncover, articulate, and initiate necessary changes in conditions like regulation, policy, financing, and incentives.

In making and deploying the prototypes, aspects of policy and regulation are being revealed.

6 Capability

Develop skillsets, perspectives or organisational cultures necessary for the mission in question, and other missions.

Building the prototypes with municipalities and regions sheds light on multiple capability capacities and gaps.

7 Engagement

Use citizen-facing formats to articulate intent, co-design action and outcomes, and stimulate discussion.

The prototypes are intrinsically citizen-facing, including participative design with schoolchildren.

8 Agility

Describe an adaptive strategy for delivery, indicating how it is able to react to changing conditions.

The modular prototype elements allow interventions to respond to opportunity; coordination is 'light-touch'.

System layers

As a key node within our living environments, the Street provides many of the key layers required for systemic change in healthy sustainable mobility. Place-based system demonstrators are distinct to their environments, yet coherently approaching their embedded system layers enables scaling and transformation beyond them.

In order to deliver both specific place-based demonstrators and widespread system change, a diverse array of collaborators are required, ranging from startups to corporations, municipalities to national regulatory agencies. The mission is designed to accumulate further partners as it proceeds, like a snowball rolling down a hill, in order to ensure the prototypes and demonstrators have sufficient depth (across the systems) and breadth (across Sweden).

Below, the emerging stack of place-based layers and their related collaborators, and then the system layers and their collaborators. This is a platform for system change.

Place layers	In the Street mission	Place-based collaborators
Skills, capabilities, and cultures	Physical, digital, and social interventions in streets in Stockholm, Helsingborg, and Umeå, within a wider network of nine municipalities coordinated by Viable Cities.	ArkDes, Stockholms stad; Helsingborg stad; Göteborgs stad; Stockholm Region planning and health departments; Voi; Volvo M; Lundberg Design; Spacescape

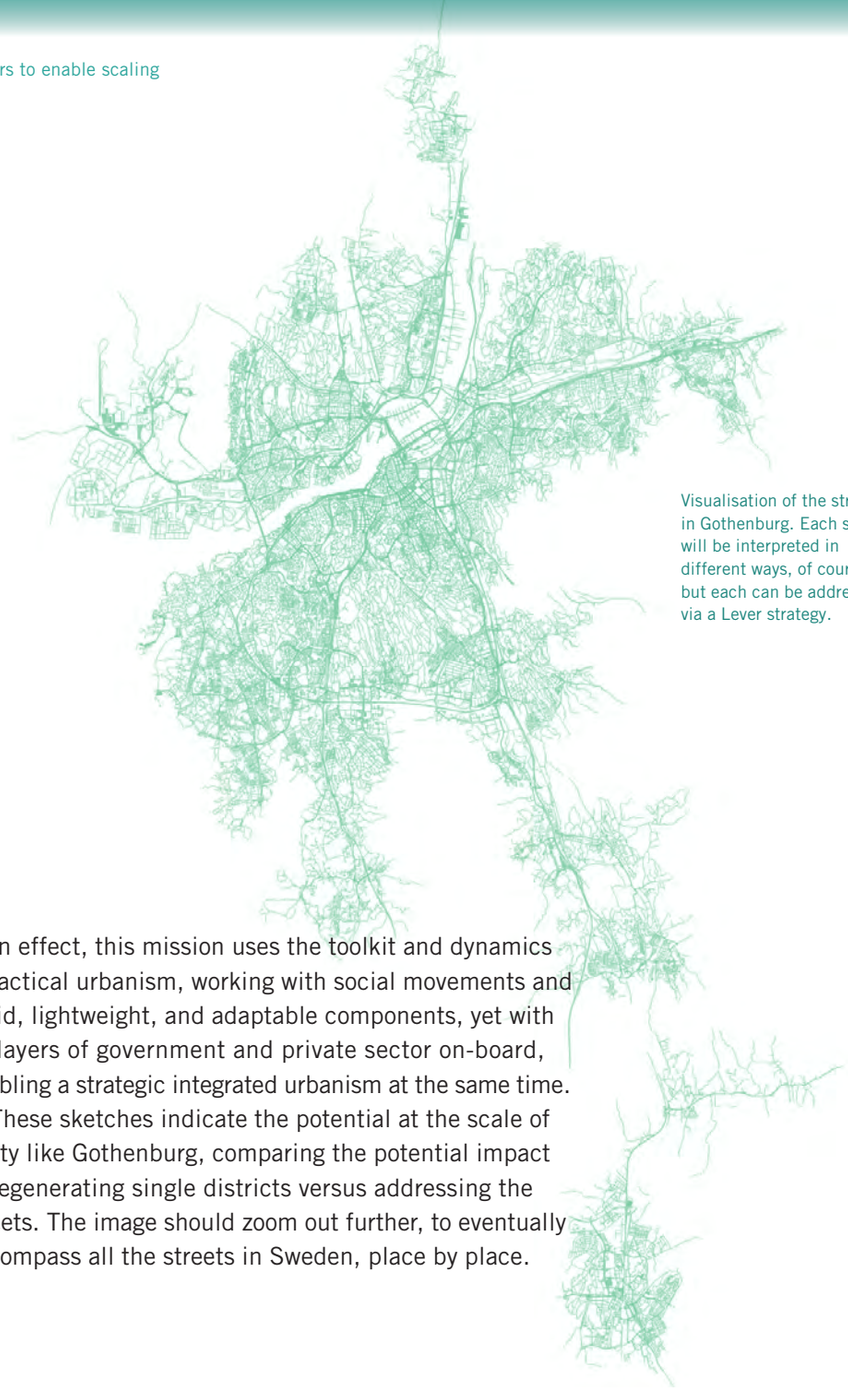
System layers	In the Street mission	System collaborators
Skills, capabilities, and cultures	Urban design/architecture; IoT, data science; user experience; micromobility, transport, and logistics; place-based governance; participative democracy; microeconomics; health and wellbeing;	ArkDes; Rådet för hållbara städer; Boverket; Voi; Volvo M; Lundberg Design; Spacescape; Stockholm Region, muncipalities in Stockholm, Helsingborg and Gothenburg
Standards and guidelines	Interoperable mobility standards, street furniture design guidelines, health and safety guidelines for micromobility, civic IoT privacy guidelines, street design guidelines and best practice, accessibility standards	Municipal traffic departments in Stockholm, Helsingborg and Gothenburg; Stockholm Region; Voi; Volvo M; Lundberg Design; Spacescape; RISE, Transportstyrelsen, Drive Sweden, Viable Cities
Data, code and services	Micromobility data standards; Real-time kerbside management systems; ‘digital twins’; Internet of Things kits; environmental sensor data standards; footfall measurement standards: public code policies	Stockholms stad; Helsingborg stad; Göteborgs stad; Stockholm Region; SKR; Voi; Volvo M; Ericsson One; Vinnova; RISE; Drive Sweden
Financing	New value models, with ‘total value budgeting’ based on public health and wellbeing savings, environmental benefits, maintenance benefits; place-based system demonstrator innovation funding	Stockholms stad; Helsingborg stad; Göteborgs stad; Vinnova; Stockholm Region; Climate-KIC
Policy	Parking space policy; street planning policy; local real estate policy; participative design and planning policy; smart city policy; arts and culture policy; licensing policies	ArkDes; Rådet för hållbara städer; Boverket; Climate-KIC; Viable Cities; Drive Sweden; Vinnova; RISE; Stockholm Region
Law	Parking space law, traffic speed limits, vehicle definitions, municipal and regional governance and financing law	Transportstyrelsen (national regulatory authority)

Gothenburg's 'River City' is one of the largest urban development projects in Europe

Levers

Most urban transformation projects focus on a particular place. Even the largest development projects have limited impact on wider systems, and even in the best cases, produce unequally-distributed outcomes.

By using a Lever strategy, building with the existing 'pre-installed infrastructures' of urban environments, outcomes can scale across the entire city, and then to others. Seeing streets as an addressable element within towns and cities, the mission can use this lever to enable systemic change. This means the mission is both super-local—citizens can design at the scale of their street—and national at the same time. A coherent approach to regulation unlocks these layers, whilst an active engagement strategy ensures learning and stewardship.

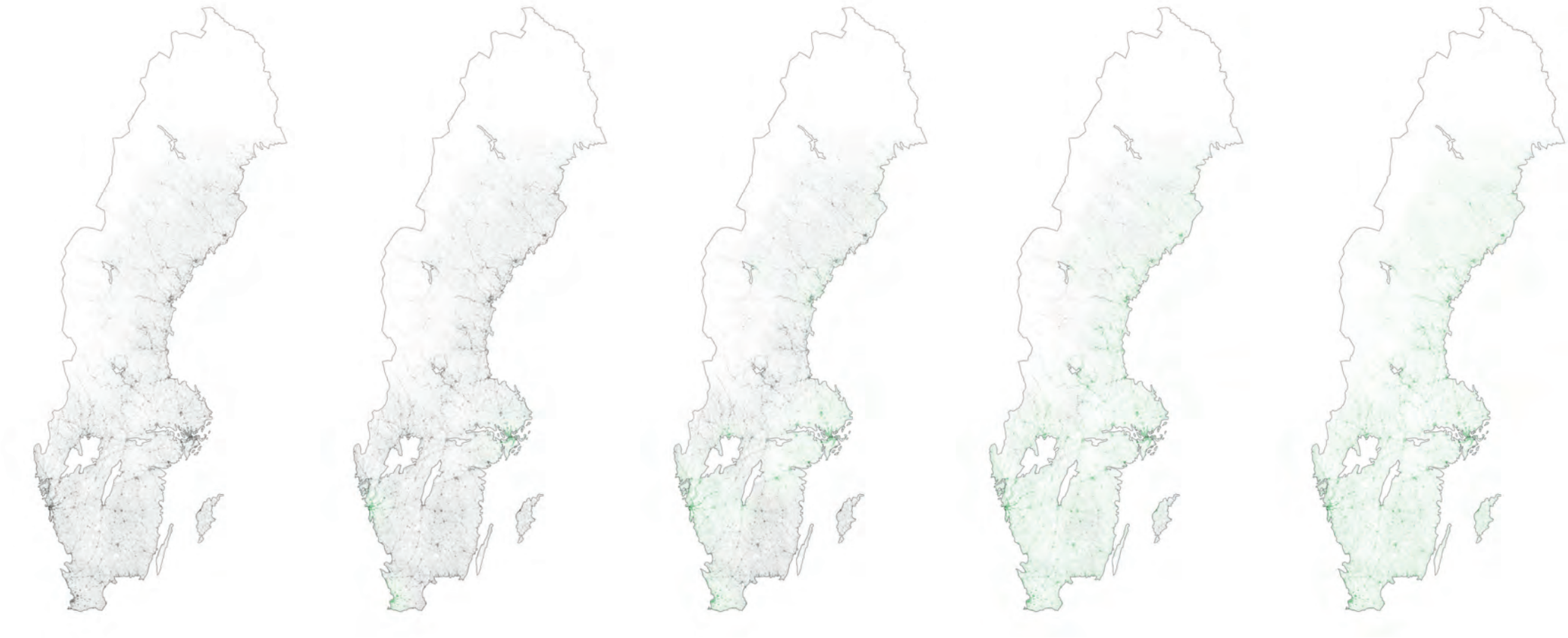


Visualisation of the streets in Gothenburg. Each street will be interpreted in different ways, of course, but each can be addressed via a Lever strategy.

In effect, this mission uses the toolkit and dynamics of tactical urbanism, working with social movements and rapid, lightweight, and adaptable components, yet with all layers of government and private sector on-board, enabling a strategic integrated urbanism at the same time.

These sketches indicate the potential at the scale of a city like Gothenburg, comparing the potential impact of regenerating single districts versus addressing the streets. The image should zoom out further, to eventually encompass all the streets in Sweden, place by place.

All the streets in Sweden, progressively moving from grey to green.



Scaling

The following pages have some early visualisations of the scaling strategies, produced by Utopia Arkitekter, indicating how a more diverse, accessible and inventive use of urban space can grow from a parking space to street to block to neighbourhood to city and to nation.

This **Lever**→ strategy enables a way of starting small, and soon, yet with potential to scale to the entire country. Meaningful spaces become addressable for innovation projects, in highly tangible ways. The humble parking space becomes a vehicle for meaningfully exploring uncertainty and ambiguity, and for generating new forms of knowledge and culture.

Strategies like this often produce the question *"But how will it scale?"* In fact, the parking space indicates the nature of scaling strategy. After all, countries all over the world have very ably scaled streets and parking spaces already. They are everywhere. So if ever there was a demonstration of a country's ability to powerfully scale mobility infrastructure, the parking space is it.

With all these spaces already built, just as the streets around them are, the Lever suggests we can simply redeploy different activities into them—the scaling function is built into cities, by virtue of these spaces having already been scaled. In fact by exerting lightweight, lower-cost layers of activity, we can move far more quickly in comparison, particularly when contrasted with all that heavy-duty, expensive and cumbersome street retrofitting that Swedish cities had to deliver throughout the 1900s. That they are a consistent layer across the country—they sit under a consistent law, coherent jurisdiction, and are largely the same form everywhere—further aids this form of intervention.

By staying close to the iterative design and delivery stage of the prototype, Vinnova is able to ensure that the systemic design possibilities remain in place, as well as scaling horizontally, as further actors from public, private and third sector come on-board, filling out all layers.

They are a **Half-step**→ manoeuvre based on relatively rapid scaling. The 'next step' of genuinely retrofitting the street will be a more difficult scaling question, yet the value generated by the Half-step can provide the financial and political impetus for those subsequent iterations. It also, following the participative approach, creates a forum for the discussion about what the more permanent moves should be: when to dig up the asphalt and start planting.

1

Street (existing)
Most of the space in this typically existing street (actually based on a street in Helsingborg) is dominated by car traffic, in terms of lanes and parking spaces. Scooters and bikes have no parking options. The street is relatively inactive. Social interaction is not supported or encouraged, due to a lack of spaces or environments for conviviality and encounter. The street is essentially without greenery.

2

Street (half-step)
The interventions typical of Street Moves and Framtidsgator are a half-step towards the North Star for the mission. The community in and around the street are involved in participation practices in order to select and refine the particular elements. Two or three boardwalks enable parking for micromobility whilst reducing space for cars. Various forms of infrastructure for social interaction and greenery are introduced. The street is rapidly transformed—and is now in motion.

3

Street (deep retrofit)
The interventions typical of Street Moves and Framtidsgator are a half-step towards the North Star for the mission. The community in and around the street are involved in participation practices in order to select and refine the particular elements. Two or three boardwalks enable parking for micromobility whilst reducing space for cars. Various forms of infrastructure for social interaction and greenery are introduced. The street is rapidly transformed—and is now in motion.

These visualisations, and on following pages, by Utopia Arkitekter

1

Helsingborg street
Before

This typical Swedish street—actually Rektorsgatan, Helsingborg—is clearly dominated spatially and experientially by car traffic. The pavements are largely without greenery, or parking for bikes, scooters, and shared vehicles, or storage for communities facilities. The street edges are lined with car parking.

2

Helsingborg street
After

After the Street Moves project has begun to shift the dynamic of the street, spaces open up for more diverse community use: social spaces, green spaces, infrastructure for shared vehicles and micromobility. The street has fewer cars but more life. In calming traffic and intensifying life, this ‘half-step’ opens the city up for a more thorough retrofit.

Social biodiverse life integrated into mobility hubs

A starting point for the mission may have been mobility transformations, such as micromobility and car-sharing, but the systemic outcomes unlocked by the mission-oriented approach mean that these interventions can also reinforce social fabric, create cultural life and repair environmental conditions at the same time. How to integrate parking for car-sharing and e-scooters, including open charge-points for electric shared cars, is a question hosted by Policy Lab processes with Transportstyrelsen. Yet the mission places them within a richer urban context, featuring newly blurred relationships between housing and street life, and biodiversity.

Public infrastructures for civic interaction

The applications that sit on top of the boardwalk's platform can be defined by the street—its residents and users—in collaboration with city authorities. This enables a balance between the expertise of the street itself (the locals), professionals, and city hall. This approach enables a diversity of applications, well beyond the typical infrastructural concerns of mobility and utilities. For instance, civic spaces, such as places for communities and neighbourhoods to gather and discuss may be key to producing the diverse yet shared identities and values we need to unlock sustainable, resilient and just transitions. The street has always had this function of informal citizen assembly; spaces like this invite these interactions.

Greenhouses for green streets

The initial boardwalk prototypes created space for extremely minimal, light-touch introduction of greenery and vegetation, if only sitting in pots rather than truly planted in the earth. Yet follow-up surveys with residents and users of the prototypes, as well as expert advice from earlier Design Workshops, indicated that increased greenery and biodiversity was particularly desirable. Few interventions produce as many positive outcomes simultaneously. Over time, the boardwalks open up the possibility of more thorough planting and growing in urban spaces, including numerous variations on shared greenhouses for the street. Linda Tegg's ArkDes installation *Infield* (2020) is an inspiration here, suggesting an informal 'meadowing' of urban spaces.

Social condensers for suburban cities

These small simple interventions can equally 'plug in' to less dense environments, from the suburban edges of large cities to small towns and villages. The simplicity and adaptability of the boardwalk means it can float into informal shared spaces, as well as parking spaces. Here, we see a stage emerging, creating a variation on the dansbana, the traditional Swedish building type for public dancing, important social spaces in small towns, especially for young people. It demonstrates how the boardwalk might 'blur' between the street and adjacent public spaces, increasing and diversifying public space. Missions provide a way of learning to work productively with this blurring, which is key to working with systems.

Reforesting Swedish cities

Streets are natural avenues

1

2

This is a speculative visualisation of Helsingborg's centre, indicating how the progressive re-greening of streets can increasingly become avenues of trees, supporting further forms of biodiversity. It implicitly recognises that we are part of nature, not separate, and thus nature must be thoroughly become part of our cities in return. The first image loosely illustrates the current tree cover around the cathedral in Helsingborg, whereas the second indicates possible coverage within existing streets.

These partly playful conception of 'reforesting Swedish cities' is drawn from the inspiration around us, such as these examples of streets in Södermalm, Stockholm. Such streets remain rarities, sadly, given the ongoing prioritisation of motor vehicles and hard infrastructures rather than the possible reorientation around what architect Julia Watson calls 'nature-based technologies' and green infrastructures.

3

These Helsingborg streets happen to be adjacent to a largely forested park to the right of the centre. Rather than the old model of 'park as a healthy offset' for the unhealthy, hard, inert areas of city elsewhere, this more advanced approach allows greenery and biodiversity everywhere, with the altered spaces, landscapes, environments and activities that implies. This approach to reforesting the city actually sees that the park becomes a concentration of that vegetation, surrounded by gradients of less dense greenery around it.

In terms of this 'reforesting' metaphor, we might learn a lot from the rich diversity of patterning in natural ecosystems, rather than the relatively homogenous monocultural approach of the industrialised forest. Intriguingly, in discussions with Josefina Oddsberg of the Swedish company Bee Urban, the team discovered that bees appreciate straight lines, like avenues, as over centuries bees had learned that there is a rich biodiversity amidst the rough straight lines where forests hit agricultural fields. This suggests the idea of a bee-centred design of cities, which may fit within and around our existing street grid patterns.

Learning from these projects, as well as similar provocations like Linda Tegg's *Infield* installation at ArkDes, which grew an urban meadow in the parking space outside Moderna Museet/ArkDes throughout 2020, we see that these street projects can ask meaningful questions about the value of a nature-centred redesign of our cities.

Four paroles for Swedish streets

Modifying Holger Blom's 1946 parks programme

1 The street ***loosens up the city,*** constitutes a network through the city, lets in air and light, is a protective belt against fire, creates edges to different parts of the city and gives them individual character, and serves as an environment for solitary buildings.

2 The street ***offers space for outdoor recreation,*** is an active area serving all ages, works as a playground or as campground, enables sports, and offers recreation as well as rest and repose.

In 1946, Stockholm's first city gardener, the architect Holger Blom, produced a parks programme for the city, describing four paroles—or public promises—for the parks. The programme was conveyed to the public in an illustrated leaflet distributed by mail to each household in Stockholm. According to Thorbjörn Andersson, the paroles addressed the planning issue, the public health issue, the social issue, and the conservation issue, indicating clearly and precisely how place-types and design patterns can unlock multiple systemic outcomes. There are echoes of Blom's diverse roles for the Stockholm park in this mission's reframing of streets as healthy, sustainable, convivial and natural environments. We have taken the liberty of appropriating Holger Blom's four paroles, simply substituting the word "parks" for "streets" above. Blom's work, produced with his lead designer Erik Glemme, was of such quality and distinction that it became known internationally as the Stockholm Style. What could be the equivalent for Sweden's streets?

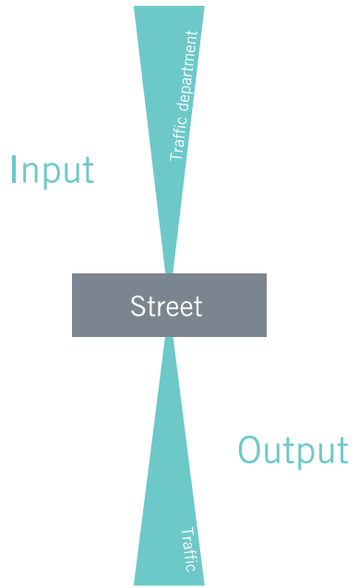
3 The street ***is a gathering place;*** it brings community in the urban realm through activities such as religious services, concerts, demonstrations, parties, and dance.

4 The street ***preserves nature and culture;*** it features original as well as new designs, from the single tree to full landscapes, and old monuments as well as contemporary artwork.

Reproduction of the leaflet to Stockholm households visualising the four paroles of Holger Blom's parks programme (1946), from Green Visions: *Greenspace Planning and Design in Nordic Cities* (2021)

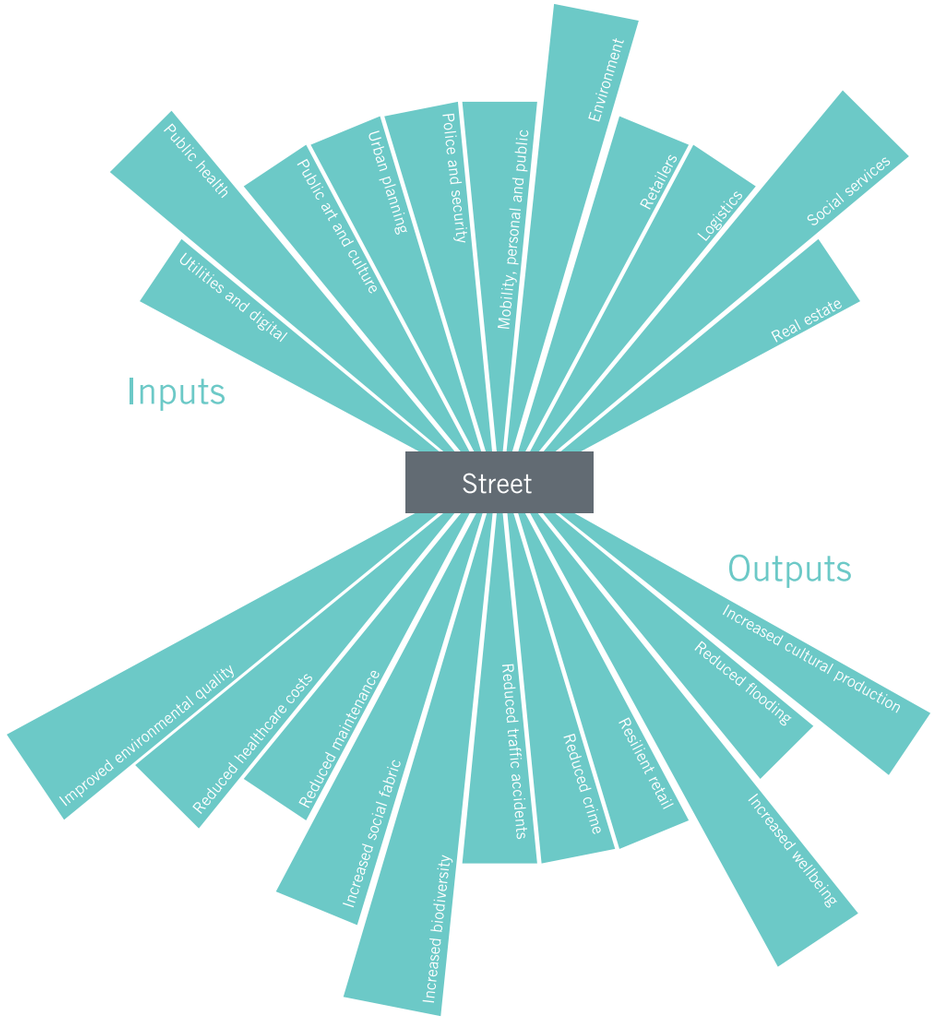
Value models for the Street

Using the idea of multiple **Lenses**→ we can see the new forms of value unlocked by moving the Street from being seen largely as the domain of traffic, and thus managed accordingly. If the traffic department is given primary responsibility for the street, the street tends towards traffic, just as historical evidence reveals that virtually all road-building programmes designed to ameliorate traffic actually induce traffic. But the street is not about traffic. If the street was given to gardeners, would it be gardens?



In reality, of course, the street involves many systems beyond simply traffic, such as plumbing and water management, broadband infrastructure, and in some cases, sustainable urban drainage systems and other green infrastructure, Yet in most cases, these are infrastructural in nature, and largely designed to not impinge upon traffic flow. They do little to transform the street.

By involving and emphasising different 'inputs' (people, organisations, and policies) in the question of the Street, and bringing together these various lenses in holistic, multi-perspective place-based interventions, many forms of value can be unlocked.



Outcomes and value: clues to pursue

Underpinning the value model, research collated by the mission team and its collaborators suggests a wide range of potential outcomes unlocked by enabling the street to fulfill its promise. By shifting the focus away from traffic management, the street is allowed to breathe, revealing a place capable of producing meaningful and rewarding complexity, across numerous variables and outcomes.

Collating this research provides an analytical backdrop for the investigation work, and particularly the value model, as well as immersing the collaborators in the subject matter. Yet each research item suggests or reinforces angles too, diversifying the possible interventions by suggesting a wide range of outcomes.

For instance, in 2020 the consultancy Ramboll was commissioned by various Swedish government agencies to produce a report on the possibilities of integrating environmental health benefits alongside socio-economic analyses, in the context of planning the built environment. This report, alongside many others, was absorbed into the value model thinking.

Although such pre-studies can be outsourced to the external research community, academic or otherwise—and indeed research was commissioned, and sourced from existing summaries—there is also value in the mission teams doing this collation themselves. It develops the diagnostic and analytic capabilities amongst the collaboration team, whilst also cultivating the instinct for detective work necessary for systems design. A simple shared document became an open repository of research relating to the street, from numerous aspects.

The balance to strike is the ability to dive deep into a subject matter area—for instance, the impact of urban green spaces on the amygdala-cingulate circuits of the brain versus the political science underpinning citizen participation versus the carbon saved by coordinating e-commerce deliveries—whilst ensuring that the overall holistic co-benefits of the entire jigsaw puzzle are being addressed.

As the mission develops, existing academic research from disparate areas can be aligned, unified by the complex object of the street, as well as identifying new areas for joint or transdisciplinary research.

Measuring and motivating for impact

The following pages indicate how this research might be brought to bear around the mission, suggesting potential outcomes and metrics. These are organised into clusters of outcome—*Biodiversity*, *Health*, *Commercial*, *Environmental* and so on.

They indicate a way of working with the Global Goals too, ensuring that they can be mapped against interventions in various configurations, rather than inadvertently driving projects into silos.

In the second phase of the mission, from late-2021 onwards, the Value Model is being specifically pursued as a specific project within the mission portfolio. Working with multiple academic researchers—both systems and domain specialists—the project will develop a theoretical framework under this richer understanding of value created by reimagined streets, as well as pragmatic tools for use by citizens, civil servants (planners and otherwise) and politicians. The idea is to create a tool which brings together a holistic understanding of all the value generated by these interventions, such that it provides the impetus for making these interventions, and scaling them, as well as measuring (via real-time data drawn from sensors on the Street Moves boardwalk, and otherwise).

This key project within the mission was being initiated by Vinnova at time of writing.

The tool needs to motivate change, as well as measure it. Many of these streets generate large revenues for municipalities, via private car parking fees going into municipally-owned parking companies. This money is valuable, in a sense, but it is also tainted—due to its associated costs in terms of carbon, public health, justice, environmental degradation, land-use, safety and so on (in fact the cost is far greater than the revenue). This mission has to develop a new understanding of value, public and otherwise, which is greater than the sum of the parking fees, conveying this via practical decision-making tools as well as enhanced awareness and capability.

Swedish councils made at least 2.4 billion kronor in parking fees in 2018, an increase of 50% compared to 2014, according to a 2019 report by Sveriges Radio. (The actual figure may be higher; not all of Sweden's 311 local and regional councils were able to state their exact parking fee revenue). Although this revenue is linked to unsustainable practices, municipalities will need to be weaned off it. In fact, the Value Model should indicate the potential total value is far greater and more diverse.

Street

Biodiversity
Increase in natural sounds in urban greenery leading to increase in mental health
Increase in residential greenery leading to increase in birthweight
Increase in birdsong leading to improved recuperation from sickness
Increase in bird species diversity leading to increase in life satisfaction
Reduction in motor vehicle use and decrease in microplastics in seas and oceans
Increase in nearby green spaces leading to increase in walking maintenance
Decrease in road traffic noise and increase in birdsong leading to increase in mental health
Increase in local biodiversity leading to decrease in urban heat island effect
Increase in local biodiversity, leading to increased air quality, decreased noise
Increase in active travel leading to increase in mental and physical health and wellbeing
Increase in community gardening leading to increase in mental and physical health and wellbeing
Decrease in urban heat island effect leading to decrease in early deaths
Increase in air quality leading to increase in mental health
Increased environmental outcomes via shared electric mobility infrastructure
Environment
Increase in sustained connection to nature leading to associated benefits to happiness, health, and pro-nature behaviour
Decrease in domestic violence due to nearby natural landscapes
Increase in neighbourhood tree cover leading to better overall health mediated by lower obesity and better social cohesion
Maintenance
Increase in biodiverse perennial meadows increasing residents' perceptions of site quality in urban green space
Health and wellbeing
Decrease in stormwater-related maintenance costs through increased green infrastructure
Decrease in child deaths due to decreased car use near schools
Decrease in road traffic accidents with reduction in motor vehicles and decrease in traffic speed
Decrease in maintenance costs through shared management
Increase in active travel and decrease in motor vehicles leading to carbon reduction, increased air quality, decreased noise
Increase in sustainable timber street furniture, versus concrete, leading to increase in carbon sink and decrease in carbon dioxide
Lively, activated streetscapes and facades lead to increase in positive affect and lively, attentive nervous system, and decrease in poor mental health
Increase in physical activity and decrease in cardiovascular diseases
Increase in air quality leading to decrease in early deaths
Property
Increase in property value (if desired) due to walkable environments
Increase in urban trees leading to decrease in building air conditioning and increase in worker productivity
Increase in mental and physical wellbeing leading to reduction in healthcare costs
Increase in retail and office rental value and occupancy levels via green, walkable environment, without increase in housing rent
Physical activity
Greener play areas boost children's immune systems
Increase in active travel leading to improved immunosurveillance against pathogens
Reduction in car use and decrease in brain cancer
Increase in active travel leading to improved immunosurveillance against pathogens
Learning
Increase in childrens' social mobility in walkable neighbourhoods
Increase in publicly-accessible neighborhood nature increases sense of community
Social fabric
Community participation improves perceptions of pedestrian environment and neighborhood safety, and decreases stigma toward individuals with mental health or substance abuse challenges
Commerce
Increase in active travel and walkability, and reduction in cars, leading to increase in retail spend
Carbon reduction and increased environmental outcomes via coordinated e-commerce delivery
Sustainable shared and equitable infrastructure for micromobility technologies
Reduced road capacity for private cars leads to overall reduction in traffic and housing costs, and increased economic return through reduced congestion
Increase in residential green space and access to nature beneficial for intellectual and behavioral development of children living in urban areas
Increase in childrens' play and sociability in play streets
Increase in trees and natural landscape leading to decrease in crime and reduced fear
Increase in dwell time leading to increase in social interaction leading to increase in mental health and wellbeing
Improvement in community participation and municipal governance via public prototyping of civic tech platforms
Increase in social infrastructure leading to increase in social interaction and increased community resilience
Increase in social interaction leading to reduction in social care costs

Governance

Working Running the Streets mission

This evolving structure defines how governance for the prototyping process sets up a broader governance model for Systems Demonstrators, capable of scaling, learning and adapting.

Note that this is how the mission board could develop around the Streets mission. The initial projects embody these relationships, but no board was formalised beforehand. This can follow, as per the 'snowball' method.

Overall steering, guidance, and advocacy, including stimulating public awareness. Includes link to other mobility systems and opportunities, and broader urban contexts, as well as international engagement. Overall goal setting.

Mission board
e.g.
Vinnova, ArkDes
Transportstyrelsen
Folkhälsomyndigheten
Drive Sweden, Viable Cities
SKR
etc.

Expert group
e.g.
Nordic Micromobility
Voi
Volvo M
Ericsson
etc.

Industry and civic society stakeholders and academic researchers. Initiated on-demand.

Manages prototype and demonstrator calls and delivery. Features ArkDes as overall coordinators, Vinnova as system mobilising and financing, and Transportstyrelsen alongside other national, regional, and municipal actors. Coordinates support for design and strategy.

Project team
e.g.
Vinnova, ArkDes, Drive Sweden, Viable Cities Stockholm, Helsingborg, Gothenburg, Malmö, Umeå etc. Stockholm Region, VGR etc.

Policy labs and other external design and delivery services
e.g.
Lundberg Design Utopia Ark. Spacescape
etc.

Tools and processes for addressing policy and regulatory issues, service design, innovation management etc. Procured as required.

Local mission boards replicate the functions of national mission board and project team but at the local level, managing multiple prototypes as they develop into Systems Demonstrators. They are coordinated by national project team, which ensures learning is shared across local mission boards.

1 Stockholm Local mission board

2 Gothenburg Local mission board

3 Helsingborg Local mission board

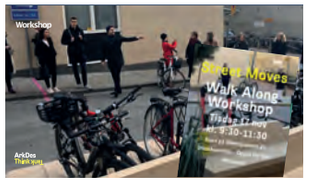
Scales to multiple systems demonstrators, coordinated by multiple local mission boards, over time.

1 Systems demonstrator P P P P

2 Systems demonstrator P P P P

3 Systems demonstrator P P P P

ArkDes ThinkTank coordinated the embryonic mission board in the first phase of the mission.



As well as project meetings, they ran study visits and workshops for the mission stakeholders.

Governance

Evolved governance model

This mission governance model allows processes, structures and ideas to be sketched, based on insights generated from the ground. It will likely suggest two layers of 'codebase' within the system, which may need new governance arrangements.

Regulatory and policy codebase
New or transformed system actor TBD

Design codebase
New or transformed system actor TBD

Linux open source model	Streets open source model
Linux codebase	Street policies and regulations
Linux kernel mailing list	Mission Board, possibly evolving into governance entity
GNU General Public Licence	Boardwalk specifications, plus related protocols
Git	Project Team gaining insights from instances and testing new directions
Linux developer community	Community and city-led projects on the ground, inventing, testing, learning

Over time, the governance model of the Mission Board enables a series of system actors to come together to collectively and holistically address necessary or probable regulatory challenges regarding elements of the Street. These might be questions of parking space law, municipal budgeting, shared car infrastructure and so on. Equally, shared policy approaches can be developed at this level. This is the highest-level overview responsibility for the mission, acting as an 'umbrella' over the Street, deploying Policy Labs and Regulatory Sandboxes.

Amongst other things, the codebase at this level involves managing the open source 'kit of parts' for the boardwalk. Loosely, a metaphorical equivalent would be the Linux kernel mailing list managing the Linux codebase, with clear guidelines, modification and review processes, an active developer community, and around which public licenses can be issued.

The 'code' in this case is a set of drawings and specifications for physical boardwalk elements, production standards and quality assurance approaches, stipulations as to material choices, standards and guidelines around digital elements, participation processes, and so on. In fact, this would mean managing and iterating many of the system layers in the platform model.

Managing this would involve checking in modifications into 'the code'. This means actively learning from each iteration, which requires some capability for engaging on the ground, liaising, observing and understanding each deployment. It would also entail ongoing documentation, training, promotion, communication, international collaboration, and so on. Just as with code and coders, professional urban designers and architects have significant impact on how the code is interpreted—and yet the system is also open to others. There is even the possibility of public or 'civic tech' to support communities, equivalent to Github Copilot's AI-supported services—but for urban design in public, shared spaces.

This approach also means progressively introducing additional elements into the models being tested i.e. those aspects of the system concept not yet trialled. For instance, as the project develops the digital characteristics barely discussed in the first phases, actual public code policies and tools must also be taken into account.

During prototyping, these functions are split across the Project Team, with the national agencies Vinnova and ArkDes acting as 'glue' elements to ensure a systemic approach. Yet the outcome of the mission would ideally be to create a transformed governance environment which can manage this system as, almost by definition, it does not fit into the existing system.

This could be a new agency—a 'Street Agency'—but if it is entirely new, it should transform, remove, or merge existing agencies. This is not easy, for obvious reasons. But this is why a collaborative evidence-generating approach is necessary. Equally, it could be a transformed existing agency, taking on this new form of responsibility. Either way, this approach to governance, allied to prototyping in real world environments, allows this role to be sketched out via practice and engagement, in order to better inform its eventual design.

What happened next

The first phases of the ***Street Moves*** prototypes, and the associated activities and relationships they initiated, were hugely successful in terms of articulating what a ***Streets mission*** could be, and what it could produce. The existing Framtidsgator project had contributed highly valuable policy insights, as well as complementary prototypes.

But alongside Streets, other missions were being developed, cultivated from the seeds planted in the first Actors Workshops in 2019. By 2020, the Grid mission was pursued at scale, addressing the electrification of heavy logistics vehicles via the major project ***Reel***, which brings together a large consortium of private and public partners, also heading for prototypes and demonstrators in the west of Sweden. The grid for lighter vehicles, including its connection to streets, buildings, and neighbourhoods, was also picked up and developed in 2021, under an initiative called ***Charging the Street.***

By late 2020, Vinnova had also commissioned the Gothenburg-based CLOSER collaboration platform to pull together system actors around retail and e-commerce, beginning to flesh out the the Shop mission.

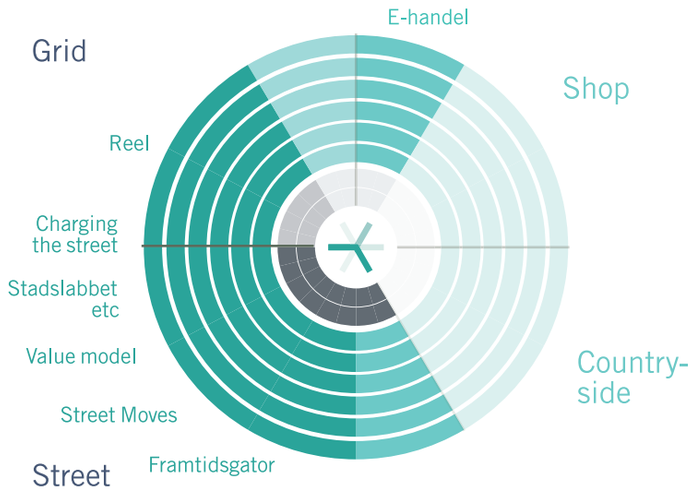
Smaller projects, such as Vinnova-funded 'civic tech' initiative led by Utopia Arkiteker called ***Stadslabbet***, can also be seen circling around the mission. In fact, the 3D models of *Street Moves* kit were used by Utopia to populate their augmented reality app, creating a directly meaningful link across previously disparate projects.

The mission-led approach enabled Vinnova to use Streets as a kind of 'umbrella' binding multiple projects together in this way, as envisaged, bringing together a portfolio of projects around shared concerns. The platform strategy also enabled the agency to understand how projects might fit together to form a systemic approach. Some projects, such as *Stadslabbet*, could focus on citizen engagement tools, whilst others, such as *Framtidsgator*, could focus on planning policy and capabilities, whilst *Street Moves* would lead on the urban design questions.

These different pieces of the puzzle could begin to align, via shared place-based initiatives.

Yet although it was beginning to yield early and promising results, this portfolio- and platform-based approach is uncharted water for most innovation agencies, including Vinnova. There are few tools in place to coordinate such portfolios, and the culture of government agencies can sometimes appear to reward a proliferation of individual projects, spread thinly, rather than integrated system-led approaches.

Yet the **Streets** mission had taken meaningful steps forward, and by mid-2021, a larger **phase two** for both *Street Moves* and *Framtidsgator* was confirmed by Vinnova. These broaden the range and diversity of activity in these and associated projects, as well as increasing the number and diversity of cities on-board. So, with *Reel* and *Charging the Street* also progressing Grid, and early work on e-commerce under way, the 'grand challenge' of **Healthy Sustainable Mobility** was being approached by several missions, articulated via multiple prototypes, and a system beginning to work as one.



The 'mission status' diagram, at high level, shows how the Street mission is being pursued by several projects by November 2021, each aligned. The projects were funded by both *Mobilitet* (Mobility) and *Hållbara samhällsbyggnads* (Sustainable community building) areas at Vinnova, bringing together different teams and budgets around a shared mission portfolio. Grid and Streets are clearly the most advanced of the missions emerging from the initial engagement work.

In order to care, we have to believe in the future not only as a chance but also as a risk. Only in the light of risk—only in the light of possible failure or loss—can we be committed to sustaining the life of what we value.

Martin Hägglund

School food

Ensure that every student in Sweden eats sustainable and tasty school food by 2025.

How can we rapidly transform our public health, our land-use and our environment, our use of resources and our social fabric, in order to produce clean, restorative, healthy and just outcomes? How do we ensure that people and place are at the centre of this change? How might we use our existing public school system as a platform to rapidly and powerfully address climate resilience, public health and social justice combined? How could this build new cultures for policy, planning and participation? What new value, or values, are lying latent within our existing school food cultures?

School food accounts for almost half of all the meals served in Sweden every day. Excluding staff meals, that's over two million meals. A further 700,000 are served in related food systems, for aged care and leisure. We spend 7 billion kronor per year on school food. This public food system is well-regulated, but largely oriented around cost and hygiene. Could this 'national kitchen' be oriented towards other goals too? Could we reimagine this cost of school food as an investment? What would be the richest and most diverse potential public return on that public investment?

Food is a particularly powerful ‘material’ to work with, from a missions point-of-view: it is a clear example of a complex adaptive system in everyday life, for everyone, everywhere.

Food is at the heart of the most fundamental mundane acts of living that we must perform several times a day. Yet it is also cultural expression, an articulation of identity, of place-based diversity, of rituals and celebrations, long histories and possible futures. Food is deeply political. Food transforms our landscape and ecosystems. Food is a large economic sector, a vast industry. Food is an afterthought for some, a mere obligation; yet it is a passion for others, a lifelong pursuit of craft. Food embodies the several meanings of the word ‘culture’, in that it is embedded in everyday patterns of living, as well as in practices of cultural production and self-expression, embodying what we stand for.

There is an undeniable pattern in the sum total of all those old stories from around the world, indicating that sedentary lifestyles and cultures that do not move with the land or mimic land-based networks in their social systems do not transition well through apocalyptic moments.
—Tyson Yunkaporta

Yet food can also be understood through the technical lenses of nutrition and human biology, engineering and logistics, production and trade, land-use and planning, soil and water health as well as public health. It is industry as well as entertainment, cultural diversity as well as biodiversity.

Given interconnectedness, shift the food system and we shift almost all other systems. So, where to start?

We chose to start with food on a plate at a school. In Sweden, school food provides a powerful leverage point within these broader systems. School food is largely controlled and managed by the public sector, which makes it conducive for sending clear directions. School food reaches almost all the country’s children

and young people every day, five days a week for at least ten years of their lives. If we broaden this to college campuses, and other forms for public food, and those involved in making school food happen, it is a vast system of systems, half of all food served every day.

Municipalities buy this food for SEK 5-10 billion per year. Rather than seeing this as the cost of school food, we can see it as an investment in health, environment, education, social fabric, enterprise, institutional trust, and more besides. At this scale, a transformed school meal system can act as a lever to change not only the wider food system, but multiple connected systems.

Our vision is that every child in Sweden eats sustainable, healthy and tasty school food. We achieve this by designing and enabling school meal systems that explicitly contribute to social, ecological and economic sustainability; locally, regionally, nationally, internationally.

As today’s food systems strongly contribute to the major environmental threats we face, food has a key role to play in sustainable development, entailing a major shifts in both production and consumption. Here, public kitchens are important players, given the volume of food that is purchased and produced. But they can also contribute by changing attitudes and behaviours towards sustainable and healthy eating habits.

This provides opportunities for working with food waste, dietary choices, cultural identity, local economies, and many other aspects of behaviour and culture.

According to Björklund (2016), healthy eating habits are in many cases also the most environmentally friendly. Environmental and health benefits come with the purchase, essentially.

Public meals intended for children can also be seen as an educational opportunity where children learn about food cultures and meal habits (Sepp, 2017). Equally, kids who eat good food may also perform better academically.

In Sweden, all children in primary school are served free school meals, with the hope of educating healthy children. There is good evidence that mealtimes eaten in preschool and school can positively influence children's eating habits and preferences (RISE).

So improving the school food that we are already procuring may increase health outcomes, learning outcomes and sustainability outcomes, all at once.

This makes it a good example of the adaptive design principle discussed previously: of working with existing infrastructures and investments, and 'bending' the money we are already spending, and our policy and delivery focus, towards a richer set of outcomes.

Given the nature of these challenges, if we can use our public procurement and service delivery in order to produce meaningful public health outcomes and transformed attitudes and behaviours around sustainability, across entire generations, the return on investment will be significant.

Equally, the position and purpose of the school in its neighbourhood, and community around, might

also transform through this engagement. Schools are archetypal social infrastructures, and full of tools, techniques, spaces and services which are not only useful to their core purpose of education during the traditional school hours, but could also be of use and value to a community 24/7.

How might school food interact with the other food systems in its community? Are their opportunities to combine with other public meals, for elderly care and equivalent? How might food waste from the school be used not only on its own gardens, but those in the neighbourhood around? Equally, might school food gardens be made available as a more open community garden? Could the useful and attractive specialist equipment in school kitchens be used for community purposes, like after-school-hours cooking clubs, or preparing food for street parties? Could the school grounds host farmers' markets at the weekend? And so on …

Unlocking the diverse potential of school as social infrastructure is core to this mission. The mission approach allows us to combine these previously disparate functions, and their often separated governance agencies. The place-based approach, focusing on the school and its surrounding networks of communities and 'foodsheds', allows a 'creative collapsing' of silos and systems into better integrated systems demonstrators.

Food is the way-in, not only to nourished bellies and minds, but also to powerful everyday examples of how we might transform complex adaptive systems.

Every school-house should be a temple, consecrated in prayer to the physical, intellectual and moral culture of every child in the community … for here the health, tastes, manners, minds and morals of each successive generation of children will be, in a great measure, determined for time and eternity.
—Henry Barnard, School Architecture of Contributions to the Improvement of School-Houses in the United States (1850)

Across the developed world, and increasingly in the developing world, the school sits at the very heart of its local community. It is not just an institution of learning but a place that shapes and guides the knowledge, capacity and experience of young lives. — Julie Willis, 'Architecture and the School in the Twentieth Century', in *Designing Schools: Space, place and pedagogy*, Kate Darian-Smith and Julie Willis (Routledge, 1997

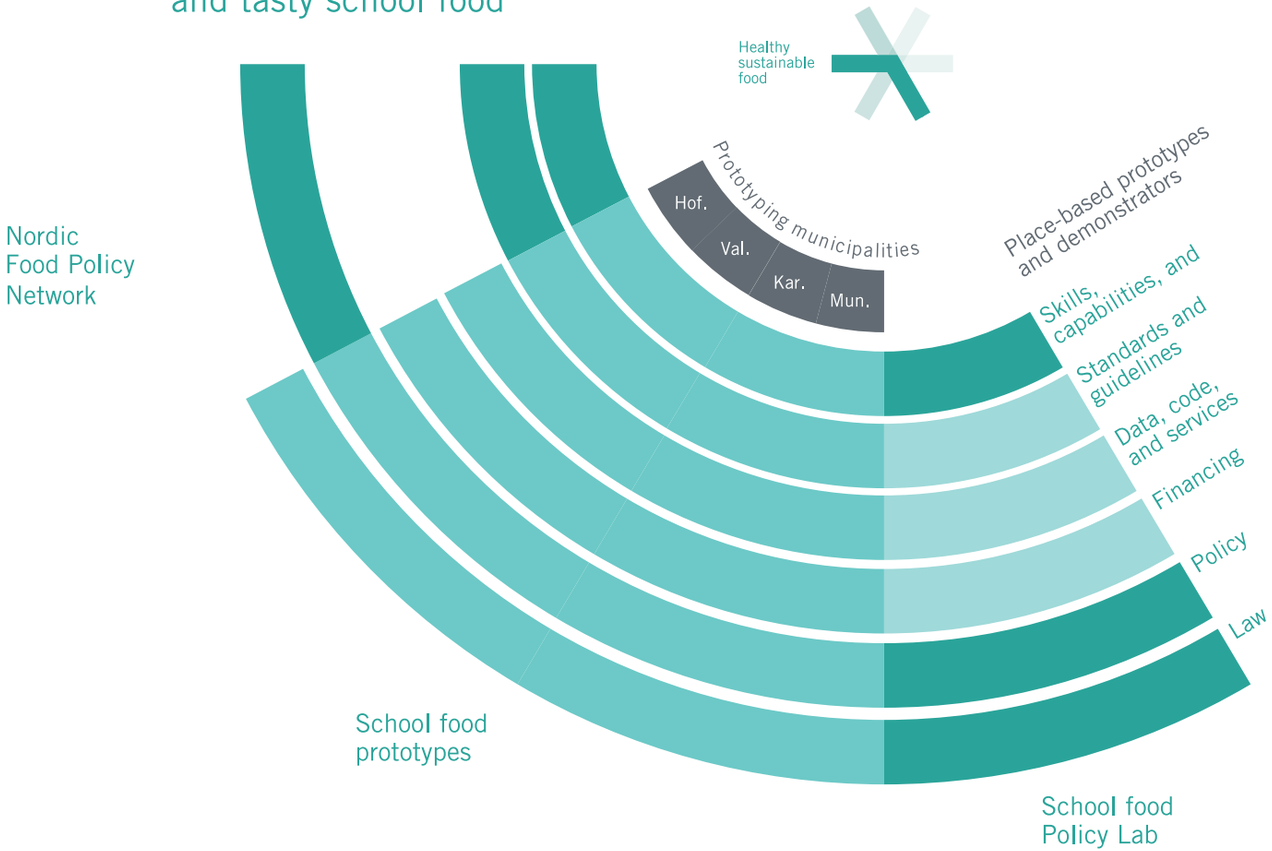
Farm

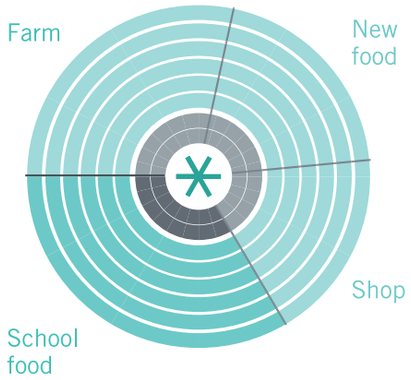
New food

Healthy sustainable
food mission #1

School food

Ensure that every student in Sweden eats sustainable and tasty school food





Shop

Concept design for prototypes

The participants in the Design Workshops helped articulate various different components involved in a prospective school food mission. As described previously, subsequent synthesis by the Vinnova team, chunking and identifying patterns and types, led to a portfolio of concepts, below. These helped organise and shape initial thinking about prototypes, and then demonstrators—they are some of the key components of a transformed school food system. They enable an individual focus on key elements, yet also suggest how they can be tied together i.e. How a *Contract* can procure food from *Farms*, using the insights from a *Database*. That food stocks the *Pantry*, which is combined into *Meals* via a *Cookbook* in the *Kitchen*, and so on. The *Forum* provides a different kind of participative governance and steering mechanism across all aspects. Yet describing as discrete elements also enables each to be addressed in detail, with those system actors responsible or relevant.

Farm

Enable local producers to produce for and deliver to schools, integrating farmers into education. Also, food growing on and around the school.

Database

Free and open database and tools for traceability about the climate and health impact of different food, meals and processes. Shaped by Contracts and Forum.

Pantry

Prerequisite for Cookbook and Meal, with ingredients shaped by a 'budget' for health, sustainability and taste, underpinned by the Database.

Cookbook

Cookbook enables chefs and students to prepare and cook tasty, sustainable and healthy food, as well as integrate food into education across the curriculum.

Kitchen

New approaches to kitchen spaces and equipment which provide 'open kitchen'-like access, enhancing learning and Meal experience.

Meal

Different spaces, durations, cultures and formats for the meal, improving take-up rates, social interaction, and learning outcomes.

Forum

A participative and active governance entity shaping Contract and activity, comprising students, parents, cooks, teachers, and municipalities.

Contract

New forms of procurement and contracting for multiple outcomes. Managed by the Forum, it stocks the Pantry and shapes the Kitchen.

Prototype #1

Skolmat prototype call

Running these workshops for school food not only co-produced a clear sense of the possible goals, but also created a wide network of stakeholders and other interested players. This, alongside the mapping presented over the following pages, helped prepare the ground for Vinnova and Livsmedelsverket to work together on a call for partners for prototypes.

The call concluded in early 2021, with four municipalities chosen to move to prototyping stage. These prototypes are detailed later, although only in high-level. Each team produced detailed evaluation of the prototypes in action, helping inform the next stages of development. Those results are not detailed here, but will be widely published by the municipal project teams, as well as Livsmedelsverket and Vinnova.

The initial school food concept design emerged from Design Workshops with mixed groups of system actors. One workshop was held at a Stockholm school—Global Gymnasiet—and the participants ate lunch with the students, before hearing from the school cook, Magnus Naess, about the school's transformation to a largely plant-based menu.

01 Farm

Description

Enable small scale producers to produce for and deliver to schools, integrating farmers into education, as well as unlocking the possibility of producing food on and around school premises, with shared logistics.

Research questions

- *How many schools are buying their food from local farms?*
- *Can local producers be directly connected to local schools under current procurement policies?*
- *What are the patterns of logistics for small, local producers? What other local actors would benefit from sharing logistics with schools?*
- *What legislation exists regarding growing food on school properties?*
- *How many schools have direct relationships with farms?*
- *Learning outcomes from closer relationships with farms?*

Examples

- Pixel farming, Wageningen University
- EU BioCanteens programme
- Amsterdam Healthy Weight Programme (AHWP)
- Ridgedale Farm AB
- Garveriet, Floda
- Vegibus, Japan
- Edible Schoolyards movement
- emmajord.se
- SESAM, University of Copenhagen
- New Jersey Farm to School programme

02 Database

Description

A free and open database, with associated tools, to access and explore information and traceability about the climate and health impact of different food, meals and processes. Shaped by Contracts and Forum.

Research questions

- *What food databases take environmental (biodiversity and regeneration as well as pollution and carbon) and health factors into account?*
- *How to coherently manage open source and open access database around traceability?*
- *What standards to measure traceability?*
- *How should data be produced, collated and communicated?*

Examples

- Carbon Cloud
- RISE database
- WWF One Planet Plate, Eat
- Lancet Nordic food recommendations
- Saltå kvarn: Toolbox for Planetary Boundaries
- Foundation for Public Code

03 Pantry

Description

The foundation for school food, providing the prerequisites for Cookbook and Meal, with ingredients shaped by a 'budget' for health, sustainability and taste, underpinned by the Database.

Research questions

- *How do schools have control of their 'Pantry'? How many schools make food a priority within the school's steering documents?*
- *What are the standards and criteria for procuring food (ingredients, crops, prepared food, equipment etc) into the school, and how are students, staff and cooks involved?*
- *How could a sustainability and health 'budget' manifest itself within the school?*

Examples

- Amsterdam Healthy Weight Programme (AHWP)
- Washingborough school, UK
- New York City banning processed meat in public schools
- Food for Life scheme, UK
- Bydel St. Hanshaugen district of Oslo serve 50% organic food, meatless hot dishes and fish in all kindergartens

04 Kitchen

Description

New approaches to kitchen spaces and equipment which provide 'open kitchen'-like access, enhancing learning, cooking and discussion, and including connections to local producers and community. Can include growing food in and around the kitchen.

Research questions

- *How could changing cuisines and food practices change the design and delivery of kitchens?*
- *How many receiving kitchens versus cooking kitchens in Sweden? What is the decision-making process here?*
- *Can kitchens be used by surrounding communities? How many already do this?*
- *How are kitchens audited and managed?*

Examples

- Washingborough school, UK
- SESAM, University of Copenhagen
- New Jersey Farm to School programme

05 Meal

Description

Enhancing the meal experience, exploring different spaces, durations, cultures and formats, in order to improve take-up rates, health, social interaction and educational outcomes, linked to Kitchen and Cookbook. Could include educational and practical aspects of gardens, service design and restaurant interiors.

Research questions

- *What various approaches to meals are in place in Sweden (duration, dynamics, spaces, organisation, cultures?)*
- *What are the various patterns of menu in Sweden? What are student perceptions of menu, and menu choice?*
- *How much food is thrown away, and where are there good examples of re-use?*
- *What are educational benefits of good school food? How much impact does it have?*

Examples

- Washingborough school, UK

06 Forum

Description

A participative and active governance entity that enables a systemic view for school food, via contracts, procurement and skills, comprising students, parents, cooks, teachers, municipalities, and others.

Research questions

- *What existing networks, councils and forums exist in schools that could be built upon to create the Forum?*
- *A Forum at what level: national, regional, municipal, neighbourhood, school?*
- *What initiatives, or similar ideas in other areas, exist today?*
- *What intrinsic value and impact does active participation have?*

Examples

- Skolmatsakademin
- Livsmedelsverkets forum
- EU BioCanteens programme
- Amsterdam Healthy Weight Programme (AHWP)
- Washingborough school, UK
- SESAM, University of Copenhagen

07 Contract

Description

New forms of procurement and contracting, predicated on enabling quality, learning, sustainability, and health, as well as cost. Managed by the Forum, it stocks the Pantry and shapes the Kitchen.

Research questions

- *What new approaches to contracting and operating kitchen spaces and equipment could provide 'open kitchen'-like access to local producers and community?*
- *What outcomes-based contracts could be deployed around school food, around which outcomes?*
- *How could savings from health outcomes produced by school food help fund school food?*
- *How do we manage for subjective and qualitative criteria, such as taste, enjoyment, engagement, and satisfaction?*

Examples

- Schools in Chile are no longer allowed to sell ultra-processed foods
- Amsterdam Healthy Weight Programme (AHWP)
- Washingborough school, UK
- Good Food Purchasing Program, USA

Systems mapping

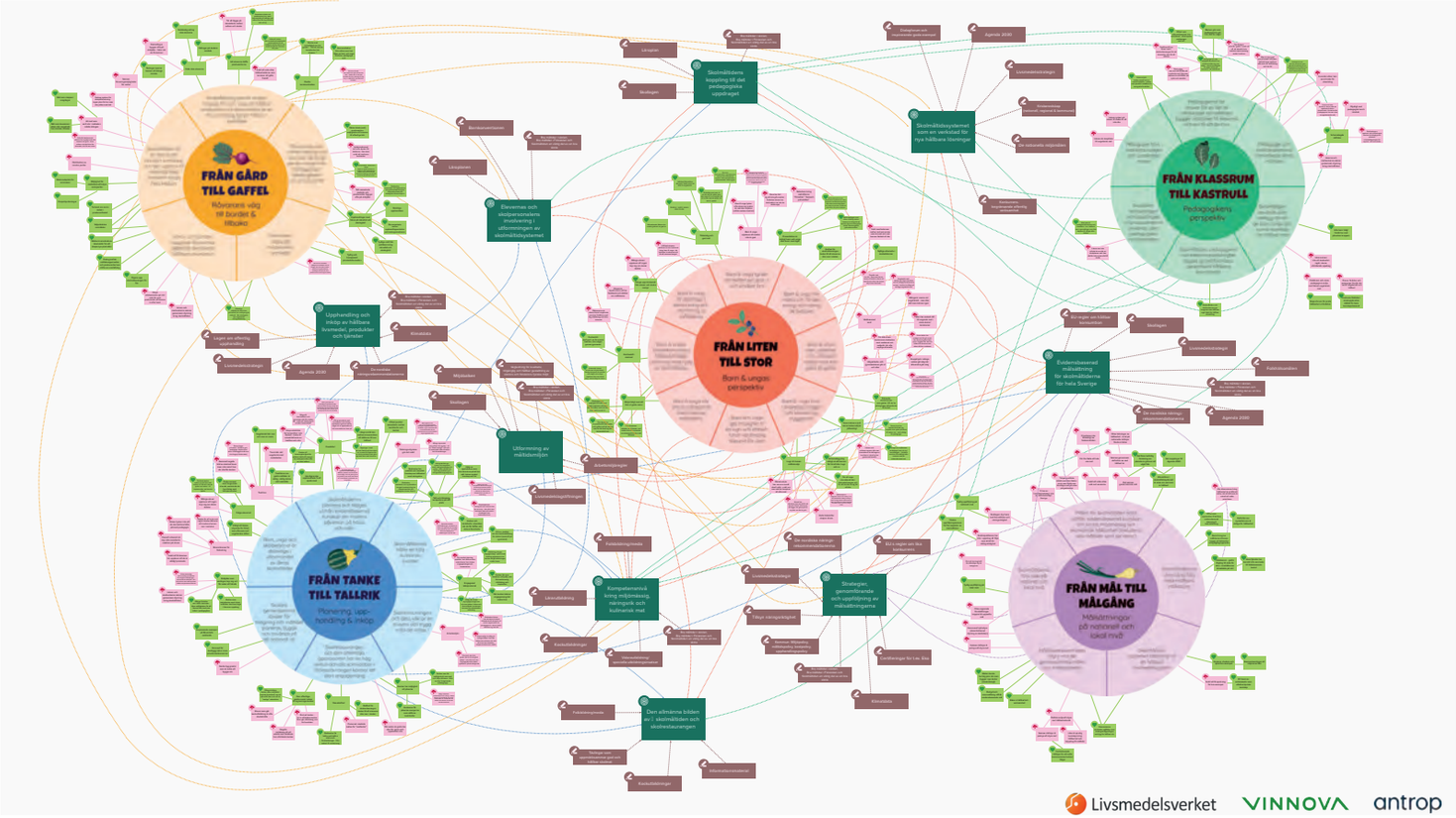
The School Food mission team, led by Vinnova and Livsmedelsverket, commissioned an initial 'policy lab' process from the Swedish design firm Antrop. (This joint procurement by both agencies together is in itself a relatively unusual act).

After over 80 deep interviews, and several stakeholder workshops, Antrop built a form of systems map, producing an informative portrait of the landscape around school food derived from many interviews and workshops. Thus it is a variation on the 'living system maps' produced for the Mobility mission theme. Yet rather than focus on the technologies and capabilities in the system, it emphasises relationships, issues, objectives and intervention points. It captures and clusters many of the key insights from research.

We chose to let the Vinnova mission teams run in parallel here: Mobility moved to prototypes more rapidly, understanding systems and outcomes from the prototypes' results, whereas Food concentrated on producing this richer picture of the analytical and organisational backdrop, before moving onto prototypes.

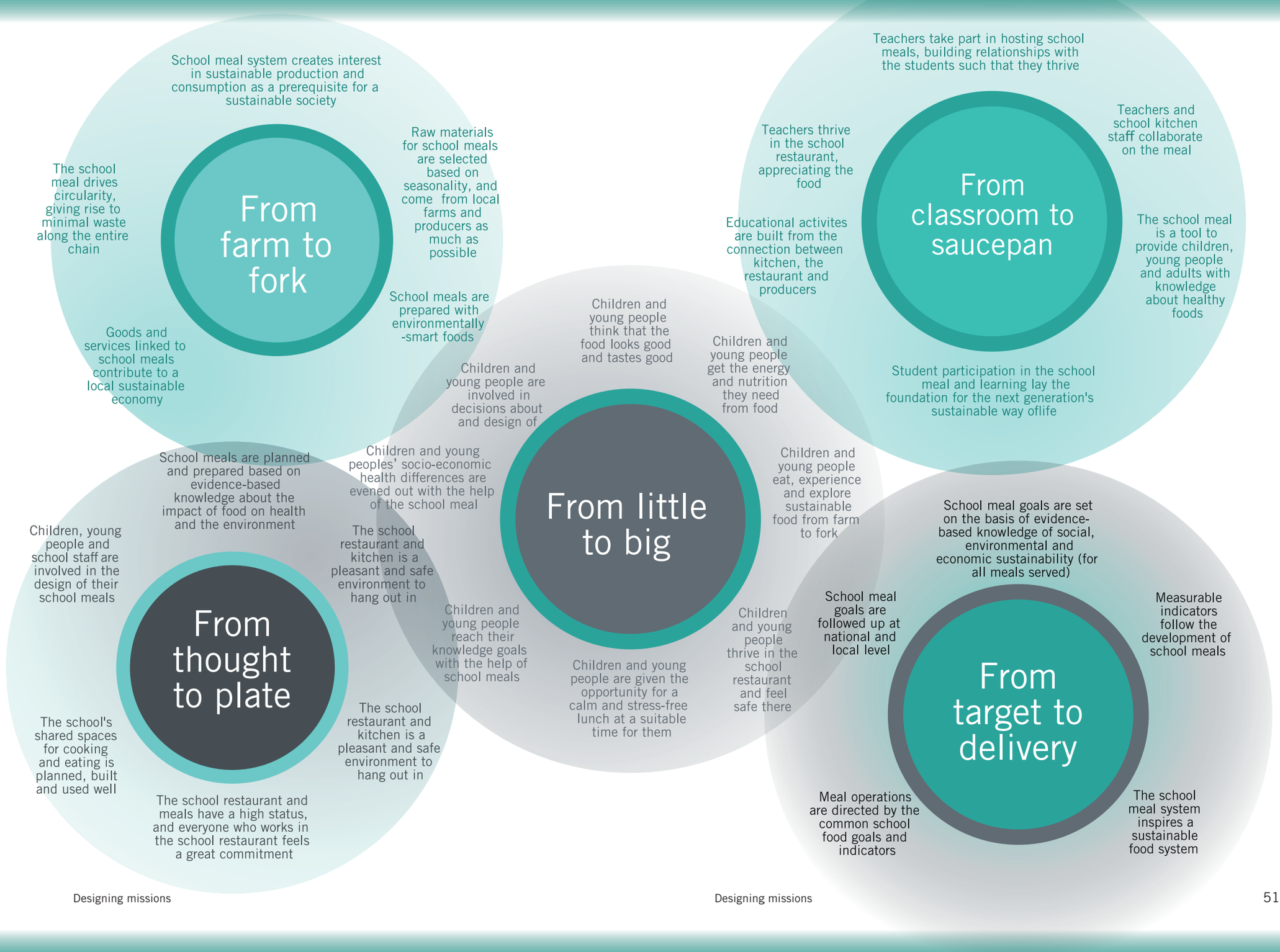
Systems, relationships and visions mapping produced for the School Food mission, by Antrop, working with the Vinnova and Livsmedelsverket teams.

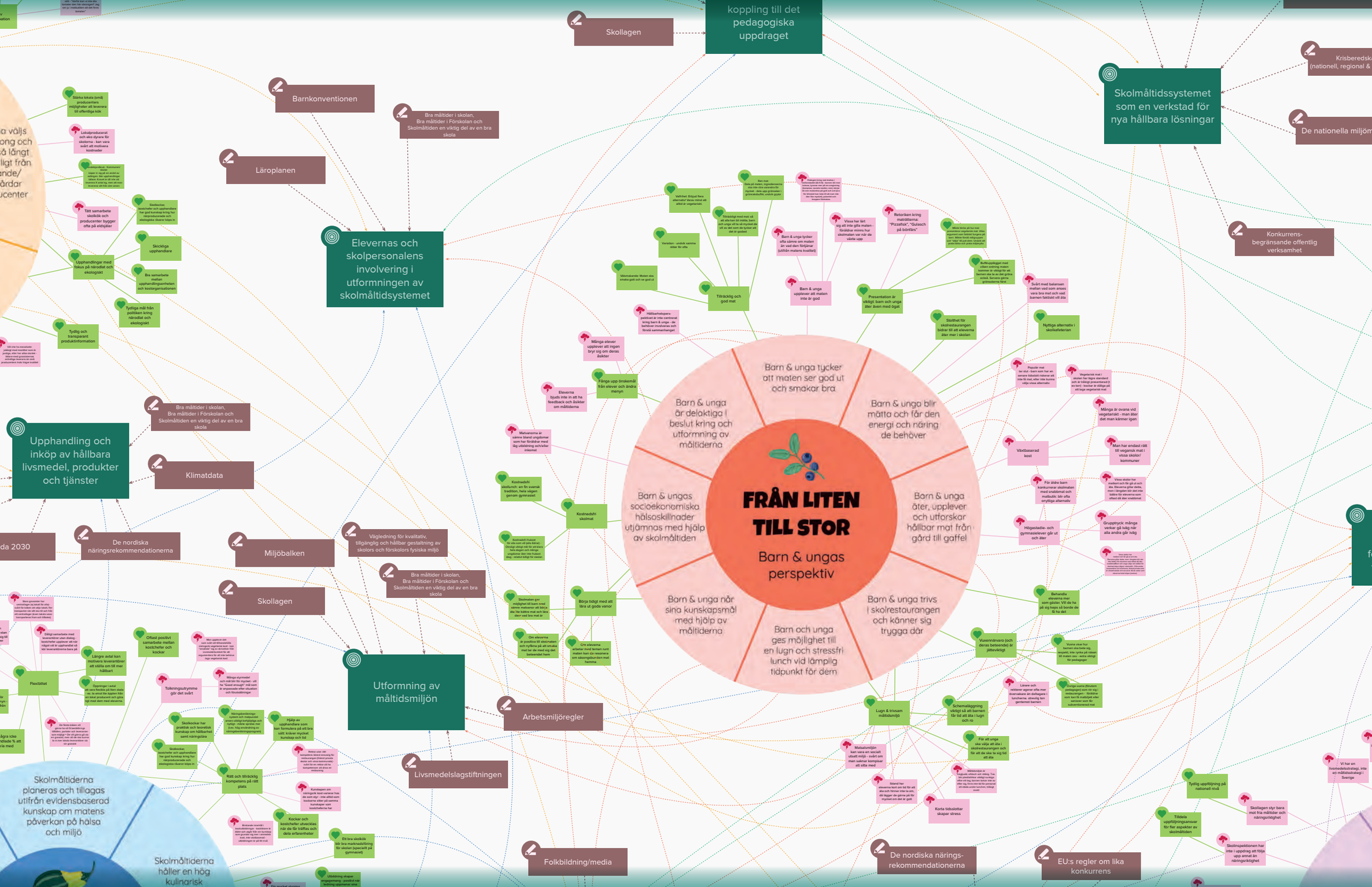
Overleaf, high-level summary of the school food systems map translated into English, followed by some close-ups in Swedish.

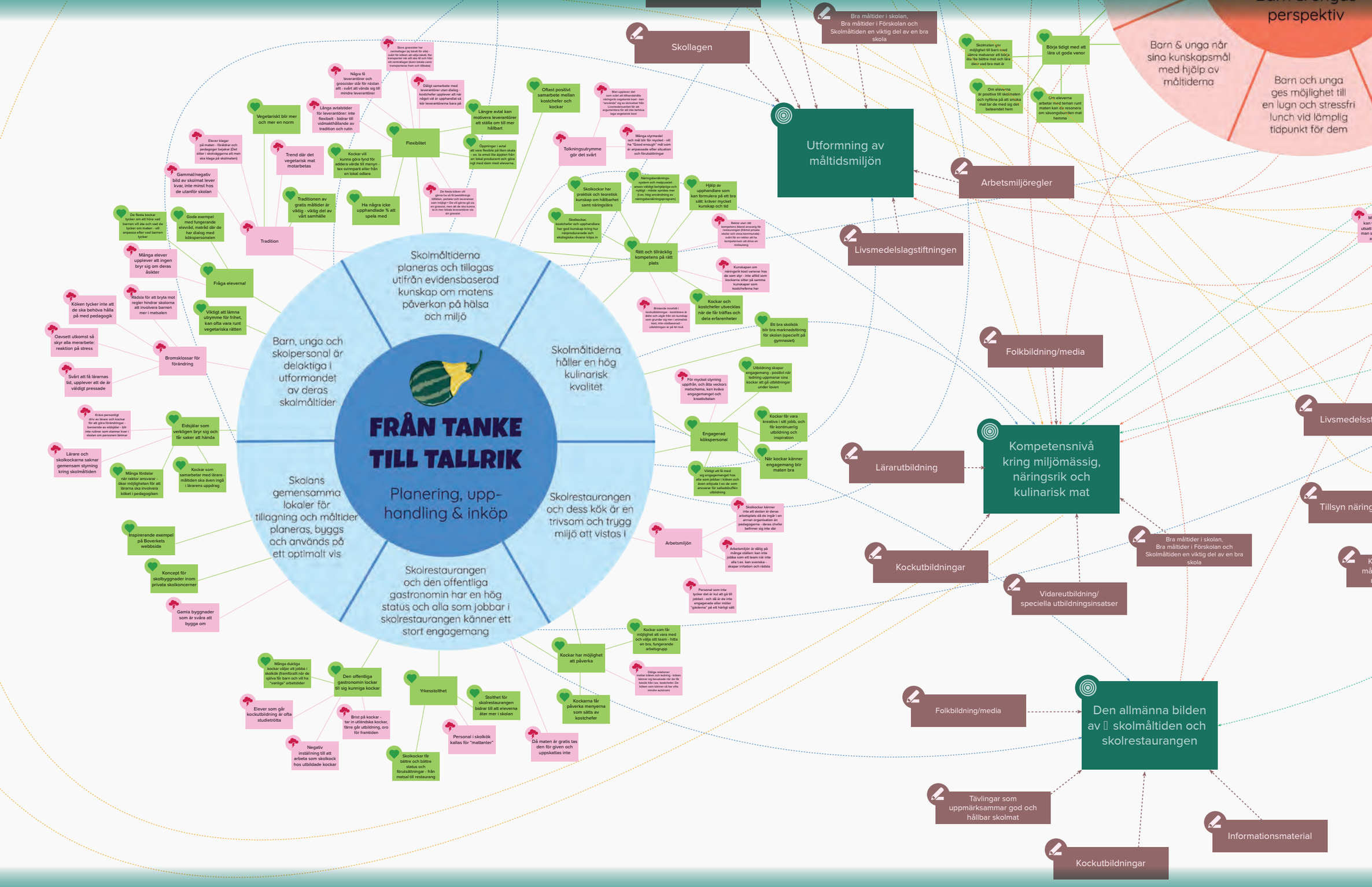


This is not a conventional systems map, which would focus on indicating flows, relationships, causal loops and feedback loops. Instead, it describes the goals and strategies for the School Food mission, clustered around insights derived from interviews and workshops conducted by Antrop.

These strategic goals are useful conceptual framing for the mission, acting almost as 'North Stars', with detailed objectives clustered around them. Each of these is surrounded by a set of intervention points, touchpoints or artefacts, which will be crucial to system transformation. Each of those is surrounded by insights derived from research (positive and negative behaviours in the current systems).


From farm to fork
School meal system creates interest in sustainable production and consumption as a prerequisite for a sustainable society
Raw materials for school meals are selected based on seasonality, and come from local farms and producers as much as possible
School meals are prepared with environmentally -smart foods
Goods and services linked to school meals contribute to a local sustainable economy
The school meal drives circularity, giving rise to minimal waste along the entire chain
From classroom to saucepan
Teachers take part in hosting school meals, building relationships with the students such that they thrive
Teachers and school kitchen staff collaborate on the meal
The school meal is a tool to provide children, young people and adults with knowledge about healthy foods
Student participation in the school meal and learning lay the foundation for the next generation's sustainable way oflife
Educational activites are built from the connection between kitchen, the restaurant and producers
Teachers thrive in the school restaurant, appreciating the food
From little to big
Children and young people think that the food looks good and tastes good
Children and young people get the energy and nutrition they need from food
Children and young people eat, experience and explore sustainable food from farm to fork
Children and young people thrive in the school restaurant and feel safe there
Children and young people are given the opportunity for a calm and stress-free lunch at a suitable time for them
Children and young people reach their knowledge goals with the help of school meals
Children and young people are involved in decisions about and design of
Children and young peoples' socio-economic health differences are evened out with the help of the school meal
From thought to plate
School meals are planned and prepared based on evidence-based knowledge about the impact of food on health and the environment
Children, young people and school staff are involved in the design of their school meals
The school restaurant and kitchen is a pleasant and safe environment to hang out in
The school restaurant and kitchen is a pleasant and safe environment to hang out in
The school's shared spaces for cooking and eating is planned, built and used well
The school restaurant and meals have a high status, and everyone who works in the school restaurant feels a great commitment
From target to delivery
School meal goals are set on the basis of evidence-based knowledge of social, environmental and economic sustainability (for all meals served)
School meal goals are followed up at national and local level
Measurable indicators follow the development of school meals
Meal operations are directed by the common school food goals and indicators
The school meal system inspires a sustainable food system


FRÅN LITEN TILL STOR
Barn & ungas perspektiv
Barn & unga tycker att maten ser god ut och smakar bra
Barn & unga blir mätta och får den energi och näring de behöver
Barn & unga äter, upplever och utforskar hållbar mat från gård till gaffel
Barn & unga trivs i skolrestaurangen och känner sig trygga där
Barn och unga ges möjlighet till en lugn och stressfri lunch vid lämplig tidpunkt för dem
Barn & unga när sina kunskapsmål med hjälp av måltiderna
Barn & ungas socioekonomiska hälsoskillnader utjämnas med hjälp av skolmåltiden
Barn & unga är delaktiga i beslut kring och utformning av måltiderna
Elevernas och skolpersonalens involvering i utformningen av skolmåltidssystemet
Skolmåltidssystemet som en verkstad för nya hållbara lösningar
Utformning av måltidsmiljön
Upphandling och inköp av hållbara livsmedel, produkter och tjänster
Skolmåltiderna planeras och tillagas utifrån evidensbaserad kunskap om matens påverkan på hälsa och miljö
Skolmåltiderna håller en hög kulinarisk
Barnkonventionen
Läroplanen
Skollagen
Bra måltider i skolan, Bra måltider i Förskolan och Skolmåltiden en viktig del av en bra skola
Klimatdata
De nordiska näringsrekommendationerna
Miljöbalken
Vägledning för kvalitativ, tillgänglig och hållbar gestaltning av skolors och förskolors fysiska miljö
Livsmedelslagstiftningen
Arbetsmiljöregler
Folkbildning/media
koppling till det pedagogiska uppdraget
Konkurrens-begränsande offentlig verksamhet
De nationella miljöm
Krisberedsk (nationell, regional &
De nordiska närings-rekommendationerna
EU:s regler om lika konkurrens
Tydlig uppföljning på nationell nivå
Skollagen styr bara mot fria måltider och näringsriktighet
Tilldela uppföljningsansvar för fler aspekter av skolmåltiden
Skolinspektionen har inte i uppdrag att följa upp annat än näringsriktighet
Vi har en livsmedelsstrategi, inte en måltidsstrategi i Sverige
Ett bra skolkök blir bra marknadsföring för skolan (speciellt på gymnasiet)
Utbildning skapar engagemang - positivt mat-fokusing uppmuntrar sina
Kunskapen om näringsrik kost varierar hos de som styr - inte alltid som kostkarna sitten på samma kunskaper som kostcheferna har
Kockar och kostchefer utvecklas när de får träffas och dela erfarenheter
Rätt och tillräcklig kompetens på rätt plats
Hjälp av upphandlare som kan formulera på vilt bra sätt: kräver mycket kunskap och tid
Näringsberäknings-system och matsedlar (men viktigt komplettiga att de inte blir för detaljstyrande för kök) - hög användning av näringsberäkningsprogram)
Många styrmedel och mål blir för mycket - vill ha "Good enough" - må som är anpassade efter situation och förutsättningar
Tolkningsutrymme gör det svårt
Skolkockar har praktisk och teoretisk kunskap om hälsarbetet samt näringslära
Skolkockar, kostchefer och upphandlare har god kunskap kring hur näraproducerade och ekologiska råvaror köps in
Flexibilitet
Långsra avtal kan motivera leverantörer att ställa om till mer hållbart
Oftast positivt samarbete mellan kostchefer och kockar
Dåligt samarbete med leverantörer utan dialog - kostchefer upplever att när något vill de uppfandlat så kör leverantörerna bara på
Upphandlingar med fokus på närodlat och ekologiskt
Skickliga upphandlare
Bra samarbete mellan upphandlingsenheten och kostorganisationen
Tydliga mål från politiken kring närodlat och ekologiskt
Tydlig och transparant produktinformation
Tätt samarbete skolkök och producenter bygger ofta på eldsjälar
Lokalproducerat och eko dyrare för skolorna - kan vara svårt att motivera kostnader
Stärka lokala (små) producenters möjligheter att leverera till offentliga kök
Barn & unga tycker ofta sämre om maten än vad den förtjänar (utifrån matens kvalitet)
Barn & unga upplever att maten inte är god
Tillräcklig och god mat
Barn mat: Dela på maten, ingredienserna ska inte röra varandra för mycket - dela upp grönsaker i grönsaksadhuffic undvik gytter
Vetthet: Erbjud flera alternativ! Värav mindt att alltid är vegetariskt.
Tillräckligt med mat: så att alla kan bli mätta, barn och unga vill ta så mycket de vill av det som de tycker att det är godast
Valration - undvik samma rätter för ofta
Välmående: Maten ska smaka gott och se god ut
Hållbarhetsperspektivet är inte centrerat kring barn & unga - de behöver involveras och förstå sammanhangen!
Många elever upplever att ingen bryr sig om deras åsikter
Påverkan kring val (maten) i skolrestaurangen - ska inte vara för mycket (kompisar, vuxna, lyssna med på vad omgivning (kompisar, vuxna) medan man), betyder att de inte vill äta det som de tycker om. En elevassk kan kasta till att man inte äter (för mycket) påverkat och kompisars förändras
Retoriken kring maträtterna: "Pizzafisk", "Gulasch på bönfärs"
Mörk torsk på fat med potatismos och grönsaker. Vilka argument kom fiskfett fungerar på barn. Mörke torsk-målgruppen och "vitar" till just dem. Undvik att prata hälsa och protein/fett
Svårt med balansen mellan vad som anses vara bra mat och vad barnen faktiskt vill äta
Buffépublicitet med utbud-ordning maten kommer är viktigt för att barnen ska ta av det gröna också. Serveras gärna grönsakerna först
Stolthet för skolrestaurangen bidrar till att eleverna äter mer i skolan
Presentation är viktigt: barn och unga äter även med ögat
Nyttiga alternativ i skolkafeterian
Populär mat br slut - barn som har en senare tidsslott riskerar att inte få mat, eller inte kunna välja vissa alternativ
Vegetarisk mat i skolan har lägre standard och är tråkigt presenterad (i en tort) - kockar är dåliga på att laga vegetarisk mat
Många är ovana vid vegetariskt - man äter det man känner igen
Växtbaserad kost
Man har endast rätt till vegansk mat i vissa skolor/ kommuner
För äldre barn konkurrerar skolmaten med snabbmat och matbutik: blir ofta onyttiga alternativ
Vissa skolor har mellanit och får gå ut och äta. Eleverna gillar detta, men i längden blir det inte bättre för eleverna som utfest då äter snabbmat.
Högastadie- och gymnasieelever går ut och äter
Grupptryck: många verkar gå tvåg när alla andra går tvåg
Vissa skolor har mellanit och får gå ut och äta. Eleverna gillar detta, men i längden blir det inte bättre för eleverna som utfest då äter snabbmat. Kommunerna och skolorna har ansvar för att ge eleverna bästa möjliga förutsättningar att äta bra mat i skolan. Men det är inte alltid det lyckas med detta.
Behandla eleverna mer som gäster. Vill de ha på sig kepa så borde de få ha det.
Vuxennärvaro (och deras beteende) är jätteviktigt
Visma visar hur barnen ska bete sig, inspekt, inte i yrrka på nästan till maten osv - extra viktigt för pedagoger
Övriga visma (fördelom pedagoger) som rör sig i restaurangen - förebilder som kan få matstipet eller sensorer som är subventionerad mat
Lärare och rektorer egener ofta mer övervakare än deltagare vi luncherna. obevikig tom gentemot barnen
Lugn & trivsam måltidsmiljö
Schemaläggning viktigt så att barnen får tid att äta i lugn och ro
För att unga ska välja att äta i skolrestaurangen och för att de ska ta sig tid att äta
Måltidsmiljön är trångsutt, stökigt och stökig. T.ex. för stressfaktor viktigt att barn och unga får tid att äta i lugn och ro efter sig. Finns inte tid för personal att städa under lunchen, tråkigt event.
Korta tidsslottar skapar stress
Matsalsmiljön kan vara en socialt utsatt miljö - svårt om man saknar kompisar att sitta med
Ibland har eleverna kort om tid för att äta och hinner inte ta om, då lägger de gärna på för mycket om det är gott
Börja tidigt med att lära ut goda vanor
Skolmaten ger möjlighet till barn med sämre matvanor att börja äta. Har bättre mat och lära dem vad bra mat är
Om eleverna är positiva till skolmaten och nyfikna på att smaka mat tar de med sig det befrämdet hem
Om eleverna arbetar med lärnam runt maten kan de resonera om sässongsburden mat hemma
Kostnadsfri skollunch: en fin svensk tradition, hela vägen genom gymnasiet
Kostnadsfri skolmat
Kostnadsfri frukost för alla som vill (alla äldre) - Örebro kommun har testat detta och deras slutsats var att frukost inte är viktigt - endast bidrar till stress
Matvanorna är sämre bland ungdomar som har föräldrar med låg utbildning och/eller inkomst
Eleverna bjuds inte in att ha feedback och åsikter om måltiderna
Pånga upp önskemål från elever och ändra menyn
Retur utan rätt kompetens: bland annaning för rektorsangren (i bland privata skolor och vinst-kommunala) - ofta inte rätt kunskap och kompetensen att driva en restaurang
Kunskapen om näringsrik kost varierar hos de som styr - inte alltid som kostkarna sitten på samma kunskaper som kostchefterna har
Bristande innehåll i kockutbildningar - kockläraren är själv och utgår från sin kunskap som grunder mig men i allmänhet. Ofta inget näringsfokus i utbildningen är på fel inriktning
Kockar och kostchefer utvecklas när de får träffas och dela erfarenheter
Ett bra skolkök blir bra marknadsföring för skolan (speciellt på gymnasiet)
Utbildning skapar engagemang - positivt mat-fokusing uppmuntrar sina
Folkbildning/media
Skollagen
koppling till det pedagogiska uppdraget
Barnkonventionen
Läroplanen
Bra måltider i skolan, Bra måltider i Förskolan och Skolmåltiden en viktig del av en bra skola
Klimatdata
De nordiska näringsrekommendationerna
Miljöbalken
Vägledning för kvalitativ, tillgänglig och hållbar gestaltning av skolors och förskolors fysiska miljö
Livsmedelslagstiftningen
Arbetsmiljöregler
Konkurrens-begränsande offentlig verksamhet
De nationella miljöm
Krisberedsk (nationell, regional &
De nordiska närings-rekommendationerna
EU:s regler om lika konkurrens
Tydlig uppföljning på nationell nivå
Skollagen styr bara mot fria måltider och näringsriktighet
Tilldela uppföljningsansvar för fler aspekter av skolmåltiden
Skolinspektionen har inte i uppdrag att följa upp annat än näringsriktighet
Vi har en livsmedelsstrategi, inte en måltidsstrategi i Sverige


FRÅN TANKE TILL TALLRIK
Planering, upp-handling & inköp
Skolmåltiderna planeras och tillagas utifrån evidensbaserad kunskap om matens påverkan på hälsa och miljö
Skolmåltiderna håller en hög kulinarisk kvalitet
Skolrestaurangen och dess kök är en trivsom och trygg miljö att vistas i
Skolrestaurangen och den offentliga gastronomin har en hög status och alla som jobbar i skolrestaurangen känner ett stort engagemang
Skolans gemensamma lokaler för tillagning och måltider planeras, byggs och används på ett optimalt vis
Barn, unga och skolpersonal är delaktiga i utformandet av deras skolmåltider
Barn & unga när sina kunskapsmål med hjälp av måltiderna
Barn och unga ges möjlighet till en lugn och stressfri lunch vid lämplig tidpunkt för dem
Barnrättsliga perspektiv
Skollagen
Bra måltider i skolan, Bra måltider i Förskolan och Skolmåltiden en viktig del av en bra skola
Utformning av måltidsmiljön
Arbetsmiljöregler
Livsmedelslagstiftningen
Folkbildning/media
Kompetensnivå kring miljömässig, näringsrik och kulinarisk mat
Lärarutbildning
Kockutbildningar
Vidareutbildning/ speciella utbildningsinsatser
Bra måltider i skolan, Bra måltider i Förskolan och Skolmåltiden en viktig del av en bra skola
Folkbildning/media
Den allmänna bilden av skolmåltiden och skolrestaurangen
Tävlingar som uppmärksammar god och hållbar skolmat
Informationsmaterial
Kockutbildningar
Tradition
Vegetariskt blir mer och mer en norm
Trend där det vegetarisk mat motarbetas
Gammal/negativ bild av skolmat lever kvar, inte minst hos de utanför skolan
De flesta kockar tycker om att höra vad barnen vill äta och vad de tycker om maten - vill anpassa efter vad barnen tycker
Goda exempel med fungerande elevråd, matråd där de har dialog med kökspersonalen
Många elever upplever att ingen bryr sig om deras åsikter
Fråga eleverna!
Köken tycker inte att de ska behöva hålla på med pedagogik
Oavsett utkomst så skyr alla merarbete: reaktion på stress
Svårt att få lärarnas tid, upplever att de är väldigt pressade
Bromsklossar för förändring
Råd sla för att bryta mot regler hindrar skolorna att involvera barnen mer i matsalen
Viktigt att lämna utrymme för frihet, kan ofta vara runt vegetariska rätten
Kräks personligt driv av lärare och kockar för att göra förändringar - berörande ev eldsjälar - blir inte rullmer som stanner kvar i skolan om personen lämnar
Eldsjälar som verkligen bryr sig och får saker att hända
Lärare och skolkockarna saknar gemensam styrning kring skolmåltiden
Många fördelar när rektor ansvarar - ökar möjligheten för att läranra ska involvera köket i pedagogiken
Kockar som samarbetar med lärare - måltiden ska även ingå i lärarens uppdrag
Inspirerande exempel på Boverkets webbsida
Koncept för skolbyggnader inom privata skolkoncerner
Gamla byggnader som är svåra att bygga om
Flexibilitet
Några få leverantörer och grossister står för nästan allt - svårt att vända sig till mindre leverantörer
Stora grossister har centrallager (ej lokalt för alla) - svårt för köken att välja lokalt, fler transporter när allt ska till och från ett centrallager (även lokala varor transporteras fram och tillbaka)
Dåligt samarbete med leverantörer utan dialog - kostchefer upplever att när något väl är upphandlat så kör leverantörerna bara på
Längre avtal kan motivera leverantörer att ställa om till mer hållbart
Öppningar i avtal att vara flexibla på liten skala - ex. ta emot lite äpplen från en lokal producent och göra ngt med dem med eleverna.
Långa avtalstider för leverantörer: inte flexibelt - bidrar till vidmakthållande av tradition och rutin
Kockar vill kunna göra fynd för addera värde till menyn - tex svinnpartl eller från en lokal odlare
Ha några icke upphandlade % att spela med
De flesta köken vill gärna ha så få beställnings-tillfällen, gärna och leverantörer som möjligt - De vill gärna gå via en grossist, men vill ofta ska kunna ta in mer lokala råvaror via en grossist
Elever klagar på maten - föräldrar och pedagoger bejakar (Det sitter i skolväggarna att men ska klaga på skolmaten)
Oftast positivt samarbete mellan kostchefer och kockar
Tolkningsutrymme gör det svårt
Men upplever det som svårt att tillhandahålla näringsrik vegetarisk kost - kan "användas" sig av skrivelser från Livsmedelsverket för att argumentera för att inte behöva laga vegetarisk kost
Många styrmedel och mål blir för mycket - vill ha "Good enough" mål som är anpassade efter situation och förutsättningar
Skolkockar har praktisk och teoretisk kunskap om hållbarhet samt näringslära
Näringsberäknings-system och mattjuvelet anses vädligt behjälpliga och mytligt - måste spridas mer (t.ex. hög användning av näringsberäkningsprogram)
Hjälp av upphandlare som kan formulera på ett bra sätt: kräver mycket kunskap och tid
Skolkockar, kostchefer och upphandlare har god kunskap kring hur näproduktionsrade och ekologiska råvaror köpa in
Rätt och tillräcklig kompetens på rätt plats
Bristar utan rätt kompetens bland ansvarig för nedsavningen (främst privata skolor och vissa kommunala) - sulit för en rektor att ha kompetensen att driva en restaurang
Kunskapen om näringsrik kost varierar hos de som styr - inte alltid som kockarna sitter på samma kunskaper som kostchefarna har
Kockar och kostchefer utvecklas när de får träffas och dela erfarenheter
Bristande innehåll i kockutbildningar - kockläarare är alov och utgår från sin kunskap och det är inte alla skolor som tar in mer lokala råvaror - utbildningen är på fel nivå
Ett bra skolkök blir bra marknadsföring för skolan (speciellt på gymnasiet)
Utbildning skapar engagemang - positivt när ledning uppmanar sina kockar att gå utbildningar under loven
För mycket styrning uppifrån, och åtta veckors matschema, kan kväva engagemanget och kreativiteten
Engagerad kökspersonal
Kockar får vara kreativa i sitt jobb, och får kontinuerlig utbildning och inspiration
När kockar känner engagemang blir maten bra
Viktigt att få med sig engagemanget hos alla som jobbar i köken och även erbjuda t.ex de som ansvarar för salladsbuffén utbildning
Arbetsmiljön
Skolkockar känner inte att skolan är deras arbetsplats då de ingår i en annan organisation än pedagogerna - deras chefer befinner sig inte där
Arbetsmiljön är dålig på många ställen: kan inte jobba som ett team när inte alla t.ex. kan svenska - skapar irritation och rädsla
Personal som inte tycker det är kul att gå till jobbet - och då är de inte engagerade eller möter "gästerna" på ett härligt sätt
Kockar har möjlighet att påverka
Kockar som får möjlighet att vara med och välja sitt team - hitta en bra, fungerande arbetsgrupp
Dåliga relationer mellan köken och ledning - köken känner sig bevakade när de får beslå från t.ex. kostchefer. De köken som känner så har ofta mindre autonomi
Kockarna får påverka menyerna som sätts av kostchefer
Då maten är gratis tas den för given och uppskattas inte
Yrkesstolthet
Stolthet för skolrestaurangen bidrar till att eleverna äter mer i skolan
Personal i skolkök kallas för "mattanter"
Skolkockar får bättre och bättre status och förutsättningar - från matsal till restaurang
Den offentliga gastronomin lockar till sig kunniga kockar
Många duktiga kockar väljer att jobba i skolkök (framförallt när de själva får barn och vill ha "vanliga" arbetstider
Elever som går kockutbildning är ofta studietrötta
Brist på kockar - tar in utländska kockar, färre går utbildning, oro för framtiden
Negativ inställning till att arbeta som skolkock hos utbildade kockar
Skolmaten ger möjlighet till barn med sämre matvanor att börja äta för bättre mat och lära dem vad bra mat är
Börja tidigt med att lära ut goda vanor
Om eleverna är positiva till skolmaten och nyfikna på att smaka mat tar de med sig det beteendet hem
Om eleverna arbetar med teman runt maten kan de resonera om säsongsburiden mat hemma

Intervention analysis derived from mapping

Alongside the concepts derived from Design Workshops, the mapping exercise carried out by the mission team, coordinated by Antrop, produced further insights into intervention points for systemic change around school food, and the wider food systems.

These intervention points are specific rather than conceptual, emerging from interviews and workshops with both system actors and researchers. They describe particular laws, policies, codes and strategies, as well as touchpoints like the powerfully formative role of the meals themselves, as well as chef training practices, public media, forums between parents and staff, and so on. This mix provides key components in a framework for action.

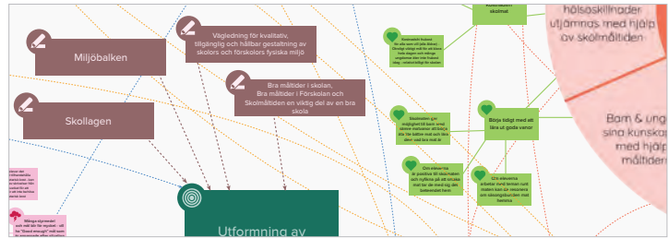
Intervention points

Law, policy and code

Various laws and policies loom large in the systems mapping produced by the project, including some fundamental legislation which frames the school experience. The project will test whether the national curriculum or School Law require changing—a Policy Lab process like this could address this—or whether it is merely interpretation of law which is preventing systemic change.

- National curriculum
- Education Act (School Law)
- Public procurement law
- Rights for children
- Workplace regulation
- National food strategy
- National environment goals
- Competition laws and policies
- National food legislation
- Crisis preparedness
- EU rules on sustainable consumption
- EU rules on equal competition
- Agenda 2030
- Public health goals
- Nordic enterprise strategies
- Nutrition policy and supervision
- Sustainability certifications
- Municipal environment policy
- Municipal meal and diet policy
- Municipal procurement policy
- Environment Code

Each of these provides an insight for the subsequent prototyping stage. They help ‘fill out’ and populate the concepts derived from the Design Workshops.



Detail from the systems mapping carried out by Antrop, after dialogues and workshops. The brown boxes at the top indicate some of the key intervention points, and are summarised below.

These various intervention points are summarised below, and will be input for the prototyping activities with municipalities.

Intervention points

Touchpoints

The formal laws and policies provide much of the context that these touchpoints emerge within. Yet the touchpoints themselves are often the key intervention points, producing direct change within the systems as they are exerted and experienced. Ultimately, ensuring that school meals are seen as fundamental to a good school will be key, yet the way that teachers and chefs are trained, or the way that spaces are designed, or what is procured, frames much of what can happen next.

- Good meals at school, good meals in pre-school, and school meals as an important part of a good school
- Teacher training
- Well-organised competitions for good and sustainable school food meals and environments
- During-meal information material
- Teacher training
- Dialogue forum
- Further education
- In-school information material
- Climate data
- General public education
- Public media

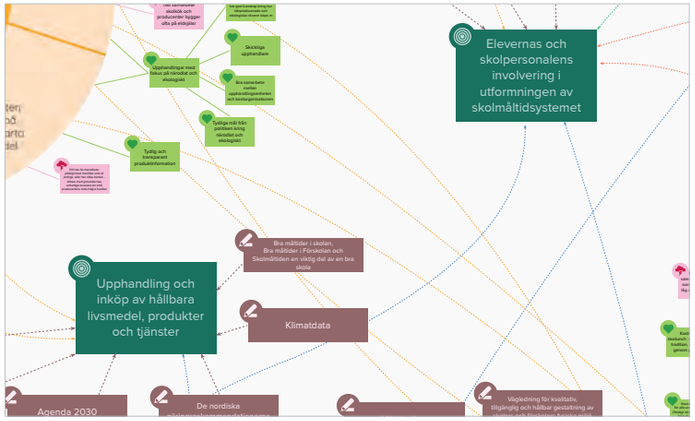
Intervention analysis derived from mapping

Looking at the diverse range of touchpoints, policies and laws derived from the mapping, a clustering of intervention types becomes clear.

These are not clear answers, as such; rather, they are areas to organise prototyping around. As the user research in the 'Policy Lab' process run by Antrop followed some months after the Design Workshops, and featured different sets of participants, the interventions here do not follow directly from the concepts described earlier.

Yet there is clearly significant overlap. These broadly similar intervention points, coming from different processes with different people, suggest some validation of the original concepts, and vice versa.

Detail from the systems mapping carried out by Antrop, after dialogues and workshops. The dark green boxes are examples of the key intervention areas and types emerging from the analysis.



This constant refining of concepts is typical of a design process, with the most meaningful refining emerging in prototypes. As well as validating that these have strong potential to be leverage points within systems, both the concepts and interventions points provide clear clues for prototyping. It's easy to envisage how *'the Kitchen'*, allied to ***"The involvement of students and school staff in the design of the school meal system"*** becomes the basis of a real-world prototype.

Analysis

Interventions from mapping

Distilled intervention areas, produced from the research process run by Antrop.

- The school meal system as a workshop for new sustainable solutions
- Evidence-based goals for school meals for all of Sweden
- Competence levels around environmental, nutritious and culinary food
- The general image of the school meal and the school restaurant
- The connection between the school meal and learning
- Design of the meal environment
- The involvement of students and school staff in the design of the school meal system
- Procurement and purchase of sustainable food, products and services
- Strategies, implementation and follow-up of the objectives

Concepts from workshops

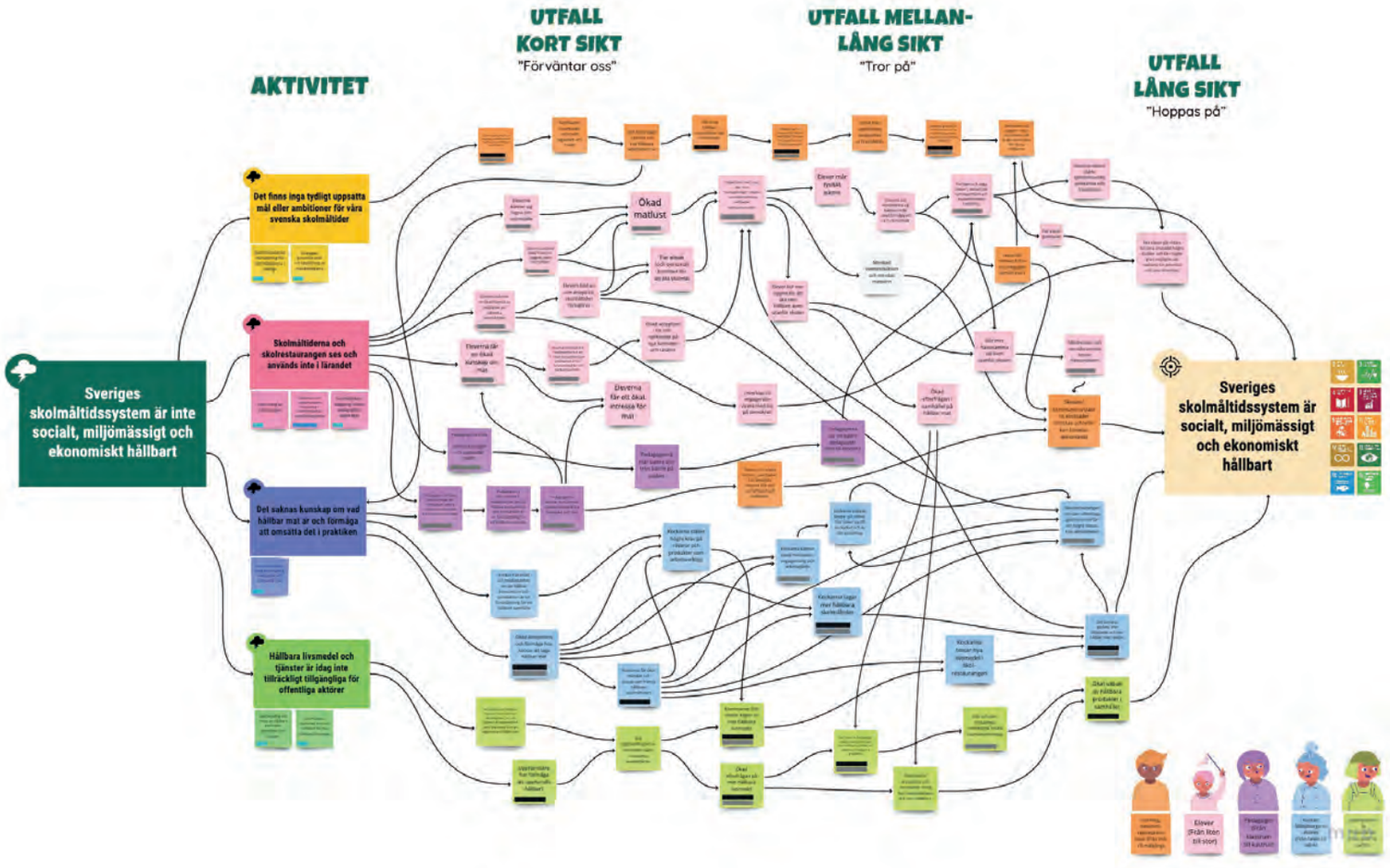
Core concepts emerging from the earlier Design Workshop phase, run by Vinnova.

- Farm
- Database
- Pantry
- Cookbook
- Kitchen
- Meal
- Forum
- Contract

This loose mapping perhaps reinforces the central role of the Forum, a participative decision-making entity that brings together students, teaching staff, cooks, farmers, service providers, local municipality officers, and so on.

Theory of change

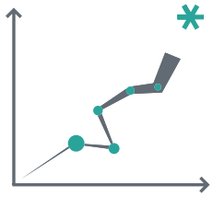
Building on the map, the team developed a ‘theory of change’ around the School Food mission. It describes a series of framing problems articulating why school food is not healthy, sustainable and economically viable. The theory of change then unpacks these problems, describing activities that address them, ultimately articulating a series of linked interventions.



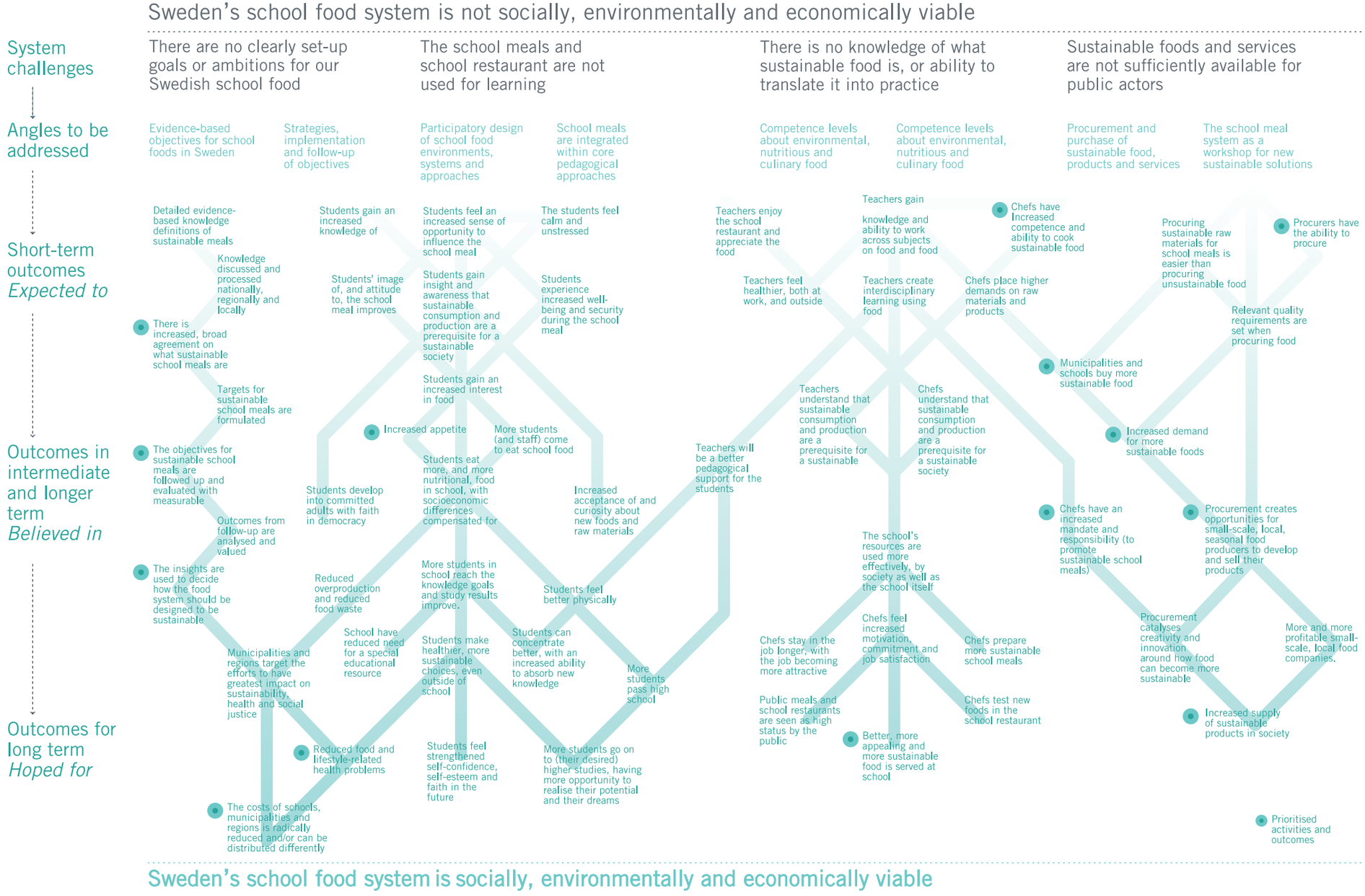
A ‘theory of change’ produced for the School Food mission, by the Vinnova and Livsmedelsverket teams.

The theory of change tracks multiple actions, moving us from an under-utilised school food system towards a system that delivers holistically against Sustainable Development Goals.

Produced by the team, the map is reproduced below (in Swedish), and then translated into English and re-drawn in legible detail on the following pages.



If this theory of change seems a little deterministic—this, then this, then this—in reality it follows the adaptive strategy described earlier, enabling the actions to pivot based on insights derived from the ground.


Sweden's school food system is not socially, environmentally and economically viable
System challenges
Angles to be addressed
Short-term outcomes *Expected to*
Outcomes in intermediate and longer term *Believed in*
Outcomes for long term *Hoped for*
There are no clearly set-up goals or ambitions for our Swedish school food
The school meals and school restaurant are not used for learning
There is no knowledge of what sustainable food is, or ability to translate it into practice
Sustainable foods and services are not sufficiently available for public actors
Evidence-based objectives for school foods in Sweden
Strategies, implementation and follow-up of objectives
Participatory design of school food environments, systems and approaches
School meals are integrated within core pedagogical approaches
Competence levels about environmental, nutritious and culinary food
Competence levels about environmental, nutritious and culinary food
Procurement and purchase of sustainable food, products and services
The school meal system as a workshop for new sustainable solutions
Detailed evidence-based knowledge definitions of sustainable meals
Knowledge discussed and processed nationally, regionally and locally
There is increased, broad agreement on what sustainable school meals are
Targets for sustainable school meals are formulated
The objectives for sustainable school meals are followed up and evaluated with measurable
Outcomes from follow-up are analysed and valued
The insights are used to decide how the food system should be designed to be sustainable
Municipalities and regions target the efforts to have greatest impact on sustainability, health and social justice
The costs of schools, municipalities and regions is radically reduced and/or can be distributed differently
Students gain an increased knowledge of
Students' image of, and attitude to, the school meal improves
Students develop into committed adults with faith in democracy
Reduced overproduction and reduced food waste
School have reduced need for a special educational resource
Reduced food and lifestyle-related health problems
Students feel an increased sense of opportunity to influence the school meal
Students gain insight and awareness that sustainable consumption and production are a prerequisite for a sustainable society
Students gain an increased interest in food
Increased appetite
Students eat more, and more nutritional, food in school, with socioeconomic differences compensated for
More students in school reach the knowledge goals and study results improve.
Students make healthier, more sustainable choices, even outside of school
Students feel strengthened self-confidence, self-esteem and faith in the future
The students feel calm and unstressed
Students experience increased well-being and security during the school meal
More students (and staff) come to eat school food
Increased acceptance of and curiosity about new foods and raw materials
Students feel better physically
Students can concentrate better, with an increased ability to absorb new knowledge
More students pass high school
More students go on to (their desired) higher studies, having more opportunity to realise their potential and their dreams
Teachers will be a better pedagogical support for the students
Teachers enjoy the school restaurant and appreciate the food
Teachers feel healthier, both at work, and outside
Teachers gain knowledge and ability to work across subjects on food and food
Teachers create interdisciplinary learning using food
Teachers understand that sustainable consumption and production are a prerequisite for a sustainable
Chefs understand that sustainable consumption and production are a prerequisite for a sustainable society
The school's resources are used more effectively, by society as well as the school itself
Chefs feel increased motivation, commitment and job satisfaction
Chefs stay in the job longer, with the job becoming more attractive
Public meals and school restaurants are seen as high status by the public
Better, more appealing and more sustainable food is served at school
Chefs have increased competence and ability to cook sustainable food
Chefs place higher demands on raw materials and products
Chefs prepare more sustainable school meals
Chefs test new foods in the school restaurant
Procuring sustainable raw materials for school meals is easier than procuring unsustainable food
Procurers have the ability to procure
Relevant quality requirements are set when procuring food
Municipalities and schools buy more sustainable food
Increased demand for more sustainable foods
Chefs have an increased mandate and responsibility (to promote sustainable school meals)
Procurement creates opportunities for small-scale, local, seasonal food producers to develop and sell their products
Procurement catalyses creativity and innovation around how food can become more sustainable
More and more profitable small-scale, local food companies.
Increased supply of sustainable products in society
Prioritised activities and outcomes
Sweden's school food system is socially, environmentally and economically viable

Food systems as entry points to tackling grand challenges

Afton Halloran & Amanda Wood

Afton Halloran and Amanda Wood worked on a parallel mission process across the Nordic region. They drew from the approaches described in this playbook, as well as their own experience and insights, in order to devise a Nordic Food Systems Cookbook, in collaboration with EAT Foundation, Nordic Council of Ministers, Innovation Norway, EIT Climate-KIC, and Vinnova. This text is a section of that cookbook, reproduced with kind permission. Dr. Afton Halloran works as a consultant to the World Bank and Nordic Council of Ministers, amongst others, and has a long history in food systems. Dr. Amanda Wood is a researcher in sustainable food systems at Stockholm Resilience Centre.

Entry points are places to intervene in a food system where strategic changes can help tackle grand challenges. An entry point will identify where to start changing a food system.

This intervention point can be a physical place, like a supply chain, a farm or a supermarket, but it can also identify a part of a food system that can change, such a meal, a food culture or food waste streams. Yet entry points are not granular enough to constitute a plan and they don't indicate how to go about changing the system.

Food system entry points may vary from context to context, so it's important to do the work needed to identify entry points for your specific food system. For example, in the Nordic context, do we focus on business solutions, citizen engagement, public policy, or a combination of all of these? Do we focus on changing what people consume (demand) or changing what and how we grow (supply)?

Answering these questions requires that we understand a specific system—in this case a food system—in a particular context, and recognize the unique capacities of that context to affect systemic change.

There will be many entry points to solving our grand challenges since the challenges are so multi-faceted. For example, ensuring sustainable meals for all might be one critical entry point to ensure good health and wellbeing, but so is closing the income gap or providing universal health care. Remember, no single solution is going to 'solve' a grand challenge.

Given the urgency to act, we cannot afford to focus on one entry point at a time. Thus, it's not about choosing one entry point over the other—or about finding the 'perfect' entry point. It's about identifying the most impactful entry points, and understanding how to address them simultaneously in a coordinated way.

The current scientific evidence base can help us identify entry points to addressing grand challenges. For example, shifting our diets, improving food production practices and reducing food waste are clear entry points to achieving better health and greater environmental sustainability. Similarly, there is strong evidence that food environments—all of those places where we make decisions about food, like supermarkets—are critical to shaping our food choices. But it's not just scientists who should identify entry points.

Everyone within a system has a unique perspective of how that system works, meaning they can provide different perspectives on how to tackle challenges. For example, businesses have a deep understanding of what drives demand, food producers have a keen understanding of production challenges and opportunities, and civil society groups have a deep understanding of how societal movements can lead to change. These same actors also keenly understand the economic forces that enable and constrain which actions they can take.

Preparing the ground for prototyping

Skolmat video, November 2020

The film starts with a statement of how much Sweden invests in school food each year: seven billion Swedish crowns (approximately 700 million Euros).

This investment translates to meals on the plates for most school children in Sweden. The voiceover makes the point that it's a lot of money. But too little food ends up in the stomach, and that frequently school meals are seen as a sideline, not connected to the broader mission of education.

Now the voiceover switches to childrens' voices, who describe the reality of school food for many. Starting with childrens' voices makes a clear point about who the experts are. They say:

"It's stressful at lunch. I never have time to eat."
"I never listen to lessons when I'm hungry in the afternoon..."
"My friends and I usually go to the kiosk instead of eating the food at school."
"Why don't the teachers and the principal eat with us i f the food is supposed to be so good?!"
"Why can't I be part of the decision?! know a lot that could become better!"
"No, I have no idea where my food comes from... the grocery store or what?"

"Could our 7 billion kronor be used another way? What would happen if we used the school meal system as an innovation platform to solve challenges related to climate, public health and social justice?"

If approached holistically and systemically, we could also deliver against some key challenges using this existing system. Here, the mission approach becomes immediately clear.

The Vinnova approach to designing missions places emphasis on stimulating public discourse about the transformation, including social movements techniques. Video has become perhaps the most effective communication tool for triggering discussion, and so preparing the ground for prototyping included developing a short film that could convey the core principles emerging from the policy lab work. It could outline the issues, and begin to make tangible the possibility within the next stages. The film should be engaging, and lead through the voices of children, yet contain key data and policy goals. It was jointly commissioned by Vinnova and Livsmedelsverket, and by produced by the design agency Antrop, and was posted across various channels in early November 2020.

"What if Swedish schools only served food that is good for health and the environment? This would increase the demand for sustainably-produced food, whilst school meals would contribute to our national environmental goals."

This makes a simple integration point—we can produce strong public health outcomes and environmental impacts at the same time. Food for nourishing the stomach, and the environment.

"What if the municipality's school kitchens collaborated with local farmers and producers, helping the local economy to flourish? What if school kitchens could be used as test beds for innovators to create the food of the future?"

This would also benefit logistics companies, waste handlers, designers, growers and many more. Leveraging this investment enables thriving local economies across Sweden.

"What if all students in Sweden got to learn about sustainable development through the school meal? How might they that their generation can make a difference? What if all students were able to do could perform better in school thanks to good food?"

This also has an impact on learning and development, as practically teaching any subject can be enriched by looking through the lens of food. For instance, if approached holistically within the curriculum, school food enables Swedish students to learn about sustainable development by using meals as teaching aids. This speaks to the strong environmental interests amongst many in this generation.

"What if our school meals were to create greater equality by giving all children the same chance to experience food joy through good and healthy food? And what if school meals could strengthen the diversity of food cultures that exist in Sweden today?"

Given Sweden's strong focus on social justice, the message that this mission concerns a food experience for all is important to reinforce. Public food such as school food can be one of the core components on a 21st century welfare state agenda.

The film then shifts gears, to begin describing what these common goals might be, and how we can address them. To begin with, it sets up a sense of bold ambition: that we will need to explore (utforska), to innovate (innovera), and we even may need to tear down some walls (riva murar). "We need to set common goals for our Swedish school meals and dare to explore, think in new ways, and tear down walls to get there. If we do that, maybe it can instead sound like this when we talk about school food … "

"We need to set common goals for our Swedish school meals and dare to explore, think in new ways, and tear down walls to get there. If we do that, maybe it can instead sound like this when we talk about school food … "

"In the restaurant we also have a wall where vegetables and spices grow, and I can pick them myself. And next door we have fish that also get food from what grows on the wall."

Here, the kids are describing the idea of making food growing tangible a part of the school environment. This means immediately different procurement, different architectural guidelines, new maintenance regimes, and new learning possibilities—all wrapped up in a different experience.

Now the film gives a more tangible sense of possibility. Again, it uses children's voices, as they are the primary protagonists. Immediately, the sense of what the school kitchen and restaurant can be aspires to something else, with a different environment and sense of status:

"Our school restaurant is super nice, I love it! Our furniture is like Lego, we can rebuild them however we want. Now the kitchen and restaurant have become the place in the school where everyone wants to hang out."

"In the schoolyard, we have greenhouses and plantations that we manage together with some pensioners who live next to the school. This year we also have a beekeeping, and so there will be as many berries and stuff as possible!"

Growing is even more extensive outside the school buildings, of course. And this is not only on school grounds, but implied within the community around the school, suggesting social fabric and community building as outcomes. Beekeeping will, for some, suggest safety issues to resolve too, which is useful to flush out at this early stage, and respond to constructively. Others will note the importance of positively addressing biodiversity degradation, as well as localising food production (different berries grow in different places).

"I like to grow and cook with the students and to teach them how good and sustainable food is. It is incredibly rewarding for me as a chef to be able to influence children's attitudes to food and feel that I am involved in creating a positive change,"

The viewpoint switches to a school chef, and how sharing the growing and cooking with the students may make their work more enriching and engaged for the chefs, as well as the school children. This creatively blurs the line between school food provision and education, whilst potentially increasing agency and motivation for cooks.

"Food is one of the best teaching aids I have as a teacher. I can teach many different subjects using food and its raw materials. For example, history, geography, society, natural sciences and lots more… It makes the subjects much more tangible for the students and the knowledge really sticks."

Here, the teacher's perspective reinforces the clear message around using food as a pedagogical aid. This suggests the possibility of teaching almost any subject via food, and the value in doing so.

The film ends with a swift animated sequence conveying a clear call to action: now is the time to make these solutions a reality, creating a sustainable school meal system together. It reinforces the mission that every child should be able to eat school food that is both good and sustainable.

"Today a school chef came by my farm together with a school class, to pick up the week's ingredients. I also broadcast live from the farm sometimes, so that the students can learn about life here. For example, today we are learning about shearing the sheep."

The viewpoint switches to a farm, and a farmer, indicating how the school's activities connect to the local ecosystems—environmental and industrial—around the school. It also reinforces the value of understanding food production, both for broad learning and for sustainability literacy.

"I work for a company that develops new sustainable food products. I usually borrow the school kitchen in the evenings to cook and test new recipes. I have a group of teachers and students who taste it—it's so good, because if children like it, then I know it will work …"

Finally the perspective of a local food entrepreneur, who is able to use the school's resources; both in terms of kitchen equipment and the school forum of teachers and students as a kind of market research. This would be a win-win for wider ecosystems.

It also notes a key point about collaboration, such that we can use food in school as a tool for sustainable change. Finally, a clear message asking 'Do you want to be part of the answer?'. The film points to the Livsmedelsverket website to find out more and get involved.

Theory of change

Antrop's design research work, in interviews and workshops, produced many insights into the current school food system. Whilst many of these issues were already known by experienced members of the mission team; others were not. They provided the opportunity for cluster analyses of insights, which could be mapped against target groups.

For instance, here is a set of observations, findings, and issues regarding children/young people and students, drawn from research activities:

Observed behaviours

- The teachers go and sit with the younger children.
- The meal environment is quiet for a few minutes.
- Many people don't eat that much at school.
- Staff do not say anything about sustainability, and it seems that most don't know much about it.
- There are often vegetarian options available, but most do not eat them.
- It is perceived that student councils can have little effect on school food.
- Some schools have done food waste projects, but only temporarily
- If the school food looks unappealing, the older students leave school to eat at a nearby fast food outlet or grocery store.
- There are a wide spectrum of approaches to school food, with some always eating it, and some very rarely eating it.
- Complaining about food is common, and almost expected, particularly as students get older.
- If the kitchen does not say where the food comes from, it is assumed that it is from other countries.
- Tasty-looking food is wasted more than other food, as people tend to take too much.

Observed/heard positive aspects

- Younger students have more educational lunches with fixed seating places, whereas older children prefer free placement.
- People are overall more satisfied with a 'cooking kitchen' (as opposed to a 'receiving kitchen', which largely heats up food cooked elsewhere).
- People appreciate choice.
- An adult presence helps make for a calmer, safer meal environment.

Observed/heard obstacles

- Food served in opaque pots which are difficult to see into.
- Little or no opportunity to influence food choice.
- It can be messy and dirty in the restaurant.
- Lunches are too short, with long queues, and therefore stressful.
- The good food runs out quickly.
- You can't concentrate in class when you have not eaten (sometimes students get tired and end up buying sweets).
- Difficult to strike a balance between "good food" and what children and young people apparently want to eat.
- It seems like vegetarian food gets less 'love'.

Observed/heard needs

- Food that looks good and tastes good.
- Enough food to eat to provide energy throughout the school day.
- Enough time, and peace, to enjoy the meal.
- Clear definition of the ingredients, including cooking methods (avoid stews or mixed vegetables, for example, where it is difficult to perceive individual ingredients).
- Freedom of choice, from within a good variety of food.
- Breakfast and snacks for everyone, as well as lunch.
- The same quality and conditions regardless of socio-economic background.
- Security: the meal should not create socially-vulnerable situations.

Observed/heard wishes

- A nicer school restaurant (plants, real porcelain etc.).
- More appropriate food for kids.
- To be listened to.

These insights help frame Concept Design, as well as subsequent framing, design, and steering of prototypes.

A flavour of the research

It's also useful to capture direct quotes, even if responses can be subjective. Food concerns *qualities* as well as quantities, and is therefore an extremely useful training ground for governance systems that will need to handle complex, subjective, and qualitative judgements as well as they do the simpler matters of quantities. These few quotes are not presented as indictments (school food in Sweden is generally in good shape, as judged against current metrics). But facing such criticism in order to frame insights is a necessary part of design research.

When it's tasty food you may take too little, but when it's disgusting food you may take as much as you want.

From an interview with a middle school student

I get restless in the afternoon when I skip school lunch.

From an interview with a high school student

It comes with the territory that you should complain about the food.

From an interview with a teacher

Student influence on school food is impossible because they don't know what is good for them.

From an interview with the principal of a school

Again, these quotes are not necessarily representative. But equally, they cannot be denied; they emerged from the research, and they are validated, to some extent at least, by Antrop's 80+ interviews, four large stakeholder workshops, and desk research. They provide impetus, as well as insight, for the prototyping stage.

Prototyping: Skolmat call, 2020–

The initial ‘policy lab’ and concept design work set up the prototyping stage well. As with Street mission, a clear set of intervention points had emerged from the co-design processes. But equally, the relationships formed during this stage also set the scene for the prototyping stage.

Crucially, the relationship between Livsmedelsverket (the government’s food agency) and Vinnova (the government’s innovation agency) was advanced to the point where a ‘joint call’ was possible. This is relatively unusual for Swedish agencies, and a big step forward in terms of beginning to unlock a systemic approach. This was carried out in late 2019, and through early 2020, and ultimately led to four Swedish municipalities being selected for prototypes.

The ‘call’ process had been modified and simplified somewhat, to open up to a more diverse set of municipalities, and to make clear the goal of mission-oriented innovation via prototyping. Municipalities ‘own’ the school food delivery in Sweden, and so they were the natural core partners for this work (just as with the Streets mission). 25 municipalities applied to the call.

Interestingly, rather than selecting the larger Swedish cities, like Umeå and Helsingborg, or reinforcing those that were already advanced with their food strategies, such as Malmö, the four chosen municipalities represented small- and medium-sized cities: Hofors, Karlstad, Munkedal and Vallentuna. Although each is of course quite distinct, they were perhaps typical of many other municipalities in Sweden, in terms of scale and capability. Although each application was judged on its own merits, this did allow a portfolio approach, with each municipality focusing on its own agenda, picking a part of the system to prototype, as well as developing shared aspects.

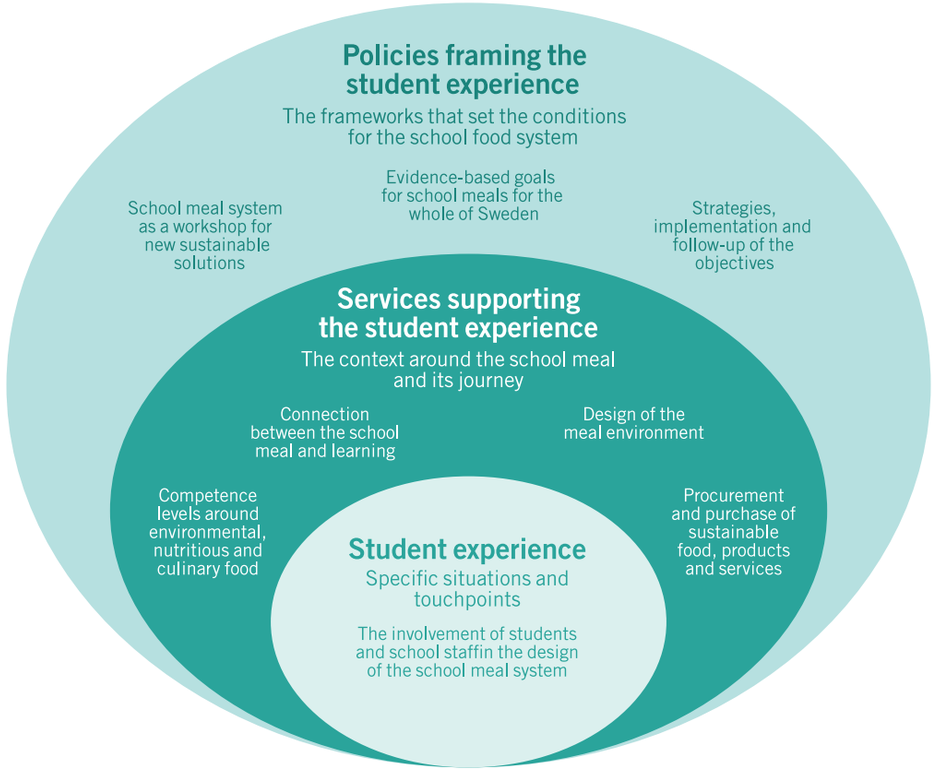
Call document:
Does your municipality want to be involved in designing a sustainable school food system for children and young people in Sweden.

The procurement text states that the project is coordinated by the national food agency (Livsmedelsverket) and financed by the innovation agency (Vinnova). Other project partners are the Swedish Public Health Agency, the Swedish Board of Agriculture, the Agency for Youth and Civil Society Affairs, National Agency for Education, the Procurement Agency, and Sweden’s association of municipalities and regions (SKR). This begins to show the system forming around the prototypes.

Prototype organisation

Ultimately, the systems mapping, drawn from field research and stakeholder engagement, combined with the concept design and theory of change, help set up a delivery structure for the

mission. This set of intervention points, organised around the students’ needs, informs prototype design and delivery, as well as being able to help articulate overall goals for the mission. Antrop produced a diagram indicating how these might fit together. Each of these intervention points could be addressed by the prototyping municipalities, as described overleaf.



School food diagram by Antrop, indicating goals and interventions, mapped against direct and indirect affects on student and school meal experience. This framework can be used to organise the prototype portfolio.

Prototypes

Intervention points

Municipal leads

Student experience

The frameworks that set the conditions for the school food system

Involvement of students and school staff in the design of the school meal system

The most sustainable food is good food that is actually eaten. By involving the students in the journey from farm to fork and beyond, we increase the students' commitment to choosing and eating good food. This also helps create the conditions for lifelong knowledge about sustainable foods.

Hof. Val.

Services supporting the student experience

The context around the school meal and its journey

Competence levels around environmental, nutritious and culinary food

There is a need for increased competence around sustainable food and produce, among educators, kitchen staff, and others who control meals. Raising competence levels can lead to both higher quality food and more opportunities to involve students, collaborating between kitchen and classroom.

Hof. Mun.

Connection between the school meal and learning

Few connections are being made between the meal and learning, currently. By using the school meal, kitchen and environment as educational tools, young people can learn about sustainable food, creating more commitment to sustainable and healthy meals and food systems.

Hof. Mun.

Procurement and purchase of sustainable food, products and services

Procurement and purchasing practices are key factors for sustainable foods, and food system, in the school meal. Today, both knowledge and time are lacking for effective and innovative procurement.

Val. Kar.

Prototypes

Intervention points

Municipal leads

Design of the meal environment

Children, young people, and adults all testify that many school restaurants are often messy, stressful, and dirty, and with boring interior design. By creating a pleasant, secure, and enjoyable place that foregrounds the meal experience, positive emotions are created around food, eating, and learning.

Kar. Mun.

Policies framing the student experience

The frameworks that set the conditions for the school food system

The school meal system as a workshop for new sustainable solutions

The public meal has long been a driving force in the transition to organic food production. By using the public kitchen as a platform, we can push through changes towards a more sustainable food system where, for example, new produce, products and services can be developed, tested, and scaled.

Val. Kar.

Evidence-based goals for school meals for the whole of Sweden

National goals for the school meal should be drawn from evidence-based knowledge so that all children in Sweden have the same conditions to eat good and sustainable food, and all municipalities are given a clear direction towards working sustainably with school meals.

Val. Kar.
Hof. Mun.

Strategies, implementation and follow-up of the objectives

Delivery towards goals must be followed up. Each municipality will need support as to how national sustainability strategies can be implemented, to ensure that goal fulfillment is based on specific local conditions.

Val. Kar.
Hof. Mun.

What we're trying to do by asking people to participate is envision what is the question, not what is the answer. There's nothing worse than answering the wrong questions well.

Alejandro Aravena

Combined prototypes deployed

Karlstad prototype

Karlstad is investigating how a high school's school canteen can be transformed into a place where students thrive, feel safe and have positive feelings about food. The meal environment intervention point addresses the problem that many students opt out of the school meal in the dining room towards something less sustainable and less healthy (leading to low energy and high waste). This behavior becomes more common in older students, with many eating buns or sweets from local grocery stores, instead of a diet-planned school lunch.

School restaurants today are perceived as messy, stressful, dirty, and boring. The project group in Karlstad is exploring how the lunch in the dining room could instead be the school day's coveted break, where students want to meet and share a healthy, sustainable meal together.

The concept benefited greatly from working directly with children and young people's involvement in the school meal system. By involving the students in the school from the start of the creative process, the results are better tailored to needs and desires, whilst the project team noticed a increased student engagement in their school canteen and school meal.

The designed meal environment is also exploring how to get students to try more sustainable and healthy alternatives. The team is testing a 'try-out' island to entice students to try something new, and a social area with a bar table in the dining room for demonstrations and lessons. This also addresses other intervention points of competence levels around sustainable food, as well as the school meal's connection to learning.

Combined prototypes deployed

Karlstad prototype, October 2021

As per the Streets mission approach, the school context meant that food environments could be co-designed with the students themselves, in workshops at the school Rudskolan, facilitated by professional designers.

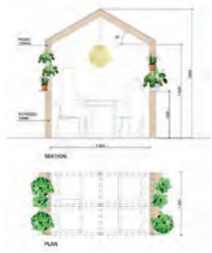
Professional design support—in this case from Antrop working with architects Amanda Lecorney and MAF—was fundamentally important. But equally, what if municipalities had these design services inhouse, capable of both working with external design agencies for major revisions whilst handling ongoing 'everyday' design and maintenance themselves?

Combined prototypes deployed

Karlstad prototype, October 2021

Karlstad is investigating how a high school's school canteen can be transformed into a place where students thrive, feel safe and have positive feelings about food. The project group in Karlstad has investigated what creates the current negative experiences of the meal environment, and in particular the dining room, and what interventions might be able to this view around. The school meal in the dining room will instead be the school day's coveted break time, where students want to meet and share a healthy, sustainable lunch together!

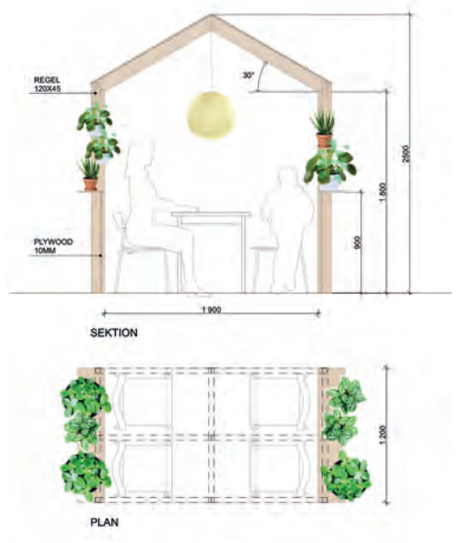
A 'greenhouse' concept, co-designed with the students. To be built in wood and painted in beautiful greens and yellows. The small houses work as room dividers, and provide a secure and relaxed environment for those who eat in the 'candle garden'.



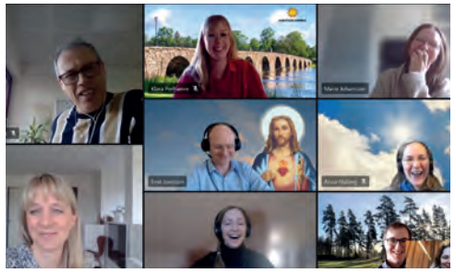
A 'living room' concept, again co-designed with the students. Features cosy spaces, for homework as well as hanging out, as well as a tent environment, with dimmer lighting and soft furnishings. There is also a teaching space, with high benches and stools.

Combined prototypes deployed

Karlstad prototype, October 2021



The new plans create an environment where students thrive, feeling calm, creative and social during the school meal. Involving students in the design also increases engagement, with more staying for school lunch, increasing diet quality and reducing waste.



The project team at Karlstad municipality, with Antrop, and below, the wider project group including students, cooks, and teachers at Rudskolan.

The designs co-produced by the students, teachers, cooks, facilitated by Antrop and architects Amanda Lecorney and MAF, were constructed on-site in Karlstad.

Combined prototypes deployed

Vallentuna prototype

The Vallentuna prototype explored different ways of broadening the diet of students, and increasing knowledge and awareness of sustainable, healthy food. Students are introduced to different types of sustainable food through the concept ExplorEAT, which tries to arouse the curiosity of students and entice them to explore sustainable food with all their senses.

Different elements of the system come together in **ExplorEAT**. Students are tempted to taste and eat food that they are less accustomed to. School cooks are involved in preparing and presenting the food to the students. Educators work with both students and raw materials. Local food producers are involved and help children learn more about the origin of food, whilst strengthening local connections.

In terms of the prototype portfolio, and different intervention points, ExplorEAT means that students eat more sustainable food, and increase their competence levels around environmental, nutritious and culinary food. Children and young people are more involved in the school meal system, and educators and kitchen staff have the abilities to make the school meal a tangible part of pedagogy.

The prototype was tested at Karbyskolan in Vallentuna. The aim was to reach grade five and six students, where pickiness about school food is typically greater, where you can leave school to buy unhealthy lunch at a nearby grocery store. The test period ran for four days in week 43 (MondayWednesday) and Wednesday in week 45. The sustainable raw material put in focus was tofu, locally produced by Yipin in Vallentuna.

Combined prototypes deployed

Vallentuna prototype, October 2021

In the first part of the week, the students explored a ‘labyrinth’ of sensory stations, to feel, smell, look and taste the sustainable ingredient. To increase curiosity and excitement, the raw material is secret and the room is dimly lit. At each station there is an adult who, talking quietly, encourages exploration by prompting and asking questions.

The students are offered to taste the secret ingredient, marinated and flavoured with pizza spices from the school kitchen, and then fill in a competition form to guess the ingredient

Combined prototypes deployed

Vallentuna prototype

The students find out from their class teacher in the classroom that the secret ingredient is tofu, in connection with a teaching session on sustainable food. The tofu is also presented in the school canteen. It is displayed in the different forms that the students encountered the day before: natural, as soybeans (feel), smoked (smell), and marinated with pizza spices (taste). In class, the students learn about sustainability and the link to food, the UN's Agenda 2030 Global Goals. They have to search for information about tofu online, as well as discuss how they can help in the school canteen. The lessons end with a knowledge quiz about sustainable food, and tofu, in Kahoot.

The students in grades 5-6 got to taste three different dishes and desserts, prepared from the school kitchen with tofu from the local producer Yipin. The dishes were served in smaller 'tasting portions' in a restaurant-like environment built up in the Food Lab at Karbyskolan. The students had to rate the appearance and taste of the dishes in a tasting form, before voting on which one was their favourite.

Combined prototypes deployed

Vallentuna prototype, October 2021

Many students are familiar with how unusual food is introduced on social media through 'challenges'. By daring to taste new food in a challenge, self-confidence grows, meaning it becomes easier to explore new food in future. This concept can be built into the school, providing a platform for introducing new food and produce.

The dish that received the most votes from students was selected to join the main school menu two weeks later. A representative from Yipin, the local tofu producer, participated in the evening and present during the tasting, before conducting a presentation and question time with the students.

A 'secret ingredient' (locally-produced tofu) was introduced and explained, before being presented in a range of dishes. Students explored different tastes, gaining certificates for doing so, and then voted on their favourite recipes.

The favourite recipe then joined the main lunch menu. It's easy to see how these 'ceremonies' could become regular ways of enriching the school's menu, as new rituals for the school students and staff.

Combined prototypes deployed

Hofors prototype

Hofors are concentrating on the pedagogical aspects of school food, particularly building an awareness of sustainable food, from growing to preparing to eating to waste and recycling.

Their '**learning programme**' increased the students' theoretical and practical knowledge of the connection between the food they eat, their health, sustainable development and the local community. The initial program will be the starting point and driving force for collaboration between learning and food in t he school, and the local greenhouse and science centre.

With the '**return of the picnic**', Hofors wanted to create an outdoor environment for cooking and eating lunches, where classes can eat their lunch with their teachers. There will be an extra focus on an interesting meal, with new local, organic, and plant-based ingredients.

Finally, Hofors are prototyping an **'Evaluation App**' and '**Food Box**'. Via the app, students are given the opportunity to choose their school food for the coming week, and give feedback on the meal afterwards. The app also enables the school to sell leftover meals to students as the 'Food Box', reducing food waste and contributing to a better nutritional intake of students outside of school, as well as evening out socio-economic differences.

All aspects were prototyped over several weeks, and the team produced detailed evaluation of the prototypes, helping inform the next stages of development.

Combined prototypes deployed

Hofors prototype, October 2021

Year 1 students visit the greenhouse. They get an introduction to how the greenhouse works, how to use rainwater with the plants, including how to collect it with large rainwater tanks. They explore tropical plants, before learning how to plant seeds for cucumbers and corn. These are plants that they can take back to school. These activities are to formalise a creative and productive link between the school, and the local greenhouse and science centre.

Combined prototypes deployed

Hofors prototype, October 2021

With a theoretical and experience-based pedagogical program, Hofors wants to increase students' knowledge of the connections between the food they eat, their health, sustainable development and the local community. They can use the connections between the school, the meal, the greenhouse and science centre to make this happen. With the basis in experiences of the physical environment in these places, digital elements will also be developed; for example, via digital VR environments, and combining coding and sensors in greenhouses. The science centre also enables connection to local industrial symbiosis and new solutions that contribute to sustainable conversion. The program is adapted based on age group, initially for years 1 and 4.

The prototype Food App (above) explores how students might be able to choose foods for the forthcoming menu, and feedback on dishes afterwards. The Meal Box prototype (below) explores how leftover food from school meals can be taken home by children for dinner, outside of school. Both of these are highly scalable ideas.

Combined prototypes deployed

Munkedal prototype

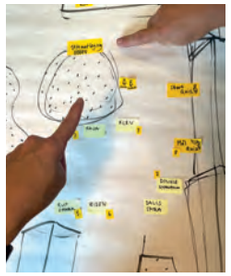
The Munkedal prototypes pivot around the ideas of **a food market running in the school grounds** and **students as food influencers**. These link multiple parts of the food system: procurement of food from local producers; a different meal environment; food being cooked by children, parents, teachers and cooks; the local community around the school; food waste and local materials; students involved in the menu, kitchen and classroom; and so on.

The market builds on the local appreciation of outdoor cooking, but in a social context, and a different starting point for the organisation of school meals, with educators working sustainably. The market also works as a platform for connecting other school subjects (e.g. handicraft, home economics, biology etc.). In addition, local producers can provide a tangible understanding of the role of production in the local community. Each market links to a specific theme, such as *'local production'*, *'diversity of tastes'*, *'eco/vego'*, *'body and health'* etc. The goal is for students and local community to leave the food market with knowledge of how locally-produced food, and new foods, can contribute to sustainable development, environment and culture.

In the related programme, students are engaged to be **Meal Influencers**, who make suggestions for the school menu and café, implement sustainable good and nutritious dishes and accessories and inspire their classmates to try new ingredients and eat sustainable, healthy food. The influencers also make signs, recipes, evaluation forms, and personally present the raw materials as well as help out with cooking. Home economics teachers are involved in running this work, together with cooks and meal staff.

Combined prototypes deployed

Munkedal prototype, October 2021



The market is co-designed with students and staff to fit the school grounds. Smells, tastes and a party atmosphere attract the students' interest! The after-school children make things connected to the market, which they show off and maybe sell. For example, they develop carpentry skills to make wooden boxes to grow food in. They make apple chips, pesto and pickles, or bake chickpeas, and use other local ingredients, as well as decorating with homemade signs and labels. This uses student influence, local knowledge, and practical experience. Students also influence parents to visit the market. Teachers also participate by introducing and visiting the market with their class.

The market allows a great emphasis on locally produced food. The goal is for students to leave the food market having learnt how locally-produced food contributes to the local economy, to a vibrant countryside, and to a better understanding of where the food we eat comes from. Local food can make places more resilient, whilst shorter distances between farm and fork contributes to reduced emissions from transport. Natural grazing animals keep our landscapes open and contribute to biodiversity. And local food often tastes better!

Combined prototypes deployed

Munkedal prototype, October 2021

Home economics teachers work together with cooks and meal staff. The student Meal Influencers have taste tests, cook food together, get to meet well-known influencers, and learn how to convey the importance of eating sustainable, healthy food and what it means to be an influencer.

The school food prototype portfolio

The prototypes for School Food mission emerged some months behind those for the Street mission. This was on purpose, as more work was done around the school food system to create the organisational ‘glue’ behind the scenes, and also to test working in a different way, with a single design agency (Antrop) publicly procured to work across the whole mission.

The school food prototyping process being led by Antrop across multiple schools and municipalities meant that the different prototypes had a consistent quality, including a shared set of graphic elements with which to build touchpoints and materials. A shared school food mission is easier to perceive across these four initial prototypes when it has shared processes and a common coordinating group—but also a shared ‘look and feel’.

Where Streets had multiple projects led by different actors (ArkDes leading Street Moves, Spacescape/KTH leading Framtidsgator, and so on), a larger Antrop team worked across multiple projects in all four municipalities.

Both approaches worked, but Antrop’s guiding hand perhaps allowed a coherent mix of different and shared intervention points, to form a portfolio. This meant that, for instance, a detailed evaluation assessing interventions could be carried out in a common way. This included reflections on what worked and what didn’t work—to inform next steps—as well as mapping against the set of intervention points, and Agenda 2030 goals.

It’s already possible to imagine how these particular prototypes can be developed locally—refined, embedded, extended—as well as adopted and adapted across the partner municipalities, and the wider set of ‘follower’ municipalities, forming Systems Demonstrators.

Governance sketch

Skolmat mission

This evolving structure defines how governance for the prototyping process sets up a broader governance model for Systems Demonstrators, capable of scaling, learning and adapting.

Overall steering, guidance, and advocacy, including stimulating public awareness. Includes link to other public meals opportunities, and broader food system alongside other systems, and international engagement. Overall goal setting.

Mission board
e.g.
Livsmedelsverket
Vinnova
Skolverket
Jordbruksverket
Upphandlingsmyndighet
SKR

Expert group
e.g.
SLU
Stockholm Resilience Centre
Sweden Food Arena

Industry and civic society stakeholders and academic researchers. Initiated on-demand.

Manages prototype and demonstrator calls and delivery. Features Livsmedelsverket as overall coordinators, Vinnova as system mobilising and financing, alongside other national and regional actors. Coordinates process support for design and strategy.

Project team
e.g.
Livsmedelsverket
Vinnova
Kommuner
Stockholm Region

Policy labs and other external design and delivery services
e.g.
Antrop

Tools and processes for addressing policy and regulatory issues, service design, innovation management etc. Procured as required.

Local mission boards replicate the functions of national mission board and project team but at the local level, managing multiple prototypes as they develop into Systems Demonstrators. They are coordinated by national project team, which ensures learning is shared across local mission boards.

1 Local mission board	2 Local mission board	3 Local mission board
1 Systems demonstrator P P P P	2 Systems demonstrator P P P P	3 Systems demonstrator P P P P

Scales to multiple systems demonstrators, coordinated by multiple local mission boards, over time.

School

3 Developing prototypes

Summary

3 Developing prototypes

Summary

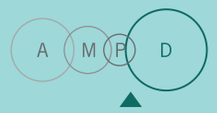
- Get to the prototypes as quickly as possible. This is where the real learning happens, even via the ‘half-step’ forward.
- Prototypes flip the focus from abstract analysis towards real world synthesis, putting ‘the room in the system’.
- Use insights from Design Workshops to build up the concept design, principles, and starting points for prototypes. Find prototype collaborators through calls as well as workshops.
- The prototype is where the mission truly begins to appear in public. Ensure that prototypes have an inherent logic for co-design, collaboration and participation, from initiation to delivery and adaptation.
- Making a prototype forces decisions, providing more ‘hi-res’ sketches of policy and governance possibilities.
- As missions involve systems of systems, a portfolio of prototypes will be required. Use the platform strategy to ensure that prototypes complement each other.
- Get close to the prototype in order to understand its relationship to people and place. Discover how to best position the mission, and the actors involved. Build a rapport with teams, for subtle steering.
- Equally, let the project partners do their work. Given them space to explore and lead, so that they absorb the mission.
- Gather multiple forms of evidence from the prototype. This data provides the propulsion for the ‘snowball method’.
- Ensure that quality media is constantly being produced, as grounded narratives also produce momentum for scaling, attracting new collaborators.

We take almost all of the decisive steps in our lives as a result of slight inner adjustments of which we are barely conscious.

W. G. Sebald

4

Developing demonstrators

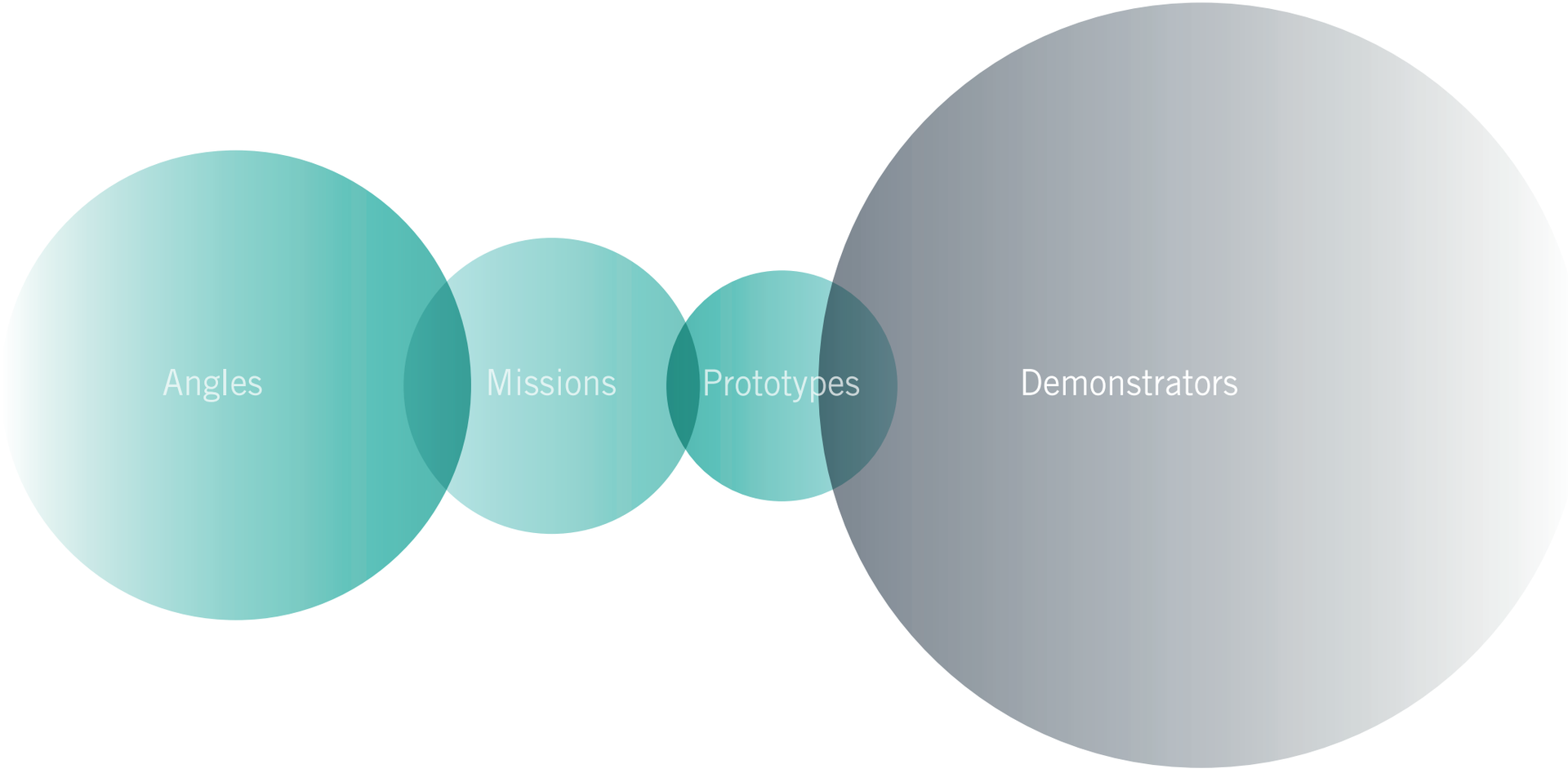


In which diverse groups work together to design, develop and organise for systems demonstrators, based on insights gathered from prototypes.

4 Developing demonstrators

As Kieran Long, director of ArkDes, has said, *"Prototypes are always wrong—but on purpose."* The mission prototypes are not actually like architect's clay models; they are real deployed systems, appearing in reality. These were real streets being used in new ways by real people, and real school kitchens cooking real food. Yet, as prototypes, they are deliberately malleable, temporary, and incomplete. Although they get the ball moving, their other job is to produce deep and rich insights into the broader systems behind them. Those insights are used to guide the next stage: prototypes connecting at scale, and being refined, in terms of quality, resilience, and impact. Here, they begin to rewire *systems of systems*; not simply a single street, but neighbourhoods of transformed streets, which has the critical mass to produces network effects on the city and its systems. Not simply a school, but its connected systems, like neighbourhoods, procurement, logistics, or warehousing. These can be shared with other schools, and translate across other cities and regions. This is the scale of the systems demonstrator.

4 Designing demonstrators



4–1

Designing demonstrators

The prototypes are a method for identifying, defining, and refining Systems Demonstrators. Just as prototypes are fully working interventions, albeit usually at small or limited scale, Systems Demonstrators are more fully-realised and fleshed-out versions of living systems. Nonetheless, they exemplify innovative approaches to transformed systems delivered in reality. They are real things, yet also stand for future trajectories, effectively living incarnations of North Stars for the missions.

From prototypes to demonstrators

When making anything remotely complex—a train station or a tax; a school meal or a school; a theatre performance or digital platform—we first do a dry run, make a scale model, hold a rehearsal, or design and test a prototype. Such a prototype performs multiple tasks, but in a mission-oriented innovation process, a key role is to lay the first planks of a systems demonstrator.

The demonstrator inherently conveys the *systems of systems* pertaining to the mission, or grand challenge behind it, and crucially, **begins to illustrate how they are now combining in a transformed way**. Systems theory indicates that all these aspects are already combined—everything is connected—but our challenge is to transform how they are connected such that they address our grand challenges, rather than ignore them or, worse, consciously produce or reinforce them.

Simply, with our examples, the demonstrator is what we begin to get when prototypes move from transforming one or two streets, to transforming multiple streets in entire city blocks and neighbourhoods, and thus producing ripple effects through all their inherent services, experiences, infrastructures, cultures, biodiversity, forms of governance, and so on.

Scaling may be non-linear here, as critical mass may be achieved at various certain points in this development, producing the 'greater than the sum of the parts' perturbation point which shifts a system from one state to another. As Jane Jacobs said, a city is *"not like suburbs, but denser"*—it is something else, a different condition. So equally, the demonstrator is not just the prototypes but bigger.

Looking through a systemic lens allows us to understand and explore these conditions, uncovering different forms of system behaviour that cannot be perceived, or even unlocked, at the scale of prototypes.

With school food, the demonstrator case is not simply achieved by transforming a kitchen and canteen in one school in one municipality—*that* is the goal of the prototypes—but transforming multiple aspects of school food across multiple schools in a municipality, and then multiple municipalities.

This might involve these schools *sharing* procurement models, low-carbon logistics, warehousing, or relationships with farmers, and so on. This requires a form of active 'glueing together' by the municipality, to make this happen, carefully balancing the individual needs of particular schools with the shared needs of all schools. The demonstrator scale would address the curriculum, and its relationship to food as a learning agenda, in all the municipality's schools, again understanding and enabling a shared approach, as well as diverse customisation of certain elements. The demonstrator might involve the creation of models—like a parent, student and chef forum—which moves from the province of one school, to all the schools. It might involve the development of shared digital platforms at scale, again with appropriate localisation.

This immediately foregrounds the question of shared development across multiple regions, and thus a national codebase and toolkit (just as with the question that the *Street Moves* physical and digital 'kit of parts' explores: how to have a shared national toolkit, which can be adopted and adapted locally). The relationships with farmers and producers begins to change at this scale. Equally, we look for the balance of common and unique logistics systems.

At this point, with multiple aspects of food systems around the municipality beginning to change—in ways that can be clearly perceived, and thus adopted and adapted elsewhere—we can describe this as a systems demonstrator. The prototypes help us imagine these demonstrators in detail, beginning to prepare the ground.

Systems demonstrators

A systems demonstrator is an inspirational and tangible vehicle demonstrating what is possible at the level of systems of systems. They demonstrate and describe transformative approaches to solving multiple societal challenges in an integrated and holistic way, often through collaborative, mission-led activities.

They are usually place-based, at various scales and levels and complexity. This means they combine and align meaningful touchpoints and experiences, operations and organisations.

Examples can include buildings and streets, campuses and neighbourhoods, ports and factories, farms and landscapes, towns and cities, and entire value chains. This enables an integrated, holistic, and people- and ecosystem-based approach.

Systems demonstrators encompass digital, physical, environmental, social, cultural, and political practices and infrastructures. They will connect local to global, with engaged international partners.

They cannot sit within one ‘silo’, nor simply stay at one end of the value chain—they must include elements of push and pull, supply and demand. They take a systemic approach to aligning new and existing tools and techniques. They are carefully designed to multiply and spread, enabling transformational change. They are real living systems, not pilots.

They are based on understanding and learning activities, derived from prototypes and other activities that help shape definition, engagement, ownership, evaluation, and communication.

They are systems of systems. They demonstrate what happens once several prototypes are woven together, beginning to demonstrate the ‘greater than the sum of the parts’ essence of complexity, the network effects of scaling produced by critical mass.

The ultimate, hidden truth of the world is that it is something we make, and could just as easily make differently.

David Graeber

Black Lives Matter graffito, on a bike path to Farsta, southern Stockholm, summer 2020.

4–2

Making networks

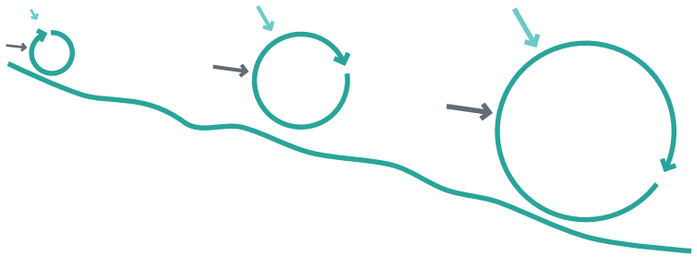
The missions are governed, at high level, by mission boards. These are diverse groups of stakeholders that can use their experience to guide the mission as it unfolds. A systemic approach ensures that it is aligned with related governance contexts. Yet mission boards also have governance ‘above and below’. This requires clear connections to broader contexts, such as EU missions. Equally, on the ground missions require steering, advice, and ‘snowplough’ work, clearing the way for effective delivery.

Governance and snowballs

Steering groups into mission boards

To a large extent, mission-oriented innovation concerns the practice of creating the conditions for multiple interventions to transform systemically. It must ensure that such conditions can nurture, stimulate, and steer activity. It must then create structures that can continue to evolve based on insights from the delivery of **Prototypes**→ and **Demonstrators**→.

This emphasis on 'the conditions' means a focus on governance, and its relationships, from the start of the process. As indicated, networks are being produced from day one, and the Snowball Method suggests how they might evolve over time, forming governance and steering networks around the insights produced from the project, rather than simply how governance happens to have been organised previously.



The snowball method described earlier suggests that missions boards can form when the time is right to do so. Forcing them too early is likely to backfire, as agencies see little reason to commit. Once a mission is running, however, the board can emerge around the action and engagement.

At a certain point, however, in the Swedish context at least the mission governance benefits from a more formal structure. The **Mission Board**→ essentially starts as the portfolio management function, capable of steering the multiple projects (often prototypes) that comprise the mission. It is populated by an evolving mix of stakeholders, as the following pages indicate. Over time, however, it provides clues as to how governance might be better organised generally, beyond the mission's lifetime. Just as the missions will provide demonstrations of how systems like mobility and food might be better organised, the

Mission Board provides a sense, and then a demonstration, of how governance of mobility and food might be better arranged and articulated.

In other words, the Mission Board for the Street mission is a sketch of how a 'Streets agency' might be built within a future iteration of Sweden's governance system. It might be constructed from elements of the existing traffic agency (*Trafikverket*), transport regulatory authority (*Transportstyrelsen*), public health agency (*Folkhälsomyndigheten*), culture agency (*ArkDes*, *Statens konstråd etc.*), environment agency (*Naturvårdsverket*), built environment agency (*Boverket*), and so on, with meaningful connections to regional and municipal governments (such as those held by *SKR*, the local and regional government organisation). Important strategic initiatives, like committees (the Council for Sustainable Cities) or innovation programmes (like *Viable Cities* or *Drive Sweden*) might also be represented.

A truly systemic and diverse approach would also find a way of incorporating private and third sector actors into the Mission Board. This would need careful handling, for obvious reasons, and it may be that the projects themselves are the best place to locate such participation. However, given the long history of public-private collaboration in Sweden, as described earlier, the idea should not be dismissed without consideration.

The same possibility emerges around the School Food mission. Rather than a system arranged around independent agencies working relatively independently, and with little in the way of deep vertical integration, the Mission Board might begin to indicate an integrated approach, oriented around school food itself.

This would comprise elements of the school agency (*Skolverket*), food agency (*Livsmedelsverket*), health agency (*Folkhälsomyndigheten*) and procurement agency (*Upphandlingsmyndigheten*), built environment agency (*Boverket*), environment agency (*Naturvårdsverket*), agricultural agency (*Jordbruksverket*), the local and regional government organisation (*SKR*), and so on.

The new constellation of actors is brought together coherently by the school food projects. The mission is a new centre of gravity, with school food no longer handled by one agency at the national level and delivered on the ground by municipalities, but instead by a network of actors, capable of taking a diverse approach to a grand challenge.

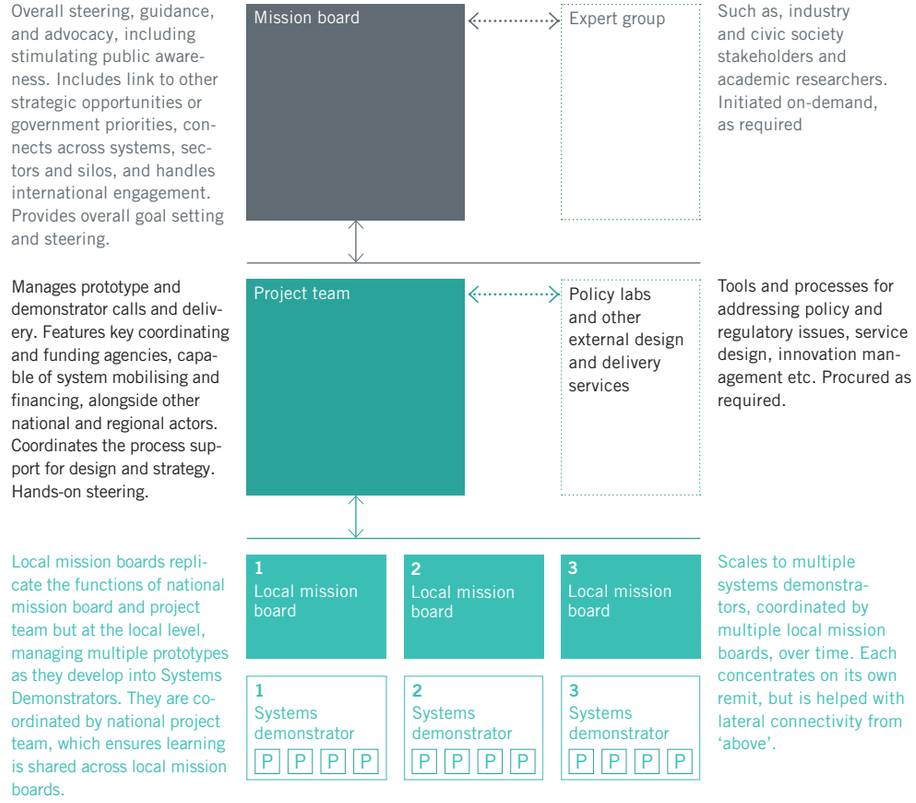
This new arrangement is framed around innovative and systemic—but also tried, tested, measured, and enacted—delivery of school food, and thus can better mirror the systems of school food as they are, and as the could be. They are more attuned to the reality of the current systems, and capable of exploring and delivering the next. The same potential obviously applies to mobility missions, like Street and Grid, as well as for challenge areas yet to be explored. In Sweden at least, the role and expertise of municipalities must be key to this new organisation, given their touchpoints with real systems and people, and their often untapped wealth of assets.

As the Snowball implies, the Mission Board best emerges once the mission is underway. It must evolve, and grow as the mission grows. This ensures that the Board is framed around meaningful networks at each point in the mission's evolution, with each member having meaningful 'skin in the game'. This can be a challenge, as some members may need to be gently convinced to consider joining, at least towards the beginning of the mission (it may not be immediately obvious, until there are some results from prototyping). Conversely, some prospective members may expect to be on the Board, irrespective of their actual involvement in the mission. As with most other things mission-oriented, handling these relationships takes skill, diplomacy, patience and empathy. It further reinforces this shift from transactional cultures within government towards relational cultures, and as such, is yet more 'good training'.

Governance example

Typical mission

This evolving structure defines how governance for the prototyping process can help set up a broader governance model for Systems Demonstrators, capable of scaling, learning and adapting. This is a typical structured, emerging around the prototypes.



Mission boards

Missions are governed by a mission board. This is a diverse group, balancing authority in the mission theme, as well as end-user perspectives and diverse viewpoints.

The mission board manages the portfolio of various Prototypes and Demonstrators in the mission. Each of these smaller projects may may have more focused ‘steering groups’, guiding their progress. The mission board is in close contact with these steering groups, as well as communication with other missions, and related activities nationally and internationally.

The Board should ideally comprise no more than 15 individuals, each of which has a meaningful perspective on the mission theme. The Board may include end-user or civic representatives, and should publicly represent the processes of participation activities as well as cross-sectoral actor engagement, in terms of co-designing concrete mission proposals and activities.

The Board members can include those with public profile as well as connections to sector actors;

they should include people with innovation skills and experience, as well as technical or subject-matter expertise in the mission theme. Some members will have connection to political processes.

A variety of types of knowledge and experience is important (noting that ‘research’ happens both inside and outside of areas traditionally synonymous with research, for instance).

International connection and direct representation are as important as local. Across its members, the Board should represent, in some way, as much as possible of Sweden’s geography.

A diverse Board will be a more effective, creative and capable board, understanding diversity in terms of gender, ethnicity, culture, perspective, age, locality, and so on.

A balance of past, present and future perspectives on the theme, within the context of 21st century Sweden, is also important. The Board should represent those with ambition for systemic change within the mission theme.

Crucially, each mission board must represent a multi-disciplinary, multi-actor perspective, deliberately looking to ‘bust silos’ in order to enable systemic change for strong social outcomes, whilst provide a

coherent yet ambitious governance function for the mission.

Thus, whilst the Board should contain those with strong footholds within the mission theme, each board ought not to be dominated by its traditional 'owner' within the system; usually, quite the opposite.

As with many forms of board in other contexts, it must weigh up a 'checks and balance' responsibility of enabling realistic, ethical, effective, and legitimate activity with a motivating drive towards systemic change. It should use its collective wisdom to advise on mission activity, and engage deeply with the information flows from the Prototypes and Demonstrators.

Yet it should not try to micro-manage them. It can help the steering groups to drive forwards by providing measured confidence and useful connections where possible.

The Board should ensure that learning moves across the portfolio of missions, as well as connecting to related mission-oriented innovation activity, such as national collaboration programmes, Horizon Europe missions etc.

Ultimately, a balance of expertise, ownership, new perspectives, constant learning, civic representation, positioning, diversity, and ambition for change is crucial. This set of perspectives should ensure that it is balanced between existing governance models for the mission theme, and where governance may go next.

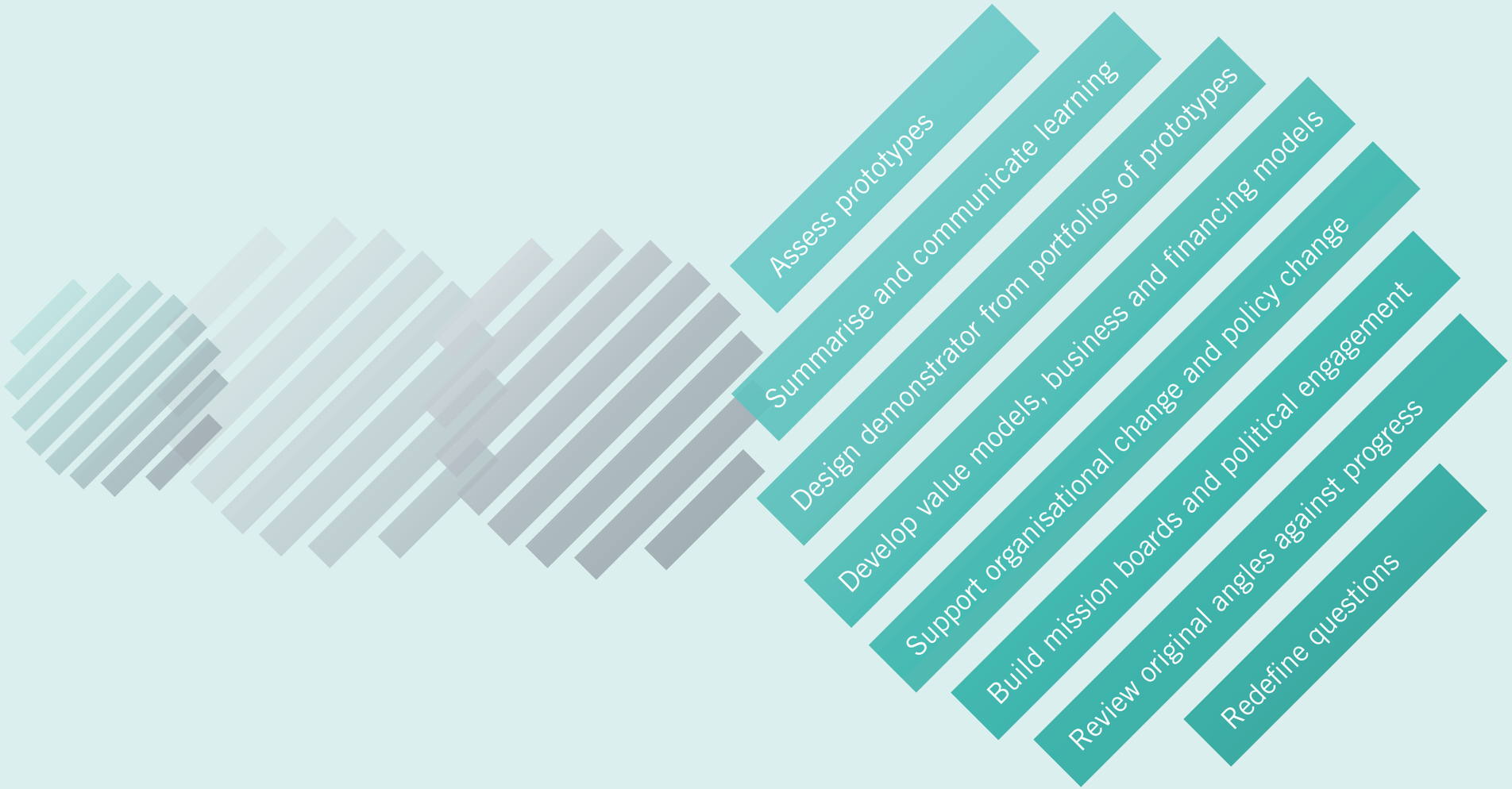
This not only provides effective steering, motivation and guidance, but also means each Mission Board can also form an active sketch of a new governance model for the theme at hand. It is a prototype enabling new structures and practices to be tested, without trying to guess what they are beforehand.

The dynamics of the particular mission should drive how frequently the Mission Board meets, and in what format. Each meeting agenda will centre on discussions in response to reports from Steering Groups for the mission, along with reports from adjacent Mission Boards, and discussion of wider context, such as national programmes and Horizon Europe, for example.

It is suggested that each Mission Board is coordinated and administered by the lead actor for each mission. The communication and interaction between each Mission Board, as part of the wider portfolio, could be performed by Vinnova, or an equivalent agency.

4 Designing demonstrators

Summary



4 Designing demonstrators

Summary

- The portfolio of projects will help articulate the different systems in play across the mission.
- The platform strategy, and its differing layers, will help articulate how complete the approach to these systems is.
- Both of these lenses can be used to help sketch out possible Demonstrators, by suggesting how these prototypes and projects might combine, overlap, and cohere together.
- As these Demonstrators will rely on prototypes coming together, pay attention to the relationships between the various stakeholders for the prototypes.
- Forge these relationships between prototypes by hosting project meetings and describing the complementary overlaps and differences between them.
- This will require diplomacy and patience, but each project should benefit from being consciously joined with every other project, as part of a larger design.
- A meaningful Mission Board can now be instituted from the project partners, institutional stakeholders, and active participants. Start small and simple with this, and use the portfolio to form its initial agenda. The North Star, and emerging value model, can be used for steering.

Beauty could emerge from the existing fabric … A not-too-apparent order should be sought from within rather than an easy one imposed from above.

Denise Scott Brown

Looking back from Base Camp One

When people ask how transformative these projects have been for Vinnova or our collaborators in and around government, I usually say, 'We're at Base Camp One in an Everest's worth of change.'

This is probably fair, in terms of a reflection on how large the broader task of public sector and governance innovation might be, at least in the context of the challenges we collectively face.

Yet I also want to suggest the nature of the challenge, and the powerful motivation implied by taking on such a journey. One does not end up at a Base Camp One by accident (unless you are extraordinarily lucky). You have to want to be there. You have to want to climb the mountain.

And in this case, you have to want to shift the entire school food system, the single largest food system in Sweden. Or retrofit all the streets in the country, which we can imagine as the largest urban development project in Europe. As impressive as actually climbing Everest may be, these missions are far more challenging, in many respects. They affect every person in the country, and many outside, as well as almost all the systems that the country is constructed from, one way or another.

Yet these 'Everest-size' missions were co-created by numerous collaborators. As such, they indicate that a participative, 'sleeves-rolled-up', exploratory process can produce missions of great ambition, of system-changing importance, of meaningful impact to both everyday life and our broader cultures of decision-making.

That humble 'everydayness', allied to the ambition required for grand challenges, is the most quietly satisfying balancing act in the work, along with the shift to running a portfolio of experiments, triggering diverse yet interconnected 'mutations in the code' of our systems. We may only be at that metaphorical Base Camp One, but in moving towards prototypes as quickly as possible, the mission-oriented approach is already changing systems, engaging people, and asking difficult, ambiguous or complex questions whilst making the next steps seem tangible, feasible, viable, and even desirable.

And yet, it is still just a start. It is part of Vinnova's remit to understand and develop new innovation approaches, and in this case, with missions, we wanted to learn-by-doing. We did this in Sweden, working with the grain of the material around us, and what happens in Sweden sometimes stays in Sweden. But we have tried to extract the broader ideas from the work and articulate them as clearly as possible. This book is part of that work. Now, onwards and upwards to that next base camp.

Dan Hill is Director of Strategic Design at Vinnova, the Swedish government's innovation agency. Dan led the mission-oriented innovation work for Vinnova, and wrote and produced this book.

Reflection from key collaborators

This approach to missions is predicated on deep collaboration. Below, reflections from some of the collaborators in these mission pilots, both public and private sector, sharing some of their insights the shared School Food and Streets missions they co-created.

"We have seen the power of agreeing on common visions. Instead of trying to solve the same old impossible problems on our own, we turned the whole thing around and put the spotlight on what we want to achieve, together with all stakeholders involved. This opened up new ideas and solutions and injected energy in the question. Vinnova were a 'door opener' in this respect, unlocking authorities and organisations that we have previously found it difficult to reach and engage, skilfully leading complex dialogue and collaboration.

Government agency culture tends to attach great importance to managing and maintaining the high quality of existing initiatives, rather than truly reconsidering our roles and activities. A clear call is sometimes needed to prompt us to think anew and to push complex issues forward. The mission-oriented approach provided this 'push'. It is also hard for these authorities to fund activities outside of their direct areas of responsibility, and Vinnova's system funding provided the opportunity to build new collaborations as well as enabling a whole systems perspective.

With the support of new methods introduced by Vinnova, we would be better able to promote various socially beneficial innovations in the food area, without sacrificing our core values and our integrity as an authority. Further change requires further resources, however, and now is the time to see if this new approach really can make change happen. I look forward to see the results of our efforts so far and how we can organise missions on a larger scale for a sustainable future."

Anna-Karin Qetel, Sustainability lead at Livsmedelsverket, the national food agency

"Street Moves has been a unique project for ArkDes that has lifted the debate about the future of Sweden's streets in local, national and international contexts. The support from Vinnova, and their l eadership on issues of strategic design-led research processes, allowed us to bring together a consortium of private and public sector actors around a creative design process. The prototypes created the opportunity for a range of dialogues with the public about the future of streets in Sweden. The resulting interest, and extraordinary range of press coverage, shows that this approach has a lot to offer us as we try to reach the ambitions of Politiken för Gestaltad Livsmiljö. We are now looking forward to phase 2 of the project, and spreading the knowledge gained from the project across the country."

Kieran Long, General Director, ArkDes, the National Centre for Architecture and Design

"The Street mission enabled us to create various dialogues with different European city stakeholders, as they'd heard that we've been part of this transformative concept in how to repurpose the streets to something better. I believe there is plenty of interest out there and probably even more than we know of today, from cities that lack the playbook for this kind of project.We believe part of the reason it has gotten the attention it has is because these modules are so appealing with their wooden design, whose material also can be extremely modular and serve multiple purposes at the same time.We're more than committed to doing the necessary 'hand-holding' with cities where we operate, that would like to pilot this concept in their own city. In addition, we're also committed to possibly hosting roadshows with repurposed modules, because it's one thing to see an image, but very different to see them in real life."

Erik Bergqvist, Head of Public Policy Projects, Voi

"From day one, we have had an internal phrase that "M comes with a garden", meaning that we want to give back. The fewer cars we have on our streets, the more opportunity we have to transform our cities into healthier and more sustainable places to live, work and play. Therefore, we need to find partnerships and projects where we could together explore this transformation. This is what we found in the Street Moves project. Key factors in the project's success was the neutral platform created by Vinnova, which allowed a broad consortium of stakeholders to work together around a common goal. The project also focused on moving quickly from ideas into action, creating prototypes that could act as catalysts for discussion, debate, and change. We at Volvo CarMobility share Street Moves' vision to ensure that every street in Sweden is healthy, sustainable and vibrant by 2030. Therefore, we are very proud of our involvement in Street moves. For us, the result is evidence that together, we can create a future in which we reclaim the space, time, and money that would otherwise be taken up by privately owned cars."

Steinar Danielsen, Sustainability Lead, Volvo Car Mobility

5

Related activities

In which the practices devised or deployed around missions help inform related programmes, and vice versa, whilst also providing the material for ongoing public communication about our shared grand challenges.

5 Related activities

This account has largely concentrated on Vinnova's work facilitating two mission pilots in healthy, sustainable mobility and food, during the period 2019–2021. Yet during this time, many other related activities ran alongside. Each of these pursued the *'learning by doing'* approach taken to the mobility and food missions, and each revolved around the linked practices of addressing missions, systems, and public sector innovation. Yet each emerged from a quite different context, and although these activities may have been 'outriggers' to the core missions, each provided opportunities to compare and contrast approaches, relationships, and techniques. Equally, significant effort was put into communicating the work, as a key part of the strategy rather than an afterthought. This meant a culture of ongoing reflection. The writer Joan Didion said, *"I write entirely to find out what I'm thinking, what I'm looking at, what I see and what it means."* The communication related to this work directly informs the work itself, in a symbiotic call-and-response, that helps refine the toolkit over time.

5–1

A missions movement

Vinnova's interest in missions was partly motivated by European Union *Horizon Europe's* interest in missions. So much of the work here has run in parallel with *Horizon Europe*, often interacting with it, as well as with the *New European Bauhaus* programme that emerged during 2021. Similarly, mission-oriented innovation was directly picked up across Sweden and the Nordic region, by multiple organisations. This work, and the models and processes described here, frequently engaged with, and supported, those activities.

Context

Collaboration

European Union Horizon Europe missions

Preparing the ground for EU Healthy oceans, seas, coastal and inland waters mission

The Vinnova strategic design team collaborated with fellow funding agency Formas, Mistra Urban Futures, and EU mission board representative Darko Manakovski, to 'prepare the ground' within Sweden for the EU mission around oceans. This included several Actors Workshops, producing sets of insights for the EU mission board's consideration (a glimpse of the work, overleaf).

European Union Horizon Europe missions

Preparing the ground for EU A Soil Deal for Europe mission

A similar process to the Oceans mission above, again collaborating Formas, as well as Swedish National Space Agency Rymdstyrelsen. Again, the format was Actors Workshops to 'prepare the ground' within Sweden, as well as derive insights into local needs.

Norwegian mission-oriented innovation actions, via D-Box

Norwegian missions, via DOGA

Vinnova worked with the Design and Architecture Norway (DOGA) to advise on the mission-oriented innovation programmes run for the Norwegian public sector via their StimuLab initiative. Vinnova's missions methods were used and tested by the consultant teams working on the trial missions, addressing the 'life events' challenges of 'starting and running a voluntary organisation' and 'having a seriously ill child'.

Nordic Council of Ministers mission-oriented innovation and research

Nordic research missions, via NordForsk

Vinnova was part of a pan-Nordic research and innovation group, brought together by NordForsk, the Nordic Council of Minister's research organisation. Led by Ingrid Petersson, Director General of Formas, the group used Vinnova's mission-oriented innovation theory and methods to identify and formulate a set of Nordic research missions—for example, Sustainable cities by the seaas well as discussing the possibilities of mission-led approaches.

Context

Collaboration

Covid-19 and food strategy

Rapid Transition Lab—Swedish food systems

Directly coming from the Food mission activity, Vinnova instigated a new model for exploratory research into the unravelling system transformations occurring due to the Covid-19 pandemic. Stockholm Resilience Centre and Dark Matter Labs are doing field research into all aspects of the Swedish food systems, which will both inform existing mission-related activities and produce insights for new innovation activities.

Swedish food industry

Sweden Food Arena

Early on in the mission-oriented innovation development work, a key discussion partner was Sweden Food Arena, a "national arena where food industry stakeholders collaborate for an innovative, sustainable, and competitive food sector". After many discussions with the Vinnova teams, they created a set of five different missions for the industry—The world's most attractive food and drink; Competitive food innovation; Food and drink for a healthier life; A resource-efficient food sector; and Climate-neutral food production—each with targets, linked to UN SDGs.

Preparing the ground for mission-oriented innovation in Sweden

Regional support within Sweden

As regions are increasingly interested in developing their own missions, Vinnova can play a support role here, providing methods and facilitation, as well as learning about local context and joining missions and ideas together at greater scale. In particular, the Stockholm Region Mental Health strategy was a particular focus, alongside development workshops with many actors in Borås, Kalmar, and Västra Götaland.

Preparing the ground for mission-oriented innovation in Sweden

Other Swedish engagement

Related activities within Sweden range from sowing the seeds for the next iteration of the Strategic Innovation Programme to be mission-oriented to informing the methods for, and approach, to the Government's Strategiska Samverkansprogram industry collaboration agenda.

Context

Developing mission-oriented approaches across the Nordic region

Collaboration

Nordic Food Policy Lab

Vinnova helped develop a Nordic Food Policy Lab, under the Nordic Council of Ministers, which aims to establish a first shared Nordic mission around food. The collaboration both draws from and informs the Vinnova-led approaches. It featured many different innovation players, such as Nordic Innovation, Vinnova and Formas (Sweden), Design and Architecture Norway (DOGA), Research Council Norway, and Innovation Norway, SITRA (Finland), Danish Design Centre, and so on, as well as EU-based actors EIT Food and EIT Climate-KIC. This playbook includes an excerpt from the Policy Lab's Cookbook for systems change, created by members of the Lab in collaboration with Stockholm Resilience Centre and EAT Foundation.

Developing mission-oriented approaches across the Nordic region

Other Nordic engagement

Numerous other organisations across the Nordic region are developing their mission-oriented approaches, and Vinnova has frequently engaged in discussion, workshops or facilitated exchanges, both to share experience of mission theory and practice, and in order to learn from related, but different, contexts. In addition to the NordForsk and Nordic Bauhaus programmes described earlier, this includes regular knowledge-sharing with Danish Design Centre on their new strategy, as well as exchanges with DEA, a Danish think tank advising the Danish government on missions. In Norway, learning exchanges with Design and Architecture Norway (DOGA) and the launch of DBox, the Norwegian National Centre for Transforming Public Services; in Finland, SITRA (the Finnish innovation fund) and Business Finland. Finally, the Oslo Architecture Triennial 2022 features Vinnova in its steering group, and is organised around a 'Mission Neighbourhood' concept. The Vinnova team also shared their experience with Charles Leadbeater & Jennie Winhall as input into their Green Paper on System Innovation for the Danish Rockwool Foundation.

Context

Developing mission-oriented approaches across Europe

Collaboration

New European Bauhaus

Vinnova's mission-oriented innovation approaches, and particularly the place-based agenda, has proved a key input into the European Commission-led New European Bauhaus programme. It has also been used to frame the initial Swedish government-led activities around the Bauhaus programme, influencing both methods for stakeholder engagement and to the typological and place-based approaches within Sweden. Similarly, a Nordic Bauhaus collaboration emerged, with Vinnova's mission-oriented experiences used as examples of new and relevant forms of place-based innovation practices.

Developing mission-oriented approaches across Europe

Other European engagement

As well as numerous knowledge-sharing exchanges across Europe—from municipal to national governments, from bilateral meetings to public events—the Vinnova team have been in regular contact with the European Commission's Horizon Europe mission development teams, sharing progress on the mission pilots within Sweden, as well as the documentation in the playbook. Additionally, Vinnova has shared its mission experience with the TAFTIE network of European innovation agencies, covering 29 organisations from 28 European countries.

Developing mission-oriented approaches globally

Global engagement

The OECD's Observatory of Public Sector Innovation has been constant 'thinking partner' throughout the development of mission-oriented innovation in Sweden, just as UNDP's innovation teams have been. Similarly, the UCL Institute for Innovation and Public Purpose have helped develop the thinking and practice as much as any other institution. Frequent discussions with similar entities—from Australia to Chile, the UK Design Council to USA government design community—has also helped inform.

Outcomes

Clean freshwater in line with WFD
2027 All EU lakes and rivers

Seawater and freshwater free of plastic
2027 50% reduction
2030 90% reduction

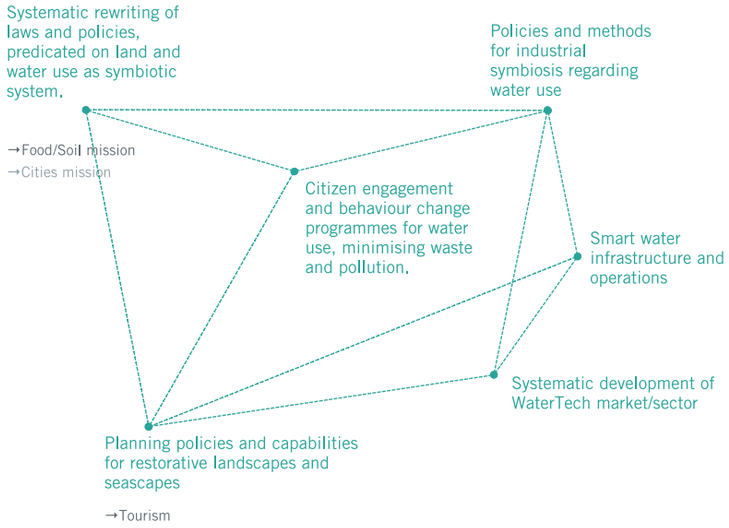
Hazardous substances
2030 Non-harmful levels

Eutrophication of seawater
2040 All reduction measures introduced

Water use in cities and towns
2040 50% reduction against 1990 levels

Natural flood resilience in place
2040 All EU towns and cities

Activities



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10 starting points for system change

— *Thinking in Systems*, by Donella Meadows

— *Randomization in the tropics revisited*, Angus Deaton

— *Mission Economy*, by Mariana Mazzucato

— *Designs for the Pluriverse*, by Arturo Escobar

— *On the Political*, by Chantal Mouffe

— *The Moon and The Ghetto*, by Richard Nelson

— *Down to Earth*, by Bruno Latour

— *Sand Talk*, by Tyson Yunkaporta

— *The Ministry for the Future*, by Kim Stanley Robinson

— *The Mushroom at the End of the World*, Anna Lowenhaupt Tsing

Some organisational starting points

Some organisational starting points Hundreds of organisations are pursuing variations on mission-oriented innovation, or related strategic and systemic design practices. The **Institute for Innovation and Public Purpose** at University College London is both leading the development of these practices and tracking those exploring missions. Their **Mission-Oriented Innovation Network (MOIN)** is the primary international network of organisations working in this area. It is a good starting point, as is related work by **OECD Observatory of Public Sector Innovation.**

In the Nordic region, as well as **Vinnova**, **ArkDes** and **SVID** in Sweden, colleagues at **Danish Design Centre** in Denmark, **Design and Architecture Norway (DOGA)** and **D-Box in Norway**, and **SITRA** and **Business Finland** in Finland, are pursuing similar agendas. In the UK, the **Design Council**, **Scottish National Investment Bank**, **Camden** and **Greater Manchester councils** and **NESTA** has developed practice guides and research programmes, and the **Dutch government** have focused innovation policy around major societal themes via missions, with **Health Holland** particularly advanced. **The European Commission's** mission-led approach to the Horizon Europe research agenda will be one of the most significant in Europe, but see also the related **New European Bauhaus** programme.

UNDP's Accelerator Labs programme may be its equivalent in the Global South. In Australia, **CSIRO** are developing multiple national missions from a scientific research perspective. Many Latin American initiatives are mapped well in **Inter-American Development Bank's** *The Age of Missions*. Variations and alternatives to mission-oriented approaches exist across diverse Asian governance contexts, in many ways more advanced than the above.

The Mission-Oriented Innovation Network provides a good list of these potential contact points and case studies. But the real key to mission-oriented innovation may simply be to start by starting.

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Colophon

This book is produced and published by Vinnova, the Swedish government's innovation agency. It was written by Dan Hill, Vinnova's Director of Strategic Design. Designed by Dan Hill and Johan Hedvall from Vinnova, and Minja Smajic for Blomquist.

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Designing Missions is a playbook for innovating how we innovate. It describes a new toolkit of techniques for mission-oriented innovation, drawn from real experiments on the ground.

Mission-oriented innovation means not only fundamentally rethinking how innovation happens and what it is, but also the ways in which government, business and society interact. Yet although the theories behind missions have been pounced upon by hungry innovation experts everywhere, there are still precious few examples of mission-oriented innovation in practice. This book closes that gap, at least a little, by sharing the stories of how Vinnova, the Swedish government's innovation agency, interpreted and explored mission-oriented innovation in Sweden between 2019 and 2022.

The book also explores the backstory: the origin of these new methods and mindsets, and why missions are important. Drawing from real-world prototypes and projects, it shows how people, places, and the public and private sectors can be central to these new innovation practices, and how it may be possible for governments at all levels to work together around these shared agendas and complex systems, changing from within in order to deliver on truly ambitious societal outcomes.

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