MANAGING THE JOURNEY TO SCALE UP INNOVATION

IN THE HUMANITARIAN AND DEVELOPMENT SECTOR

Second of four contributions on the subject of innovation scaling

Submitted for the Transformation Through Innovation Theme

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Dan McClure and Ian Gray

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INTRODUCTION

The premise of our prior paper, *The Missing Middle of Innovation*, was that scaling fails so frequently because it actually represents two new problem domains, one of Scaling Up and another of Scaling Out. To succeed with these persistently thorny challenges, we believe there is a need for new insights into the unique nature of the problem space and new, appropriately tailored, tools.

This paper explores the first of those domains, the challenge of Scaling Up. How does an innovator take a Pilot program that was intentionally simplified for rapid learning and add in the complex functionality needed to create a complete sustainable solution in the real world?

In the following pages, we break Scale Up problem space into six parts, focusing on how this kind of work differs from other areas of innovation where practices are already well-tested. It is a different journey. Scaling Up requires us to directly engage with the complexity of wicked problems. More familiar innovation techniques avoid this messiness by taking refuge in tame corners of the innovation problem space.

How can we effectively work in and with complexity? In researching this paper, it was fascinating to the authors that so little of the '*how*' of scaling innovations in the humanitarian and developing sector has been documented and shared. There is a growing body of research on innovations in numerous sectors including, Cash Programming, Health, Shelter, WASH and Digital solutions. These case studies include numerous *stories* of how the wider ecosystems support or hinder innovation and of innovations that scaled or failed to scale. They provide anecdotal insights into the innovation journey and the innovation ecosystem.

What they generally don't do is construct a practical guide for action, rooted in thinking model. There is little help for funder or practitioner when it comes to structuring, decision-making, and management of scale up initiatives. We hope to start filling the gaps.

We write to the concerns of Innovators, Innovation Managers and Innovation Funders who are seeking to scale up pilot programmes in order to create complete and sustainable solutions. Our goal is to provide the basis of a model for scaling up pilots that explains *why* things work as well as *how*.

Innovating within complexity is not a field with well-developed practices, as such, there is no claim that these are the only possible approaches or even that they will be the right choices in all cases. There are few available examples of successful journeys in the public domain and no ready answers sitting in the literature. This paper therefore is designed with a thoughtful consideration of the problem in mind and leverages our hands-on experience as practitioners of innovation in this messy (and most interesting) part of our profession.

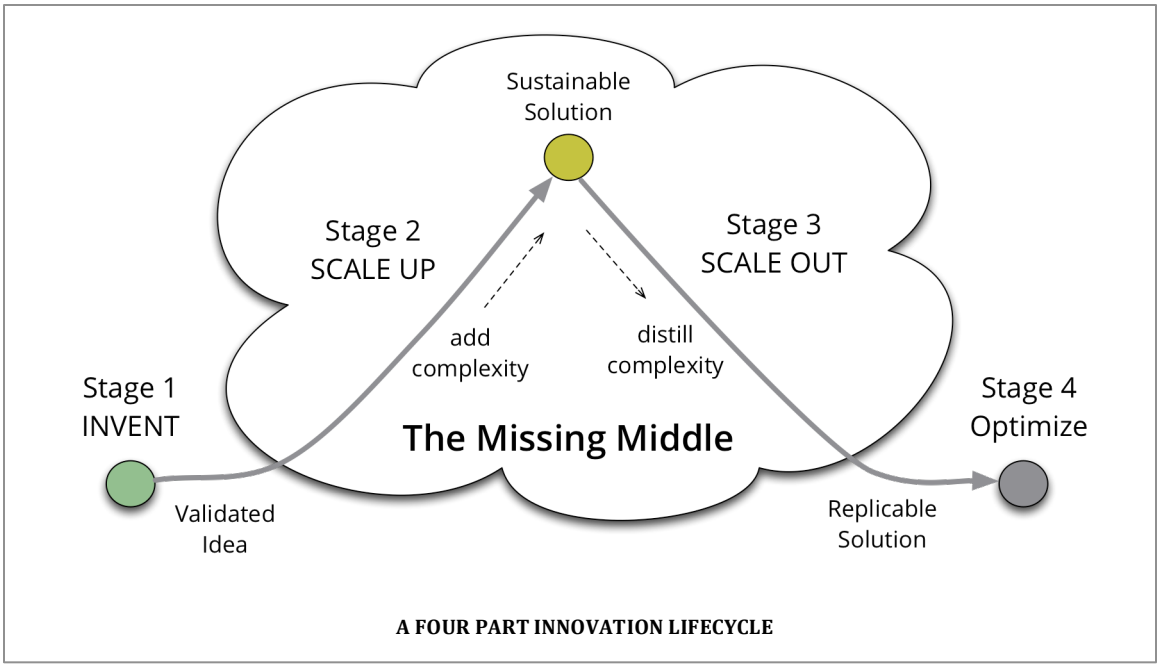
Two follow-up papers are planned. *What Wicked Looks Like* will more deeply explore the complexity in the design elements of the Scaled Up sustainable solution *Distilling Complexity* will dive into a different set of challenges that are associated with Scaling Out.

EMBRACING COMPLEXITY - THE CHALLENGE OF SCALING

The Humanitarian Sector has difficulty scaling innovations. After several years of growing success in fostering Pilot programs based on the lean testing of creative new ideas, the growing gap between the ideas we imagine and the innovations that have actually been taken to scale is disheartening.

This paper expands on a presentation originally given at the 2014 Humanitarian Innovation Conference in Oxford, England. There, the authors asked why scaling innovations should present such a problem to a sector that has gotten so good at the piloting of new ideas.

Our conclusion was that between initial Invent stage and the ultimate Optimize stage of the innovation lifecycle there was a "Missing Middle," with fundamentally different properties and challenges. It is an area that lacks the types of established practices and thinking models that benefit innovators working in the better understood Invent and Optimize stages.



A FOUR PART INNOVATION LIFECYCLE

This Missing Middle has two parts. In the Scale Up journey, previously omitted complexity is added into the pilot program to create a sustainable solution. In effect Scaling Up builds a shining city where all the pieces work together, delivering original value over time. In contrast, during Scale Out, selected elements of complexity are distilled from the solution so that the innovation can be more easily replicated.

This paper focuses on managing the Scale Up journey. Before rushing into a definition of potential practices of *how* we do scale up, let's look more closely at *why* designing in the midst of complexity changes the problems innovators face and how it affects the journey they must take.

MANAGING A FUNDAMENTALLY DIFFERENT JOURNEY

ASPIRING TO CREATE A MESSY SOLUTION

Real life sustainable solutions are typically messy solutions to wicked problems. They have a complexity that comes from lots of moving parts. For example, there will need to be ongoing funding or a business model and someone will need to manage the ongoing effort while looking into the future. There will be questions of maintenance, support, staffing, training and more.

They are messy too. Standalone elements of the pilot will need to be tied into complicated real world ecosystems. Stakeholders who sat peacefully on the sidelines during the Pilot suddenly are engaged, while organizational, cultural and legal barriers will demand attention.

And because the parts of the problem intertwine with each other, tradeoffs will continually be needed. Some, like balancing the cost of one part of the solution to the quality of another part, may be easy to assess. Others like which political battles to fight next, are effectively unknowable.

THE PROBLEM SPACE – INTRINSIC COMPLEXITY

Developing a Scaled Up solution is difficult because of this messiness. Drilling into the nature of the complexity, we find four underlying challenges that change the nature of the innovator's job.

Coupled Choices / Conflicting Needs –Design choices for solving each challenge are linked together in a complex web of dependence. Each choice made creates unpredictable feedback that changes other parts of the work. In this tangled web of cross connections, multiple stakeholders fight over tradeoffs. Tangled webs like this are hard to solve whole and dangerous to subdivide or simplify.

Big Problems / Diverse Domains – The problems are large in absolute terms. There are lots of moving parts. To make matters worse the problem spaces span a diverse range of disciplines. Innovators must find a ways of being quite good at a wide variety of things.

Uncertain and Unknowable – Within these problem spaces, knowledge is intrinsically incomplete. This isn't simple uncertainty that can be quickly researched and set aside. These challenges are filled with messy and hidden complexity that is often impossible to penetrate short of taking action.

Perpetually in Flux – It is not a stable end state. All of these problem spaces are constantly in flux. Competitors actively change the playing field and new insights gained from action continually shift the understanding of the challenge.

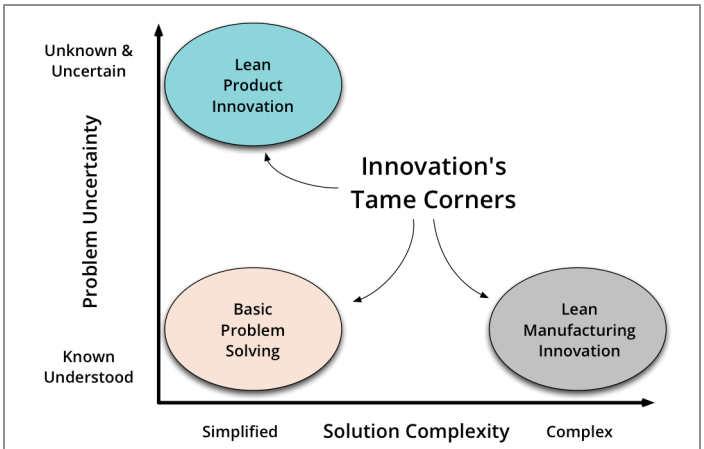
WHY EXISTING MODELS DON'T WORK - MOVING OUT OF TAME CORNERS

Scaling Up comes with challenging complex problems, does that mean we need new innovation tools? The broad failure to scale pilot programs seems to indicate that new tools are needed. However, before simply accepting this failure at face value, let's explain why existing tools are ineffective. Then it will be possible to define alternative methods that specifically respond to those shortcomings.

Today, there are two major innovation toolkits to choose from. The first is linked to exploring new ideas and developing pilot programs. This is what we have described as the Invent stage. These are lightweight practices that have been popularized in books like Eric Ries' Lean Startup[i]. They are well suited to exploring the unknown, simplifying the problem so they can learn quickly. (blue oval)

Prototype and pilot grants, open innovation and design thinking are all part of this fast moving space. Invent stage innovators are encouraged to test disruptive new ideas by "failing fast" using small stripped down "minimum viable products" or MVP's.

The second type of innovation originated in efforts to optimize manufacturing operations in the mid 20th Century. We've called this the Optimize stage of innovation's lifecycle.

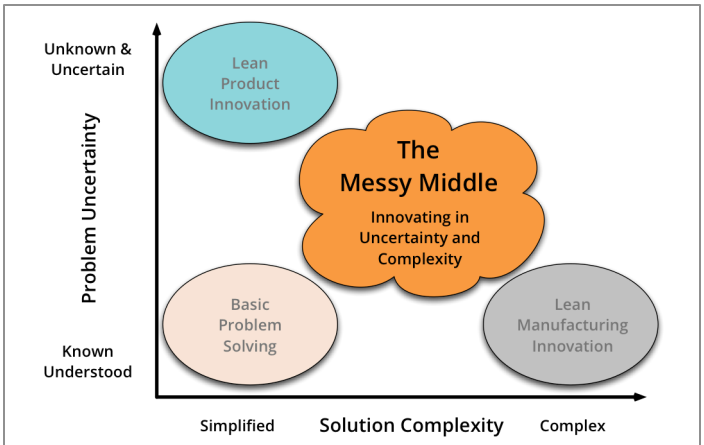


EXISTING INNOVATION MODELS – AVOIDING COMPLEXITY

Lean Manufacturing models take on very complex and mature business systems, but simplify the innovation effort by creating detailed descriptions of processes and paying zealous attention to fine grained measurements. Small incremental improvements can be made using processes like six-sigma with impacts that can be easily mapped and measured. (gray oval)

Both innovation models find ways to simplify their work. They are in effect Tame Problems, the better-behaved siblings of Wicked Problems. The techniques are well suited to the challenges they take on, exploring the unknown or optimizing a mature system, but these same tools have limited value when applied to Scaling Up's complex messiness.

The work for Scale Up sits far from the tame corners of the existing innovation models. Here we are positioned in the orange cloud, where both complexity and uncertainty are present, and neither can be easily set aside.



THE NECESSARY EMBRACE OF COMPLEXITY AND UNCERTAINTY

TABLE 1 – COMPARING THE STAGES OF INNOVATION				
Feature	**Stage 1 – Invent (Pilot Programs)**	**Stage 2 – Scale Up (Architecting Solutions)**	**Stage 3 – Scale Out (Distilling Complexity)**	**Stage 4 – Optimize (Established Operations)**
Driving Goal	Explore new ideas	Create a complex system	Selectively distill complexity	Optimize performance
Primary Challenge	The Unknown	Messy Complexity	Balancing tradeoffs	Measuring Performance
Key Skills	Fast testing of ideas Ability to pivot	Architect complex solution Tradeoffs in real life	Insight in real priorities Maximizing value of solution	Document & measure Incrementally improve
Output	Proven Idea	Sustainable Solution	Replicable Solution	Optimized System
Leadership Type	Entrepreneurial	Architectural	Architectural/ Business Development	Managerial
Time Frame	Short Experiments	Long Journeys	Varied Journey Lengths	Ongoing Processes

Table 1 compares the dimensions of each innovation challenge. Complexity is an inherent attribute of the Scale Up problem space. Neither the Invent or Optimize practices have tools for architecting complex original systems in with limited knowledge.

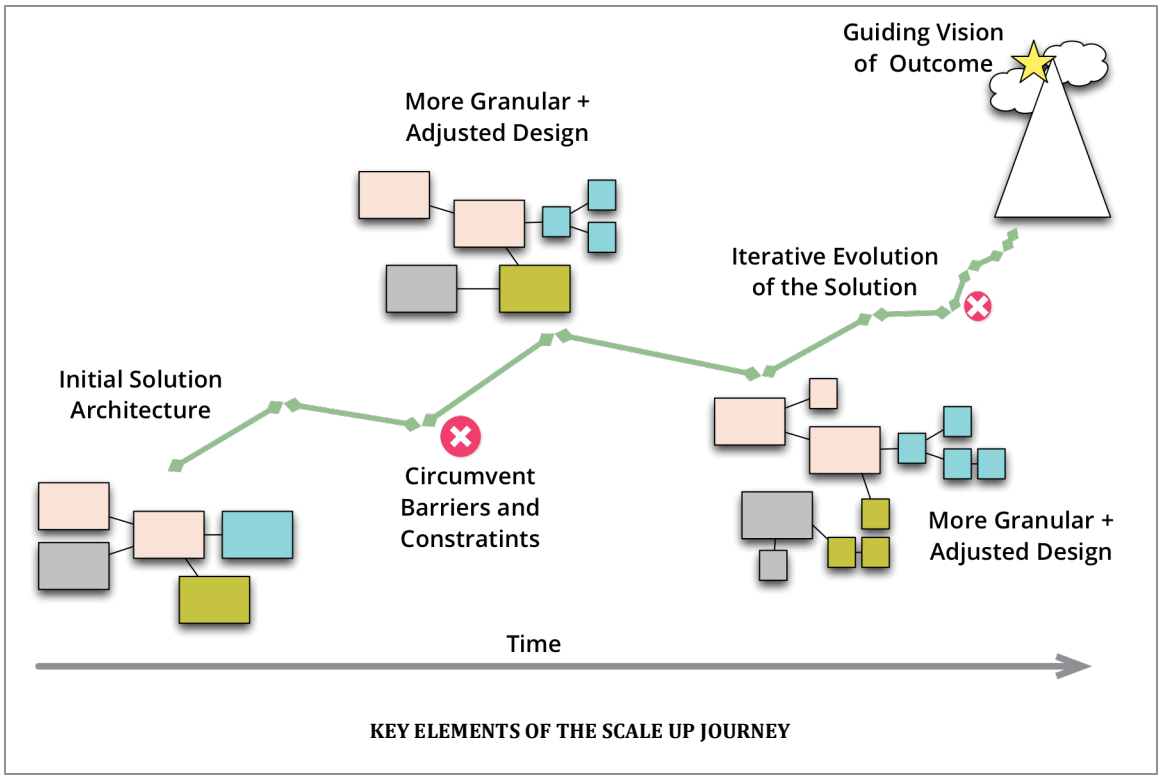
The design elements of are linked in webs of influence. A change in one part of the solution impacts another, which cascades further and further into the architecture. A key tenant of our proposition is that it is not possible to ignore this messiness in order to make the innovator's work more tractable.

The whole problem space needs to be present, requiring leaders of the Scale Up effort to design, build, and pivot their approach across multiple dimensions. The feedback loops are non-linear and unpredictable, so traditional project and programme management tools are insufficient on their own. Simply rolling out a Prince2 methodology will not cut it.

Nor can decisions simply be taken as you go; making what seems like the best choice based on the latest hypothesis testing. A version of the whole solution is kept in mind throughout. The architectural decisions must elegantly balance different competing priorities and creatively circumvent barriers. Instead of validating original hypotheses, the feedback loops validate the 'what' and 'how' of the overall architecture.

TAILORING AN APPROACH TO SCALE UP – A VISION LED JOURNEY

What would an alternative look like? It would meet specifically deal with the challenge of creating a complex solution in an environment of imperfect knowledge and change.



KEY ELEMENTS OF THE SCALE UP JOURNEY

The approach we lay out is basically one of making a best guess of the end state solution and then iteratively driving through the complexity and constraints to adjust the approach and fill in the gaps. This *Vision Led Journey* leans heavily on an architectural mindset, an ability to see and adapt a big picture vision to a real world situation. The strategy has three core elements.

- **Vision of the Outcome:** As a metaphor, it's useful to think of this as a journey through rough terrain, aiming for a mountaintop in the distance. Adversity and conflicting demands along the way will pull the team in one direction or another. Many of the specific features or assumptions from the early days of experimentation will change, so there must be a way for all the stakeholders, funders, innovation managers and team members, to orient themselves and keep alignment.
- **Iterative Design Through Complexity:** Complexity is extremely difficult to analyze and plan in advance. So the effort is not completely planned out, relying instead on iterative cycles of development with ongoing reassessments of direction and approach. Not every detail can be spelled out, so there must be the capability to see the summit of the mountain of complexity, discern false summits on the way, while at the same time taking footsteps on the next leg of the journey.
- **Continuous View of the End State:** While it is not wise (or even possible) to define all the elements of a complex interdependent design up front, it is possible to create a high level view of the entire problem space. High level views of the problem space and solution architecture act like road maps, which get refined and adjusted as the team moves forward.

SIX STRATEGIES TO ENABLE THE SCALE UP JOURNEY

Currently, this type of journey through complexity is an area of program management that is low in best practices and high in difficulty. Donors and innovation managers, need to intentionally deal with the hard parts of this work. To that end we've identified six root challenges and responses that can guide a model of practice. We outline these in brief in table 2, before unpacking each one in more detail in the remaining sections of the paper.

TABLE 2 – THE CHALLENGES AND STRATEGIES OF SCALE UP

Challenge		**Response**
(1) Starting with Weak Ideas	The Pilot program failed to do its job. Key questions of value and feasibility remain unanswered.	Establish a gating process based on a clear testable vision to keep weak ideas out of the Scale Up effort.
(2) Creating a Picture to Guide Work	The full complexity of the scaled up solution is not yet understood. The dimensions and dependencies are unclear.	Create a holistic view of the end state architecture of the solution, including all the key elements and their relationships.
(3) Need for a Choreographer of Complexity	Architecting complex solutions requires different skills from what made a leader successful in the Pilot (fast moving, corner cutting) or Optimize (detailed, structured) stages.	Create and fill new senior leadership roles for *Passionate Owners*, providing strategic vision, complex architectural design capabilities, multi-faceted skills, and stamina, with perseverance and emotional intelligence in the face of adversity.
(4) Longer Engagements Strain Funders and Contracts	Engagement models based on either short Pilot projects; those linked to institutional funding cycles and even those that follow simple innovation stages don't provide the sustained commitment needed for a long scale up effort. The Pilot project's funder is not aligned with the needs or outcomes of a longer Scale Up effort.	Redefine engagement models to provide for longer funding cycle and more consistent execution across breaks in contracts. Align funding with risk reduction, rather than innovation stages. Reevaluate the sponsor / investor model for the scale up effort. Find sponsors who understand the needs and are aligned with the timing and outcomes of the journey.
(5) Over-reliance on Outcome Based Measurement	The traditions of outcome based measurement that work in Invent and Optimize often fail in Scale Up, where adding complexity to create a sustainable solution can lead to periods of reduced performance compared to the 'sheltered' Pilot.	Rebalance the evaluation model from outcome based measurement to measurement of progress toward a complete sustainable solution. There can still be a measurement of the likely end value of the innovation, but this is not the primary measure of progress in Scale Up.
(6) Teams Lack Key Skills	The demands on the Scale Up team are very high and cross multiple domains. Few teams have all the necessary experience or resources.	Funders need to take a greater role in the actual support of teams executing programs. Among the areas for support are partnership brokering, venturing, mentoring and a closer relationship with the innovation team, not just funding and measurement from afar.

(1) SET A HIGH BAR FOR THE PILOT

COMPLEXITY'S CHALLENGE - WEAK IDEAS DON'T SCALE

A weak idea won't scale. The ending of a pilot's grant does not automatically equal a stage gate for the Invent Stage of innovation. Failing to complete idea validation during the Invent stage where Pilot programs can use lightweight flexible experimentation pushes fundamental uncertainties into the Scale Up stage for which it is poorly suited. The tools available in Scale Up are ill suited to going back and finishing the Pilot Program's job.

Yet, many of the challenges commonly identified with scaling are in fact failures of the Pilot. The Guardian published a list of key success factors for scaling social innovation. [ii] Interestingly, a close look shows that most are actually tied to doing a good job during the Invent (Pilot) stage of innovation. The hard fact is that bad ideas, programs that solve non-existent problems or have intractable flaws in their design, won't go to scale, no matter how effective and earnest the scale up efforts are.

It's not surprising that warnings against beginning badly are a common theme. In their study of scale in the social impact sector, the Bridgestone Group[iii] identified three key factors as prerequisites to scaling.

- Listening carefully to beneficiaries
- Obsessing over affordability
- Building a scalable operating model

The first two out of three of these needs are linked to effective development of the original idea in the Pilot stage.

Scale Up is the wrong time to fix fundamental flaws in a value proposition. The tools at that stage are complex and cumbersome, ill suited to the kind of nimble learning that idea formation requires. As a result, the first step in doing scaling well requires separating potentially scalable ideas from the mass of pretenders.

GOOD SCALING BEGINS WITH A GOOD PILOT

In 2014 a Guardian panel of social innovators outlined 17 ways to take innovations to scale. What was surprising was how many focused on issues to do with the pilot (invent) stage of innovation. Of the 17 suggestions, nearly half were clearly issues that should be addressed in the pilot stage.

- Meet a customer's need
- Look for ideas at the grassroots
- Uncover an unmet need
- Work with existing infrastructure
- Look beyond mobile (broad thinking)
- Beware of innovation for innovation's sake
- Usability is essential
- Be willing to take a leap

MAKE SURE HIGH RISK QUESTIONS ARE ANSWERED

The first step of the gating process should determine which Big Gnarly Questions the Pilot should have answered. Pilot's should explore the riskiest and most difficult questions associated idea. These are the questions that, if the answer is no, then the idea is dead in the water. Identifying the questions should be driven by two factors; which aspects of this innovation are:

1. **Most Uncertain** - where current insights and answers are least available
2. **Most Impactful** – where what you don't know hurts you the most

As part of an application to Scale Up, the Pilot team should be able to identify the range of questions it sees associated with the idea and then make a case for which are the most important.

Frequently, the most important questions are not the ones that naturally draw attention and action. Imagine the challenge of providing sanitation in an IDP setting. It's a classic wicked problem with hundreds of potential questions embedded within it. What's the right technology? Who will maintain the facilities? Where should they be located? What incentives are needed for users? What are the logistics of waste disposal? The list goes on and on.

In such a complicated domain, the engineering challenges of the toilet may actually be the most straightforward of the challenges, and it is often these tangible manifestations of "innovation" that are the focus of Pilots. Showing off a toilet design may be gratifying, but understanding the culture of adoption is often more important.

The flexibility of the Invent stage should be used to tackle the Big Gnarly Questions. The deeper the uncertainty and the greater the impact, the more a particular question contributes to the innovations risk level. Conversely, answers to Big Gnarly Questions reduce the total risk of the endeavor. The key starting point is asking the question, 'if we are wrong about this assumption, will it kill the innovation's value?'

One tool that we have leveraged for tackling this is similar to Johari's window,[iv] but we call it 'the Rumsfeld Wall,' after Donald Rumsfeld's famous quote about known known's, known unknown's, unknown known's and unknown unknown's.[v] It is a two by two matrix that assumptions can be mapped against, helping unearth the BGQs. It is a useful team exercise that focuses the team not only on the right questions to ask, but also where to go to find the answers (e.g. secondary research, interviews of technical experts, user feedback etc.)

MAKE SURE VALUE IS DELIVERED

Innovators are disturbingly prone to joyously inventing galoshes for fish; developing inappropriate technologies for people who have no need or desire for the invention. Here are key questions to ask.

WHAT'S THE VALUE PROMISE?

A Value Promise seeks to clearly state in actionable terms what an innovation will do for someone. The format is:

If you are ___*name of a target beneficiary*___ **we promise that you will / will not** ___ *bold promise* ___ .

An example could be:

If you are *a young woman living in a refugee camp,* ***we promise that you will*** *be able to access water safely.*

Note this is not a passive mission statement or a statement of need still looking for an answer. It is an active promise to deliver value to someone, made real by an action you will take.

A clear well validated idea is usually easy to put in this form. If this is a hard exercise, that's a warning sign.

In some cases there is more than one promise. Improving the efficiency of an aid intervention may provide real value to a disaster affected population. It may also provide improved control and efficiency to those executing the program. The key is to disaggregate the promises and understand the BGQs for each.

WHAT IS THE INTENDED VALUE?

Before going to scale it's critical to know just who the intended beneficiary of the innovation is and what the promise of value is. A surprising number of fascinating inventions can't answer this most basic of questions. The Value Promise (see box) is a way to determine if the targe recipient and intended value have been thought through.

DOES IT WORK?

In the narrowest sense, this question is seldom a problem for well-run Pilot programs. Often the entire purpose of a Pilot is framed as an effort to prove that the functional capabilities of an innovation do in fact perform the desired function.

This is what Pilot programs often label as success. So, it is an important question, since an invention that doesn't work clearly can't scale, but 'functioning' is not the most common form of scaling failure for "successful" Pilots.

IS THIS A REAL PROBLEM?

Surprisingly, successful Pilots are often solutions looking for a problem. This failure frequently occurs with inventions that are driven by new technologies or exciting ideas. Ironically some of the worst innovations are those that generate the most excitement.

In the humanitarian and development fields prime culprits of this fascination with bright shiny objects are private sector companies who think that solutions they have from one area can easily be metamorphosed to solve Humanitarian or Development challenges. When combined with senior HQ staff getting excited by the latest 'shiny toy,' the impact is often the political power and money to create 'white elephants' – solutions that nobody wants, often to misdiagnosed challenges. Therefore the gating process for moving to scale should receive proof not only of the functional capabilities of the solution, but also of the level of genuine need.

This is where specificity in the original vision helps. It's easy to make a broad brush statements of need, the kind of generalizations that are always true. A detailed statement of who the beneficiary is and the specifics of their need is much easier to inspect for validity and impact.

IS THIS A DESIRED SOLUTION?

Even, when the problem is understood, inappropriate solutions journeys can be developed. The gap between need and invention is magnified when the idea is developed by outsiders who assume they know far more about someone's needs, desires, and values than they actually do.

Often there is a genuine need but the solution fails to deliver the value in a way that is actually desired or practical for the beneficiary. This is a very common fault of technical innovations with examples ranging from the cook stove that no one wants to use to the project management system that is actively avoided as a way to manage projects.

The tricky part with this type of Pilot failure is that the innovation looks like it works (see box [vi] [vii]) The stove does cook. The project management system tracks and tallies. One way to evaluate this is to look at the practices of the Pilot Team. Were they actively involved with the users or were users

part of the innovation team. A good rule of thumb in humanitarian and development innovation is that 'the further away from the pain point a proposed solution emerges from, the less *fit for purpose* the proposed solution is likely to be.'

Even with locally driven efforts, there is still a real danger of excessive hubris. It is almost always the case that innovators believe they know more than they do. They project their own experiences on others and use incomplete models of other people's lives.

There should be lots of testing, and it should begin early in the Pilot effort. Not every user facing test needs to be positive. In fact, all positive tests should be a warning sign. Failing fast allows teams to learn quickly. However, clearly documented answers to key questions are key elements of Pilot's ready to advance to Scale Up.

AT THE GATE – GOING BACK TO PILOT

Questions with high uncertainty and high impact are generally be better answered in the Pilot stage. The Invent Stage tools are flexible and investments are still low.

Extending the Pilot and delaying the final choice for Scale Up should be a real option on the table. It will be particularly appropriate if the unexplored risks might derail the entire initiative.

If some questions are unanswered, but unlikely to stop the show, then it may be possible to run a small test in parallel with the Scale Up effort. In this way the lightweight tools of the Invent Stage can be leveraged without delaying the start of a potentially long Scale Up journey. It also enables greater flexibility options for financing and support for the innovation, as it enables ongoing de-risking through the Scale Up stage, and doesn't overburden the pilot with answering too many questions.

WHY IS THIS STILL A QUESTION?

Is this a great idea? Kids are always running around kicking soccer balls, so why not use all that energy to provide light at night?

As a technical invention the Socketball works well, but it has received mixed reviews in the press. Is it an ingenious answer to a pressing problem, or another Play Pump, a solid invention that failed to achieve real world acceptance and use?

Both sound like good ideas, but have been criticized for their child labor driven sources of energy. For potential users (and the donors that serve them) the question is not just whether these are viable options, but if they are the best options available.

Aaron Ausland, in his critique *Deflating the Soccket Ball*, questions the "relatively expensive and relatively inefficient solution to a basic needs access problem that required an inordinate amount of kinetic energy input for the output given back."

In the absence of strong market forces, which naturally validate commercial innovations, this disconnect is a persistent threat to humanitarian and development programs.

There should be little reason for this debate. Even without market drivers, user centered trials can answer to a high degree of certainty whether innovations are both functional and desired. This is exactly job of the Pilot.

(2) CREATE A BIG PICTURE FRAMING MODEL

COMPLEXITY'S CHALLENGE – COMPLEX WORK IS HARD TO ORGANIZE

Messy real world design challenges cannot be subdivided and simplified. The complexity of the problem matters, and so all the parties involved need to see the whole problem and work with it in multiple ways.

In every model of innovation there is a methodology for understanding the underlying solution space and organizing a course of action. These frames are what keep the innovators from wandering around randomly.

Light weight inquiry driven tools for framing a Pilot's development, are ineffective as working guides for the Scale Up journey. Complex systems cannot be simply be stitched together as you go, deriving the principal source of guidance from questions asked to a user or from a series prototype tests.

Traditional project planning processes are also ineffective frames for work. The target solution of Scale Up is not enough understood for detailed plans to be created in advance. This level of planning may be possible during the later mature Optimize Stage of innovation when the complexity has largely been defined and locked down, but there are still far too many design choices and uncertainties to be resolved for locking down an up front analysis during Scale Up.

The Scale Up journey needs a different type of tool, something that provides both the structure for a complex design and the flexibility to evolve as a messy program of building in complexity proceeds. There needs to be a way to expose the high level view of the overall approach, the complex, interconnected and mutually dependent elements of a sustainable solution. One possibility is a big picture of the proposed end state design. Developed early on, it allows leaders and teams to assess the overall effort and identify gaps, but is still flexible enough to support the shifting design that occurs during the iterative journey from simplified Pilot to complex sustainable solution.

MANAGING THE CONSTRUCTION OF COMPLEXITY – NEED FOR A NEW TOOL

Having filtered out the "weak ideas", the challenge is now to begin a journey of taking a simplified Pilot and adding the elements needed to create a self-sustaining solution in at least one location. This is a new kind of work for most innovators and requires a different underlying toolset.

In the Invent stage, Pilot programs are intentionally simplified, limiting constraints, dependencies and scope so that key questions about an idea can be explored quickly and cheaply. Frequent input with users and short feedback loops are leveraged to assemble a testable version of the idea. The complexity is kept low so that changes can be made spontaneously with little advance planning or overarching design.

In contrast, a mature program in the Optimize stage of innovation, has already mastered its complexity. Processes are well documented. Operations and incremental change can be planned out in detail. Planning becomes a powerful tool for working in a world of tamed complexity.

The Scale Up effort must construct complexity in a problem space that is still incompletely understood. The diversity of the solution elements (legal, cultural, technical, financial), the

interdependencies, and the constraints all matter. Simply setting aside inconvenient complexity is not an option. Nor is pretending that we know more than we do. Plans are at best broad and provisional.

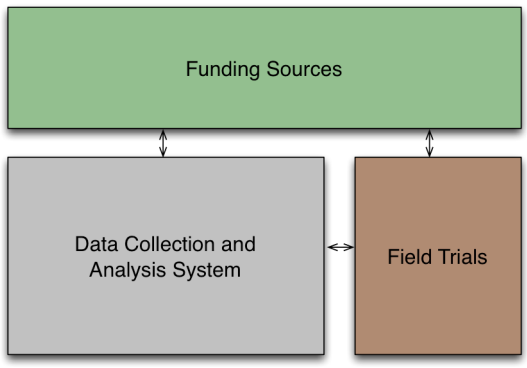
Tools are needed to structure action in this environment. It is effectively an architectural challenge, so we look to the techniques that the designers of complex systems use to frame and guide their evolving work.

USING A BIG PICTURE AS A GUIDE

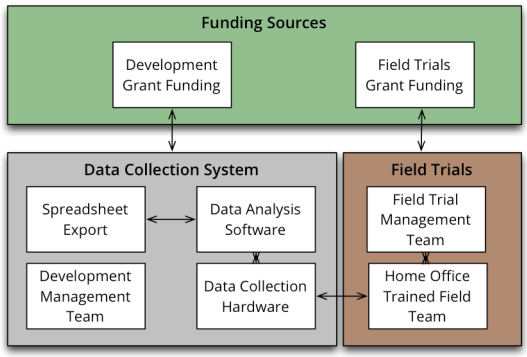
Architects of every ilk, those who design buildings, plan urban spaces, or design complex technical systems inevitably gravitate to a big picture view that incorporates all the elements of a solution. They may be expressed in only the broadest terms … a school goes here … but they offer a complete overview of all the parts and their key relationships.

In a well designed Big Picture detail can be added as the solution is developed. The broad space set aside for a school can now show two buildings, a road, and connections to supporting facilities. Because they are drawn at a high level they can also be revised as new insights occur during development. The school needs to move over one block to take advantage of access to a residential area.

MECE DIAGRAMS



MECE DIAGRAMS PRESENT A BIG PICTURE VIEW OF THE ENTIRE EFFORT.



AS A MECE DIAGRAM IS DECOMPOSED IT STILL RETAINS A HOLISTIC VIEW

These diagrams have a consistent set of attributes. They are Mutually Exclusive and Collectively Exhaustive or MECE. MECE diagrams have wonderful properties for the architect in complexity.

1) **Holistic View:** They show all the parts at once
2) **Visible Relationships:** Major connections between parts are visible
3) **Decomposable:** They can be broken into ever smaller parts … but don't have to be at the start

These properties mean that a MECE diagram created at the beginning of the Scale Up journey shows the same overall system as one that is produced at the end of the work. The elements may shift and change and the detail will increase, but both are pictures of the same thing.

With these attributes, MECE diagrams are particularly useful wrestling with difficult tasks on the Scale Up journey. The Big Picture becomes the new innovation tool for managing the construction of complexity.

Note that lists, dashboards, and detailed design specifications don't have architectural power of a MECE diagram. They are fundamentally an inventory of detail, not a big picture view. While they may be useful as supporting tools, these standbys of traditional project management are not well suited for driving the construction of complexity.

Initiating Work – Defining the Scope of a Wicked Problem

How much work is constructing a sustainable complex system in the real world? This is not a question that can be answered precisely and yet it is unreasonable to ask donors and investors to support an initiative without any sense of the scale.

So the first practical application of our Big Picture view will be to identify the major elements of a Scale Up initiative. Visual diagram(s) are particularly good at exposing high level components, including their expected connections to one another. While the pictures won't provide details about all the work tasks, they support efforts to create an inventory of the areas where work needs to be done.

A key goal of this work will be to highlight areas of action that are outside the initial scope of the Pilot program such as surrounding infrastructure, supply chains, and legal changes. (A follow-up paper that describes a range of these challenges is being developed as part of this series.) With the diverse elements defined, stakeholders can see the broad scope of the challenge and begin to assess the rough order of magnitude of work in each area.

While still only defined in broad strokes, its important to have a sense of scale early on in the imitative. There is often a misconception that the Pilot program was the hard work of the innovation, and that scaling is now a case of simply turning the crank. Seeing the full scope of the Scale Up effort can expose the messiness and size of the journey ahead, making it possible to secure appropriate on the ground leadership, sufficient funding, and leaders willing to take on a long difficult journey.

Embracing Wickedness

Wicked Problems are enormously difficult to solve because they are interconnected with other problems, burdened by incomplete knowledge, and have many different stakeholders. Solutions to these problems depend on many different elements working together, so a brilliant solution on paper (or in pilot), may well be blocked for unexpected reasons in the real world.

Consider whether the broader ecosystem is ready yet. If your widget needs other things in the wider ecosystem to work, then the risks for intransigent blockers or gaps in the ecosystem extend beyond the innovation itself.

For example, in an interview that was part of the initial research for this paper, Paul Currion used the example of the United Kingdom's National Health Service (NHS).

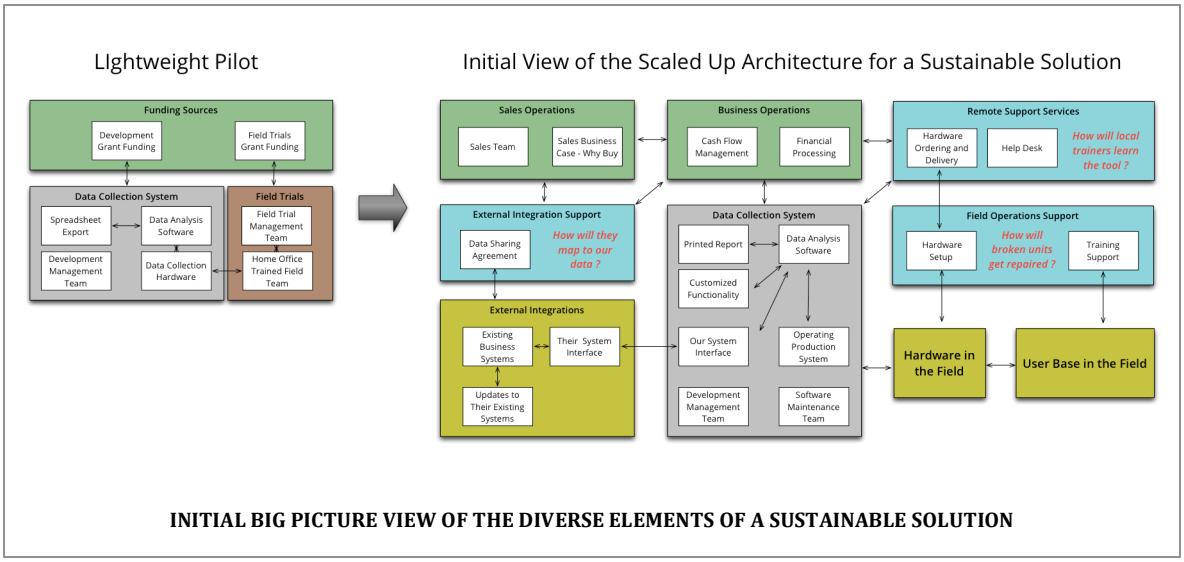
Prior to World War II the necessary health care ecosystem was not available. In the 1930's efforts to deploy a complex system like the National Health Service would have been blocked because the supporting interconnections that would enable centralized planning and integration were lacking.

WWII changed this, forcing the integration of the UK's health providers to serve the spike in demand for wartime health services. This fundamentally changed the surrounding ecosystem, making systemic change possible. It then required the political will of the post war Labour government to realize the new capacity within the ecosystem to create a National Health Service.

The NHS could only be successfully established on an ecosystem that could sustain it and with the political will to drive it. Without these scaling health provision into a National Health Service would have been doomed.

INITIATING WORK - IDENTIFYING GAPS AND RISKS IN MESSINESS

Earlier, during the evaluation of the Pilot's effectiveness, we made sure we could identify who the user is, what their real needs are, and validate that the solution actually met those needs. That's a key step, but often the real stumbling blocks in scaling are less obvious areas of risk. Will social structures discourage women from adopting the device? Can the devices be maintained? Are there pieces of supporting infrastructure that need to be in place? Who is motivated to run the program?

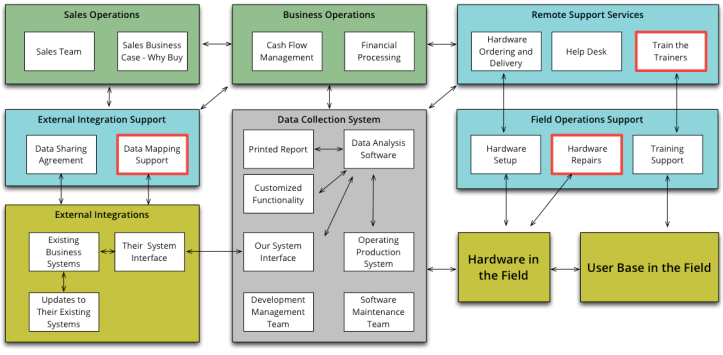


INITIAL BIG PICTURE VIEW OF THE DIVERSE ELEMENTS OF A SUSTAINABLE SOLUTION

With financial investments there is a disclosure of risk to potential investors. Funders of humanitarian innovations should demand similar insights before they make substantial Scale Up investments. Yet, most Pilot programs emerge from the Invent Stage with a series of blind spots, areas that have been intentionally or inadvertently ignored. This is entirely expected since fast moving Pilots must simplify their problem space in order to speed experimentation and learning.

Uncovering gaps and identifying the associated with them is the second key responsibility of the Big Picture view.

It's very difficult to spot gaps in a list. A collection of details has no natural structure to highlight holes or call out areas that have been given less than thorough consideration. In contrast a good picture enables Q&A between sponsors and program leaders. It's possible to point at a particular activity and ask probing questions. "Who will do this?" "Is these legal under current statutes?" "Where does the equipment come from?"



POSING QUESTIONS TO THE BIG PICTURE (SEE PREVIOUS DIAGRAM) ENABLES MISSING ELEMENTS OF THE SOLUTION TO BE DEFINED

The inspection may result in new elements being added to the picture; instruct operators, lobby for new regulations, build a supply chain. Each of these new functions may spawn their own set of additions.

Particularly high-risk activities can be called out. The stepwise examination of activities in the context of the whole solution may uncover challenges like an immature market or missing infrastructure hat can be difficult to circumvent.

SELECTING FIRST STEPS – BEGINNING AN ITERATIVE JOURNEY

The Big Picture view gives us a sense of the total scope of work and the areas of greatest risk and difficulty. While this is extremely useful information, it will not enable the creation of a detailed plan from these insights. Work may be subdivided into parts with frequent checkpoints, there is no presumption that the entire scope of work can be mapped out in advance.

This is a fundamental shift in thinking. Constructing complex systems involves making tradeoffs that feedback into the design of the solution. A decision to cut costs here drives up challenges over there. The impact of design choices in interconnected non-linear systems cannot be predicted in advance.

The scale up process needs to learn as it progresses. Make a design choice, see the impact, make another choice. Since it is impossible to plan the operation in detail from start to finish, what can be done is propose a high level roadmap based on current knowledge and then select a starting point that can be explored in more detail.

This looks very much like the techniques used to shape Minimum Viable Products (MVP) during the Pilot. The difference is that we're not focusing on market testing an idea. Instead we're working through the complex and high-risk areas of the Scale Up solution's architecture and implementation.

ADJUSTING THE ARCHITECTURE – MANEUVERING INSIDE COMPLEXITY

The purpose of an iterative journey is to incorporate new insights as the architecture of a sustainable solution emerges from complexity. While both the Pilot and Scale Up leverage this kind iterative learning, there needs to be considerable more structure than was present during the Pilot stage. A Kanban Board with a two week planning horizon is a favored tool of Invent Stage entrepreneurs.

The interdependent nature of a large complex design problem requires more powerful tools for visualizing the system as it evolves. Once again our MECE diagrams, the big pictures of the overall solution, can be applied to the Scale Up challenge. As the journey progresses, the diagrams can be easily updated to shift components around, change connections, and add new elements. In effect, the definition of what done looks like can evolve. Further, because MECE diagrams can be selectively decomposed, it's possible to break individual elements into ever more granular pieces. The same diagram can be used to represent the overall solution even as the thinking becomes finer grained.

At each step in development is an opportunity to revise the view of the problem space. The components to be implemented and the dependencies the connect elements are shifted and reshaped based on an evolving view of the challenge. From time to time the ultimate goal, that city on the mountaintop, may be adjusted, thereby changing the ultimate end point of the Scaled Up solution.

(3) INVEST IN PASSIONATE OWNERS

COMPLEXITY'S CHALLENGE – COMPLEXITY NEEDS A CHOREOGRAPHER

There is no clear path through complex problem spaces. On an ongoing basis, hard choices with many dependencies and significant uncertainty must be knit together into an effective whole.

Navigating the twisting Scale Up journey, aiming at a complex end state and iteratively shaping a complex solution with messy design choices, doesn't just happen. Creating a sustainable solution requires someone to act as choreographer, owning the holistic view of the solution, driving an evolving architecture and navigating a shifting journey.

There are ambiguous architectural tradeoffs to make and multiple streams of work that need to be woven together into a whole. Execution is messy. In contrast to the feel good excitement that often surrounds Pilots, the Scale Up effort raises the specter of real change in peoples lives and work. As immune responses kick in and unexpected problems emerge. Even well tested assumptions will be vulnerable to change.

A key leadership role needs to be filled to navigate these complex system level challenges.

CHOREOGRAPHERS OF COMPLEXITY – A NEW ROLE

Multiple shifting challenges face Scale Up teams over an extended period of time. This makes scaling from a Pilot less a programme to be managed, and more a journey to be led. A unique role sits at the center of that Scale Up journey. The Author's have dubbed this the "Passionate Owner", a person responsible for understanding the big picture of where the initiative is going and making complex architectural choices in an uncertain and messy environment.

An analogy can be made to the role a choreographer takes in a dance company. Their job is to produce a finished work that integrates many different performance elements; music, dance, and storytelling. This must be done by making tradeoffs and finding synergies within the available resources of the company, and all the while driving toward an ultimate vision.

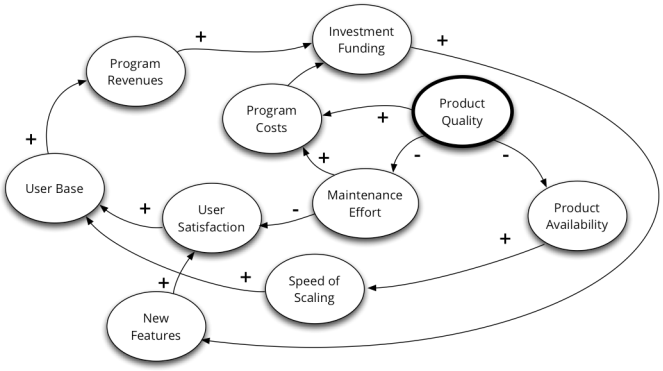
In the commercial sector, these choreographers of complexity are increasingly identified as Product Owners. They are more than managers of feature lists and work schedules, someone who organizes and tracks well-defined projects that have reached maturity in the Optimize Stage. Nor are they the insurgent pioneers, breaking with tradition without getting tangled up in the fine print.

The Passionate Ownership doesn't have the luxury of knowing exactly how things will turn out or of being a mercuric experimenter. Instead, they must architect a complex solution with multiple parts and navigate the messy journey that leads to a sustainable system of value creation.

WICKED PROBLEMS – MASTERING TRADEOFFS AND SYNERGIES

As we've already stated, Scale Up solutions include complex architectural design choices that are dependent of each other. Changes in one area of the solution impact the performance of another. When priorities conflict, for example cost cutting is good but reductions in quality are not, the design

effort becomes tangled up in itself. There is no quick way to analyze or test for the best possible solution. An iterative effort of mutual adjustments is needed to explore the design feedback loops.



COUPLING OF DESIGN ELEMENTS CREATES FEEDBACK LOOPS

For example, in the adjacent diagram it would be possible to reduce program costs by lowering product quality of an innovation. The savings would add to the funds available for new innovations. However, the lower quality would also increase the need for maintenance, which would in turn drive up program costs. It would also force down user satisfaction, reducing usage and paradoxically cutting revenues to support new feature development. On the other hand the cheaper components might be more easily available and so scaling could be done more quickly, increasing the user base and adding to revenues.

These kinds of tradeoffs can't be ignored during the Scale Up effort. Architecting solutions in these messy networks presents multiple challenges:

1) **Unpredictable Feedback:** Changing one variable impacts another in a cascading chain. They produce chaotic behavior where small input changes can drive substantial alterations in behavior.
2) **Beyond Analysis:** Over a certain level of complexity the systems can not be explicitly analyzed with traditional time saving computer algorithms for digital solutions
3) **Hard to Segment:** Because the network is interconnected, it is hard to make problems simpler by subdividing them.
4) **Uncertain Values**: Many of the most important variables are difficult to estimate. For example, how much will customers be put off by lower quality and more frequent repairs for shelter or WASH solutions?

ITERATIVE JOURNEYS – ARCHITECTS OF PIVOTS AND ELEGANT SOLUTIONS

So how does a Scale Up team find a good solution that embraces all this messy complexity? The nature of the solution space makes it impossible to create an optimized solution up front, something that can be locked down and executed by a project team.

An alternative to up front planning, is the iterative evolution of a complex solution. The journey begins with the choreographers best sense of how the overall end state will look. This is the initial big picture view of the solution.

Then a portion of the solution is developed on top of the Pilot's foundational elements. As each element of the solution is expanded, new insights will become available. The Passionate Owner's job is to integrate constraints, dependencies, and opportunities into an evolving architectural design,

creating an elegant solution that leverages the resources and constraints of the problem space in the best way possible while achieving the end vision.

It's a wandering path that keeps the full challenge in view. The Passionate Owner needs several skills to make this journey effective as a tool for wrestling with complexity.

Divide Problems Along Seams: It's not possible to undertake all parts of a complex tangled problem at once. At the same time, the coupling of elements within the solution make it impossible to cleanly break the work into independent parts. A skilled Passionate Owner identifies the natural "seams" in the problem, the areas where the interdependence and coupling are least critical. Eventually the impact across the seam must be accounted for, but a good choice allows for evolution of smaller segments of the solution with less catastrophic feedback into other parts of the challenge.

Architect Elegant Solutions / Synergies and Tradeoffs: An effective Passionate Owner can look across the overall architecture of the solution and see how the elements interact with each other. They help shape elegant solutions that balance these tradeoffs in unique and unintuitive ways. Leveraging a chorographers holistic view of the possibilities, they identify where tradeoffs are necessary and select the best combination of outcomes from conflicting goals. They should also be able to discover unexpected sources of value, places where multiple elements create synergies with other, performing better as a group than they would individually.

Design Effective Pivots: During the execution of the Scale Up journey, unexpected disruptions to the original vision and architecture will occur. This is a near certainty in any genuinely complex problem space. Simply giving up (failing fast) is not an option. Instead, the Passionate Owner should lead efforts to pivot the approach based on the new insights. This

A PRIVATEER'S MINDSET

In many ways the Passionate Owner needs to walk a tightrope between structure and independence. An analogy might be drawn from the different leadership mindsets of the historical Pirate, Privateer and Navy Captain.

The opportunistic Stage 1 pilot program leader aligns to the pirate, opportunistic and nimble. Think of Steve Jobs' famous pirate ship at Apple. In contrast, the Navy Captain, with rigorous and clearly laid out Standard Operating Procedures is analogous to a leader working in a mature Stage 4 programme.

Scale Up requires the Passionate Owner, to follow a third model, blending the two mindsets.

Sir Francis Drake is probably history's most renowned privateer. These people captained private battle ships commissioned by the State to carry out missions at sea until the mid-Nineteenth Century. A privateer had to have the individual initiative of pirates, but also had to align their work with the broader strategies and aims of the Navy's campaign.

Today, there is a danger in assuming the Pirates of the Pilot stage will adapt well to the compromise of the wider programme. For the Pirate, frustration can build up quickly when the challenges of a complex solution cannot simply be short cut.

Nor is the Naval Officer, with their well trained discipline and expectation of order, easily moved into this role. There is often shockingly little structure for making decisions or support for complicated sets of actions. Without a Privateers disposition; one that lends itself to self-directed flexibility, the effort can get stuck waiting for a world with more order.

requires a fine talent for understanding what genuinely matters in the new information and how the solution might be altered at the least cost. A well-designed pivot can save enormous amounts of time and can sometimes circumvent an otherwise unmovable barrier to progress.

EVANGELISTS OF CHANGE

Scale Up journeys are cluttered with stakeholders, each with their own concerns and priorities. The Passionate Owner, needs leverage a deeply felt sense of what the innovation is about and why it matters to get active engagement from this diverse community. The Passionate Owner must be able to influence others to:

- **Dedicate Time and Effort:** The Scale Up effort will often require others outside the circle of the original Pilot programme enthusiasts to participate in creation of a sustainable solution.
- **Embrace Change:** Once the programme is in place, the innovation will begin disrupting the status quo each of a variety of different individuals and organizations.
- **Support the Mission:** Funders and Senior Leaders must also be sold on the work, not just once, but on an ongoing basis, particularly during the inevitable periods of misfortune and performance dips along the journey.
- **Follow their Lead:** On long extended journeys the on the ground teams are probably the most in need of visionary leadership and ongoing inspiration.

PASSIONATE OWNERS – CREATING THE ROLE

When this position is wrong, either because the role doesn't exist, or because a person with inappropriate skills is placed in it, little hope exists of delivering a successfully scaled initiative. However, getting this role right creates operational resilience within the tem. An effective passionate owner counters imperfections in the creative journey.

There are several challenges in creating and maintaining this role.

- **Emerging Role:** This is a different kind of role. Simply getting the role recognized and appropriately staffed requires breaking with convention.
- **Special Skills:** The position requires a diverse set of talents, including hard to quantify "soft skills". This make sourcing the role difficult, a challenge that will get worse as demand rises for these flexible big picture skills.
- **Unique Motivations:** The people who have these talents and the energy to drive through numerous obstacles are often motivated by different kinds of rewards, making them hard to satisfy and retain conventionally structured organizations.

WHO ARE THESE PEOPLE?

The leaders we are talking about are not primarily administrative or managerial. Nor are they freewheeling creatives. Instead the combine some of both mindsets (see Privateer box). The key traits are those of a strategically focused product owner, including

- **Holistic Thinking:** An ability to see the big picture and craft a holistic view of complex systems is their principal talent. While these individuals often dive down into details of a problem or design, they work principally from strategic guiding models that they naturally build.

- **Multi-Disciplinary Perspective:** Creating a complex ecosystem requires insights from many different domains. This may include subject matter expertise in the domain, although most often this is the easiest to learn on the ground. An understanding of diverse fields such as technology design, organizational change and community impact is generally more important to success when dealing with these wicked problems.

- **Urgency for Action:** There are many big picture thinkers who are entirely content building castles of theory in the air. What is needed in this role is someone with urgency for making something happen. Delay is deadly to an initiative of change. A force of personality and passion must be present to drive the transformation forward.

- **Change Architects:** Not only are they urgent in pushing change, they are also architects of that change. Edgar Schein talks of a three stage change model which is commonly known as the un-freeze, change, re-freeze model.[viii] The passionate owner must create a container for the component parts that become chaotic in the period of unfreezing and change so that they can be reformulated for the "re-freezing" of the future state.

- **Win-Win Storytelling:** Almost no one has been successful by just 'ordering' other people to change or mandating belief. Sustainable change requires insight into what people need in order to *buy in* and where the barriers to adoption lie. With this insight these individuals can then create win-win stories that guide action and bring people along on the journey.

- **Tenacious Passion:** This is not work for someone who places their job in a box when they go home. The work is frustrating, discouraging, complex, and can drag on for years. As the soul of the effort, there must be a capacity for tenacious dedication to reaching the end state. Ideally, the Passionate Owner is someone who buys into the wonder of the dream and can draw energy from that investment.

For many years, these individuals have been something of a square peg being forced into the round holes of conventional business management. However, the field is now rapidly evolving. Many large consulting firms are grappling with filling this need and are struggling to source these.

SUCCESSION PLANNING

There is a need for succession planning as the Pilot comes to an end. It should be a warning flag if such a passionately engaged individual can't be identified as the driver of the Scale Up effort.

Can the Passionate Owner be one of the members of the original innovation team? Absolutely, but this shouldn't be assumed. Many disruptive insurgents see the conclusion of the Pilot program as the natural end to their engagement. Having delivered a successful Pilot, they are ready to move onto a new challenge. The strong focus on solution architecture and the long effort needed to negotiate and implement a Sustained Solution are not necessarily aligned with the *pirate's* flexibility that a pilot program leader embodies in the early stages of innovation.

At the other end of the process, after scaling is complete it is worth noting that the Passionate Owner may not be the best positioned person to take over day to day management of functions that have matured to the point of being repeatable. Passionate Owner naturally will often want to engage with new issues and future focused needs. The workman like organization and structure that a mature innovation needs in the Optimize stage represents a different set of skills.

(4) ENABLE SUSTAINED ENGAGEMENTS

COMPLEXITY'S CHALLENGE: THE JOURNEYS ARE LONG AND DIFFICULT

Complex design problems in messy environments, which have a low degree of control and limited level of understanding, take time to solve. Engagements becomes longer and less easy to time box.

Scale Up engagements differ from either the free wheeling experimentation of the Invent stage, or the well planned predictability of the Optimization stage. During the Invent Stage, pilot programs are intentionally time boxed, with limited investments and fast feedback cycles. Later, managers of mature Stage 4 innovations can package both incremental improvements and new deployments into discreet units.

These are familiar well-bounded contracting strategies that appeal to purchasing departments and administrators. They can reassure themselves that, even though the specific tasks are new and different, the management practices used are still well tested and easily defended.

It might be assumed that an extended complex endeavor like Scale Up would benefit from similar thinking, but the underlying nature of this journey to architect an evolving complex solution has different needs. It takes both time and continuity to construct a complicated multi-part system within a messy and only partially understood environment.

This requires a funding and engagement models that gives priority to sustaining a consistent effort without repeated funding and staffing disruptions.

SCALING'S LONG JOURNEY – SIZE, MESSINESS, AND LACK OF CONTROL

Scaling Up is generally one of the longest efforts in the Innovation lifecycle, one that requires a sustained consistent engagement from investors/donors and sponsors. Looking at examples of innovations that have successfully gone to scale it is not uncommon to find that true scope of work took years.

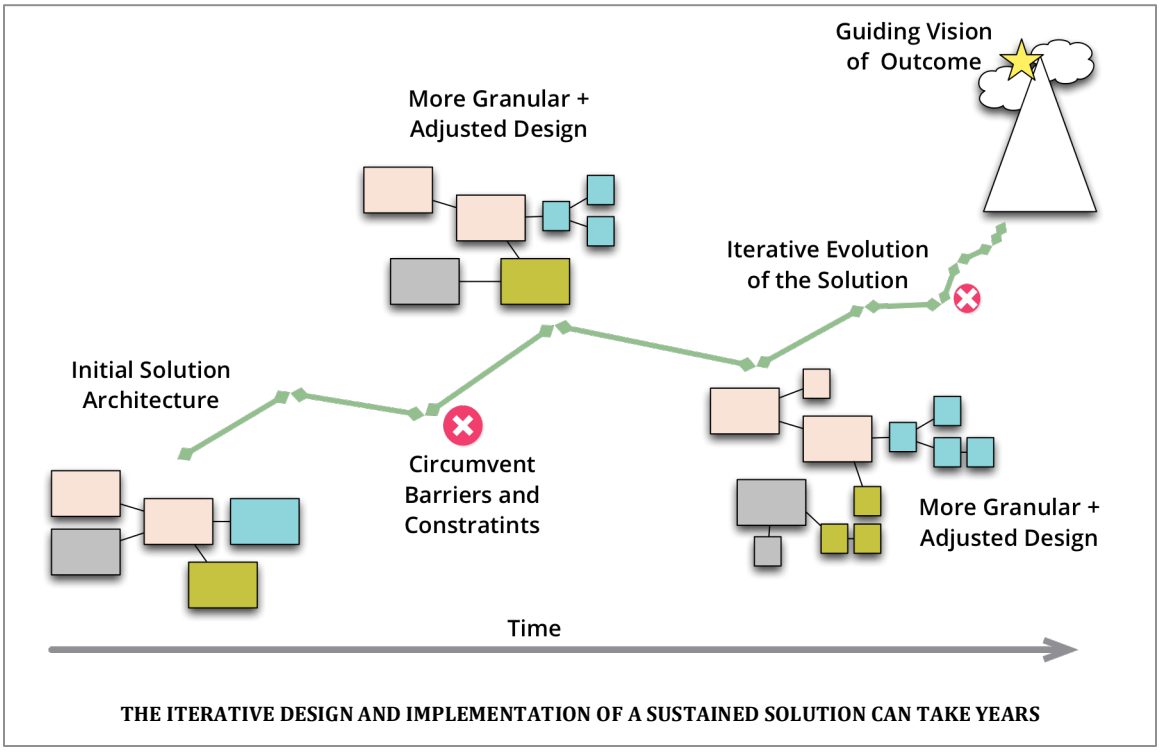
It's useful to understand why this is true, since this will drive the need for sustained commitments that are often substantially greater than those needed to breed the baby bunnies of Pilot programs.

MORE MOVING PARTS

As seen in the prior section on providing a frame for the journey, Scale Up programmes often bring many new elements into the solution. Since the job of a good Pilot is to trim away distracting parts of the problem, it's quite reasonable for a Scaled Up solution to have more components. In addition to the sheer size of the problem, the number of disciplines that must be applied grows.

Challenges Untangling Complexity

While sheer size drives time and effort, may not be obvious is that the complexity of the solution space, is often a bigger driver of the work's magnitude. As outline in the prior section, the number of design choices an innovation team faces when developing a new innovation, grows exponentially with the size and connectivity of the solution problem.



THE ITERATIVE DESIGN AND IMPLEMENTATION OF A SUSTAINED SOLUTION CAN TAKE YEARS

Since these complex interactions often can't be solved through simple analysis or by applying past best practices, there is a need to leverage iterative learning. This iterative model is one of the powerful means of dealing with complexity head on, but it is also difficult and time consuming to execute.

Lack of Control Over Execution

A third often deeply frustrating source of delay comes from the dependence on others to take ownership of key actions. This may be as simple as requesting the technology team of another organization to make updates in their software or as difficult as persuading a body of lawmakers to change the rules of play.

While delays often seem like others are simply trying to stand in the way of progress, there are usually more systemic reasons for their failure to act quickly on a project that is not their own.

- **Getting on Their Agenda:** In real life, no one has free time and an open work schedule. Attempting to push new work onto someone's already full work plan is in effect a request to

delay some other work that is on their plan. Often this creates long lead times process for evaluating and prioritizing requests, even when everyone is basically in agreement on the need.

- **Conflicting Goals / Messy Choices:** If the change is systemic and not just a set of work to be done, it may well be that the other party has a point of view and a stake in the outcome. A change in a humanitarian programming model is not just a task to be completed by an obedient group of technical specialists. They need to balance concerns and priorities, achieve consensus, and avoid blow back from decisions.

- **It's Your Urgency, Not Theirs:** The party asked to do the work will seldom care as much as the group making the request. Fast tracking an external request in front of urgent needs of their own may make little sense.

- **Asynchronous Tasks:** Tasks that are under an innovator's direct control can be tightly choreographed, switching back and forth to resolve dependencies. Work under other people's control often needs to be scheduled sequentially, for example, Group A must finish their work before Group B can start. This creates hard dependencies, where any one group's delay slows the entire chain of work.

- **You Threaten them:** Pilot projects are often viewed as 'flights of fancy' by people with an vested interest in keeping the status quo. Once an innovation is scaling up, it is drawing in more resources, people and attention. It is starting to become a threat to entrenched interests. Intentional roadblocks and even subterfuge can occur. Identifying such 'terrorists' and managing them is crucial. Finding win-wins is crucial.

VALUING CONTINUITY IN LEADERSHIP

Changing the Passionate Owner mid-journey is very costly. Context and continuity are critically important for this work, with many subtle relationships, dependencies and insights captured in the leader's head.

We are used to thinking of management skills as being fungible. A new manager taking over a traditional team focused on the operations of Stage 4 may take a bit of time to settle in, but there is a large amount of stability built into the processes and design of a mature process or product, more often than not captured in Standard Operating Procedures, programme models and the like

In contrast, switching from one Passionate Owner to another is extremely costly. Much of the effectiveness of leader in this role comes from their deep internalization of the vision, dependencies, and strategic plan. A Passionate Owner cannot waste time documenting all the pivots and changes in direction, all the re-sequencing that is required in architecting solutions in complex ever changing systems. Beyond the simple transfer of knowledge and insight, there are many other more subtle assets that leave with the departing owner. Relationships and social connections that are crucial to ensure the integration of the innovation into the wider ecosystem can take a long time to rebuild.

There can also be a more subtle impact on execution. Many complex design strategies are premised on the ability to execute additional steps in the future. Without this belief, the Scale Up team can be pushed to adopt short-term tactics, which can be completed before the next funding round disruption occurs. Skilled Passionate Owners can make this cost invisible to funders. The solution

seems to work. The full impact is never fully exposed even though the innovation doesn't work as well as it potentially could have under a more long term strategy.

FINANCING AND CONTRACTING FOR AN EXTENDED PARTNERSHIP

To break with past engagement practices, its useful to view the Scale Up journey as an ongoing partnership. Much like with a marriage, this makes selection of the partner (i.e. the innovation and it's team) in scaling up an important decision. Of course if a team is failing to perform a change should be made, but this is not the same as regular rebidding of work where vendors are treated as fungible units of production. Divorce is possible, but not something you want to undertake lightly.

Traditional humanitarian short term contracts, and even to a lesser extent, the limited stages of innovation financing currently being used, work against a model of sustained partnership. In addition to this, many innovations in humanitarian organisations are still reliant on deployable personnel, or are being led by individuals on short-term contracts. The better pilot innovations are often run with significant user input, and therefore, are often being led by people who will be in the context where the innovation is being trialed for a maximum of 1-2 years.

Unfortunately, these funding and contracting models don't align with the on the ground needs of a Scale Up team. The need for continuity and support over a long journey demands a different approach from Donors and Organisations. The traditional models of humanitarian funding and contracting need to be seen as critical risks to success. Purchasing and Project Administration can derail a Scale Up effort doing business as usual.

FINANCING SCALE UP JOURNEYS

The root cause of a number of the difficulties in contracting for Scale Up journeys stem from how innovation Scale Ups are currently funded. Prototypes and to some extent Pilots are able to source funding. They are shorter journeys, and have less requirements from funders perspectives. However, once the significant investment for Scaling Up is required, there are significant challenges in how it is financed. These challenges are highlighted in a forthcoming study by one of this papers authors[ix] Some critical issues that were identified were:

Volume: Funding for Scale Up is often too small. Significant tranches of money are required.

Funding Stages: Equating the innovation stages to funding stages creates issues of risk jumps at stage gates being too large. As stated above, the Scale Up journey requires iterations of funding within it. This enables risk to be incrementally reduced, rather than expecting it to be reduced in large jumps, which turn into *valley's of death*.

Funding Alignment: Aligning more traditional funding mechanisms within agencies or by donors provides a clear line of sight for how the sustainability of funding, and the business model can occur for Scaling Out and Optimization. Forward purchasing commitments are catalysts that can attract private sector and other partners to commit to the scaling journey.

CONTRACTING

Providing more secure and significant funding enables organisations to deal with other issues that affect the capability of the organization to manage Scaling Up effectively.

Gaps in Contracting: Two year employment contracts and disaster specific recruiting are the norm in the humanitarian field. This is a model of practice that can work for humanitarian operations, however, it is not fit for purpose for Scale Up in humanitarian innovation. The skills of Passionate Owners and their supporting teams are of growing value in an innovation driven environment. They are not a resource that should be allowed to come towards the end of their contracts mid way through the scaling journey, leading to them seeking work elsewhere.

Resource Shifts: Assured and stable funding for the Scale Up Journey means that the issue of staff being re-deployed can be more effectively addressed. The next large-scale emergency need not mean that key staff suddenly disappear from the innovation team. Funding does not need to be leveraged from the cash injection provided by emergency response funding, enabling stability and continuity in the innovation team for the length of the Scale Up journey.

INSTITUTIONAL STAMINA - FINDING THE RIGHT FUNDERS & ORGANISATIONS

Scaling Up innovation is analogous to building a business. Unfortunately, the agency where the "bunny" was born may have not have a priority investing their limited resource in scaling up an idea that is not aligned with their overall strategy.

This can be a problem for organically created, bottom up innovations within large organizations or one-time challenge grants. The practice of breeding baby bunnies in the Invent stage of innovation has made many institutional leaders comfortable with the idea of short investments that have just a taste of risk to them. For funders they are exciting bites of newness where commitments are relatively easy.

However, this ease of short-term support comes with the risk of abandonment at the end of the initial period of invention. As has been stressed throughout this section, Scale Up journeys are long, often multi-year efforts that can require sustained investment and engagement to be successful. They are likely to be much bigger parts of the organization's portfolio and need deep support long after the initial blush of excitement has worn off.

Institutional stamina is needed in funding, contracting, and support. If the funders for a Stage 1 Pilot program are unwilling or inappropriate for the next stage level of sustained commitment a "jail break" may be needed to move to a better-aligned investor.

Escaping from institutional indifference can be difficult. There may ties back to the original funder, such as issues of intellectual property ownership. Even with these barriers resolved, it may be necessary to look far afield to find someone whose interests are naturally aligned with the innovation's outcomes. Fortunately, the proliferation of new business models and partnerships in the sector increase the possible choices available to the innovation team. An innovation developed inside an NGO does not necessarily need to mature within the same NGO, or even an NGO. Also, an idea funded by a grant does not necessarily need to go to scale through grant funding. The initial funders and homes for innovations should see it as part of their role to try to 'match-make' the innovation with a new home, or new funders if the innovation no longer aligns with their strategies.

(5) GO BEYOND MEASURING FIXED OUTCOMES

COMPLEXITY'S CHALLENGE: OUTCOMES DON'T MAP TO PROGRESS

A key thing for all involved in Scaling Up and innovation is that the efficacy of a pilot solution may actually decline as real world constraints and dependencies are added. Measuring progress and quality needs to look at more than just fixed pre-planned outcomes.

Investors in innovation should not demand risk free programs of change anymore than a financial investor should demand risk free securities. Risks need to be understood and acted upon. However, traditional measures of performance based on predefined outcomes miss the key elements of both risk and progress in a complex Scale Up journey.

While tools like logframes can be useful for clarifying intent, the progress of a non-linear journey through complexity cannot be so neatly planned in advance. Fixed outcome improvements cannot be relied on to provide a complete picture of program health. Instead, the measures must reflect an evolving completeness and sustainability of the solution.

INABILITY TO RELY ON OUTCOME MEASURES

One of the most striking features of the Scale Up journey is how difficult it is to measure progress. In both Invention and Optimization, effectiveness can be measured in outcomes that benefit the recipient. Inventing better ideas produces better outcomes. More effectively planning efforts to replicate a proven solution will also multiply the benefits to recipients.

In contrast, during Scale Up, adding complexity into simplified pilot program comes with no assurance at all that outcomes will improve. Long term sustainability and predictability of results may improve, but there is a very real chance that an innovation operating within the demanding constraints of the real world actually reduces the effectiveness. Outcomes may even decline.

Equated good projects with better outcomes, made it possible for the contracting and measurement of innovation to fit well within traditional logframe tools. Yet, if these outcome driven measures of performance, the very thing the sector has gotten skilled at, specifying and tracking within progress against agreed upon indicators, are poor measures of Scale Up success as standard indicators may not apply, and are likely to be changed mid-journey. Alternatives are therefore needed.

Clearly, progress must still be tracked. The need is to find measures that accurately reflect the status of the scale up journey. Much work needs to be carried out on defining these, but the key issue is coming to agreement between the innovation management team and the funders.

REDEFINING PROGRESS – ADVANCEMENT TOWARD THE END STATE

The journey to create a sustainable solution in a complex real world environment has two dimensions. The first is the progress toward realizing the architectural end state. The second is determining how well each of the component steps have been shaped along the way.

How do we measure progress? It is always done in the context of an end goal. If someone evaluating the progress of a homebuilder would look at the architectural plans for the whole house and then assess how far the team had come with the construction effort. If we simply see someone energetically nailing together boards, there is no sense for how far they have come in creating the finished building or even if they are the right track. Further are they dealing with the activities that are most critical to success and progress at this moment? Perhaps digging the foundation is the real need and more hammering is irrelevant to the job at hand.

The work of this zealous carpenter highlights three key elements needed to measure progress.

Progress Toward the End State Vision

How close the team is to fully realizing the envisioned end state of the system. Here we find another use for the big picture views of the program that were discussed earlier with regard to developing the overall solution architecture. The MECE diagrams of the overall solution provide a view of the entire connected solution ecosystem.

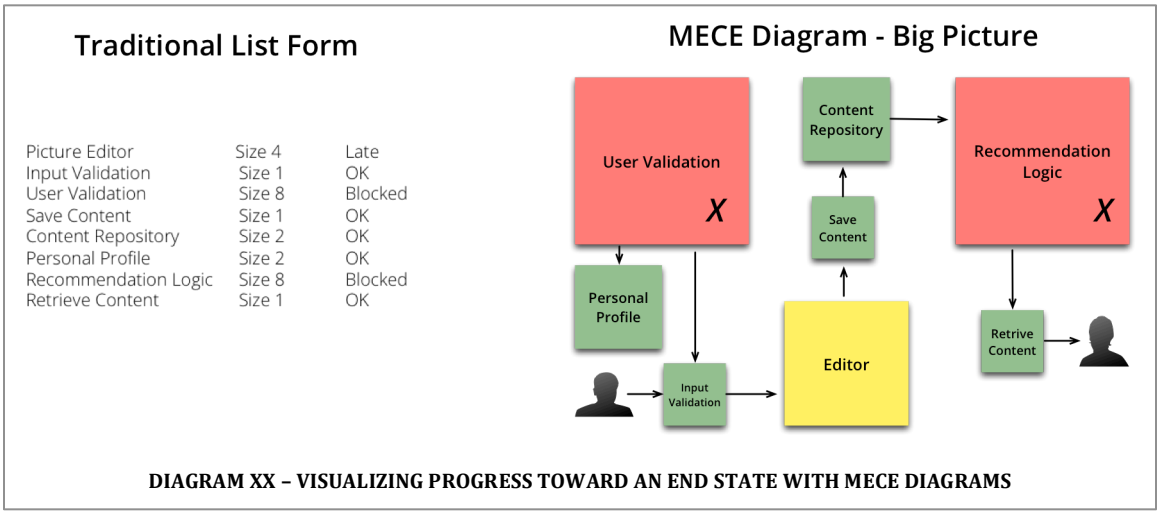


DIAGRAM XX – VISUALIZING PROGRESS TOWARD AN END STATE WITH MECE DIAGRAMS

A bonus of using visual tools with complex systems is that subtleties in the current condition are easy to detect. For example, the diagram above reflects a simple tool for delivering confidential and other important information to users based on their circumstances and needs.

The list at the left is a traditional inventory of project tasks. With the list it is difficult to see just how well the program is progressing to the end state. Is progress being made on the big challenges, or just the small easy components? Are areas still to be done at a key juncture in the design, a point with many dependencies? In comparison, even a quick glance at the view of the end state of the solution shows that the project is in deep trouble.

Appropriate Choice of Priorities

Complexity provides cover for self-indulgence. Even the best-intentioned teams will tend to focus their efforts on areas of the solution that are familiar, tangible, and rewarding. It's surprisingly easy

when working in the midst of a messy problem, to convince oneself that the things you know how to do are the things that need the most attention.

A good holistic view highlights not only the areas where progress is being made, but also those areas that remain the orphans of neglect. A complete view of the solution is needed to call out these journeys down a rabbit hole.

Alignment with a Shifting End State Vision

An even worse situation is when the complexity of the effort and the pressures of day to day conflicts drive the solution off track. The measure here cannot simply be did the work get done. There are many examples of programs that successfully completed all their assigned work, stepping through the logframe with precision, and yet failed to deliver on the promise of value.

The decision to deviate from the original vision may be intentional. In fact, this is a key goal of an iterative journey. Everything remains subject to new insights. Constraints may shift the understanding of what is possible or new opportunities may emerge that can be incorporated into a solution. Both the goal and design can shift, but ultimately they need to be aligned with one another.

Redefining Quality – Elegant Solutions

Of course there is still a need to make sure that each element of the work was done properly. On its surface this might seem well suited to a log frame approach. Traditionally, each component would be identified with an Activity, Output, Purpose and Goal.

A shifting complex solution architecture creates three challenges for doing this:

- **Defining Appropriate Measures** – If recipient outcomes are not a good proxy for success, alternatives will need to be defined. This can be done by looking at the nature of activity and determining "What Success Looks Like". Once this basic definition is in place, there may also be a challenge to define how the performance is going to be quantified and measured.

- **Elegance of Solutions** – Complex solutions involve tradeoffs and leave open the possibilities of synergies between the parts. While "it works" may be a necessary condition for completing a element of the design, there will often be many different possibilities for achieving that base goal. Ideally program success is defined not only in terms of what works, but in how effectively a solution takes advantage of its circumstances and circumvents multiple conflicting demands. In short a good solution is elegant as well as functional.

- **Shifting Architecture** – Finally, the definition of a component part of the solution, the goals to which it aspires, and the constraints under which the solution must perform can all shift as the Scale Up journey progresses. As a result, even when working goals and measures have been defined, these are not set in stone. It is not a failure of the innovation team to change the elements of the log frame. Rather this is an expected and necessary activity.

(6) PROVIDE MENTORSHIP AND SUPPORT

COMPLEXITY'S CHALLENGE – THIS IS A HARD JOB

When navigating in complexity the number of things that groups working in Scale Up must master is beyond the reasonable skill sets of most on the ground teams. Complexity extends the narrow concept of a program administrator's role to include filling gaps in team skills and experience.

The traditional program oversight activities must shift. Appreciating the impact that unexpected barriers have on progress, and the strategic shifts needed to circumvent them, can't be done by checking an outdated list of pre-defined outputs. Even when things work, richer insight is needed to distinguish an elegant solution from a makeshift approach without active.

In short, it is not enough to write a check and then measure results. Assessing the health and progress of an initiative requires more engagement if straightforward measures of outcome can't be used as the foundation for evaluating performance.

Complex multi-dimensional journeys also expose needs that extend beyond an administrator's traditional oversight role. Few individuals have all the skills and experience needed to navigate such a complex path. Providing seasoned insight and support becomes a powerful tool for reducing the risk that teams will become stuck in the messiness of their problem.

BECOMING A VALUED MENTOR

The demands on a Scale Up team are enormous. Passionate Owners and their teams are asked to solve ill-defined problems in a variety of domains. Solutions that balance conflicting demands and constraints often demand unique perspective and experience. It can be difficult for a team who experienced in a subject area domain, but new to the complex journey of creating sustainable solutions, to see what the source of their difficulties is. Even skilled Passionate Owners will eventually face some gap in talent, knowledge, or experience.

Who should step in to fill this gap, providing seasoned experience in the art of Scaling Up?

BEYOND ACCESS: SUPPORTING LOCAL INNOVATORS

Improving the outcome of a Scale Up initiative is not the only benefit of a mentoring capability. It can also be used to empower local participation in the complex effort to create and implement sustainable ecosystems.

Several of the recommendations for successful scaling in the previously cited Guardian article centered on involving people closest to the problem in developing the solution.

This discussion often centers on the core design of the original invention, but the same principles apply to developing the surrounding elements of a complex sustainable solution. Enabling locally aware and invested teams to take leading roles brings insight into complex constraints and opportunities, reducing one of the key drivers of complexity, uncertainty of how things work and what is possible.

We have observed a broad trend among donors and implementers engaging local innovators. For this to be genuinely effective in Scale Up it will be important to couple access to funds with proactive support.

One possibility would be to place an experienced advisor on each team, someone on the ground who fills diverse needs as they arise. This is a fine solution, but one that runs into challenges of practicality. In this emerging field of work, there are few candidates with the needed experience and finding all these skills in one person falls prey to the recruiting fallacy of looking for unicorns. It's possible to imagine a person who has the necessary talent and experience, but actually engaging them is far more difficult.

Rather than depend on hiring superheroes, *Business Sponsors* may be better positioned to provide the necessary mentoring. If so, this would be a significant and important stretch in the Sponsor's role. Another option is to use an *Insider-Outsider,* someone from outside of the organisation and the innovation team who has the necessary experience to mentor, and are committed to advising on the journey.

In multi-disciplinary domains dominate by wicked problems and messy social contexts, the Sponsor has an opportunity to leverage their unique position to see across projects and provide insights into strategies that individual Passionate Owners have not yet encountered. Examples of potential support include:

- **Visioning Guidance:** What does a good end state vision look like? How should roadmap be built to leverage continual learning and enable pivots? How can a holistic picture be visualized?

- **Learning/Pivoting Support:** How is an ongoing process of learning structured? What should be measured? How are inputs evaluated? What should be taken into consideration when designing a pivot? What kind of messaging should be developed around learning and change?

- **Adoption and Change Leadership:** What needs to be considered when engaging in cultural and organizational change? What tools are used to support change? What should be done to circumvent blockers in change efforts? What does a well managed change look like given the inevitable noise of a messy complex environment?

- **Sustaining Action:** How to engage with teams over time? How to build strong narratives and provide evidence of progress to stakeholders? What does reasonable progress look like on a complex journey like this?

- **Domain Expertise:** The natural inclination might be to put domain and technical knowledge at the top of the list. In practice, this is often the easiest information to acquire and the quickest to assimilate. While technical information may often be useful in programs that involve multiple domains, this will often be the easiest to satisfy of the Passionate Owner's needs.

BECOMING AN INSIGHTFUL CRITIC

This highly engaged role might be seen as conflicting with the historic role of a *Business Sponsor* and certainly for Donors as enforcer of contract terms. It is important to find a new balance. Discipline and accountability are still needed for innovation teams. However, an adversarial arms length contracting relationship is unhelpful in a journey that requires so many difficult choices in a shifting field of complex issues.

It is hard to replace a model that has a proven track record of success. The development of log frame models, which demanded measured contract results, was a major step forward for the Humanitarian and Development sector. It provides a level of rigor.

The existing outcome driven model appeals to a number of political and business needs. It provides a defensible measure of success that can be used to publically justify the investments in a sector that is often under great scrutiny. And finally, the contracting cycle have generally been aligned with funding cycles.

There must now be sufficient understanding to interpret what is happening, moving the position from one of detached management and compliance to one of partnership with an innovation team, providing guidance and valued advice. This alternative to outcome-based measure, is a more difficult standard to use, in that it requires shared insight from all parties, Donor, Sponsor and innovation team on the planned approach and the complexity of the solution.

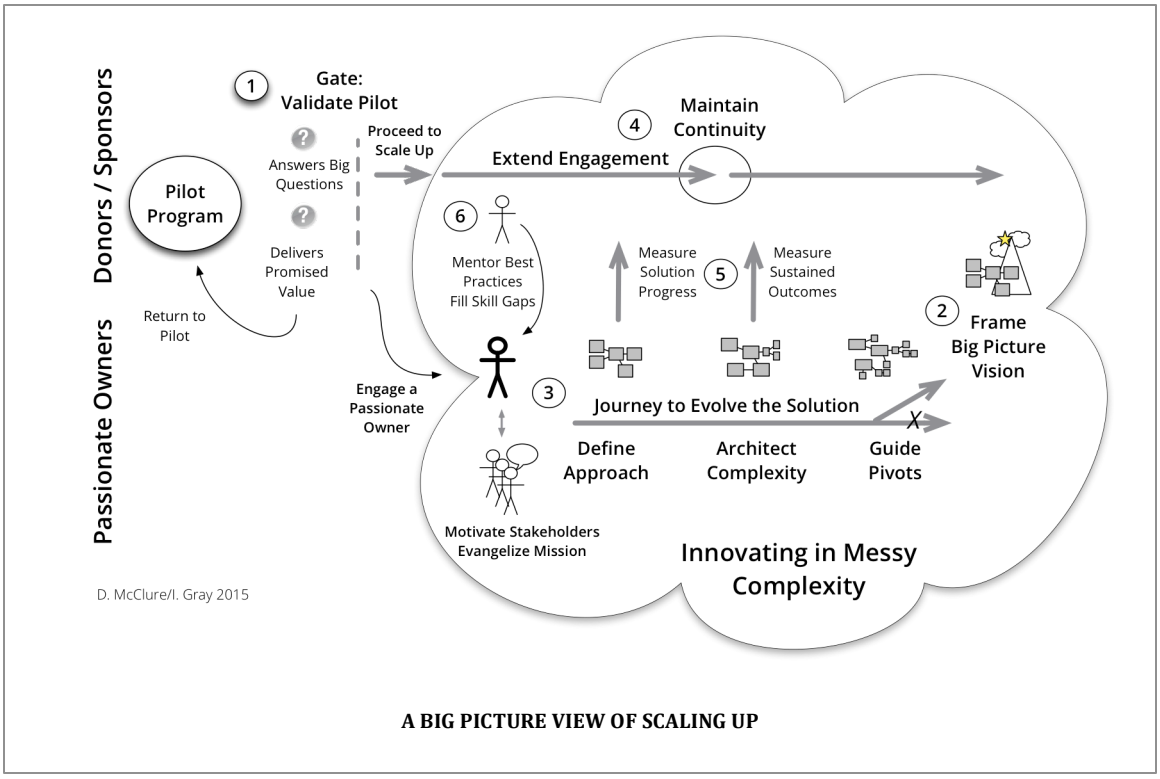
Shifting the contracting and engagement model to support extended journeys working with complex multi-faceted solutions will be difficult. None the less it is an important need, one that requires its own level of innovation and organizational change.

CONCLUSION AND ADDITIONAL PAPERS

INTEGRATING THE APPROACH

The final challenge complexity offers is that it cannot be addressed piecemeal. Validating a pilot program (1) makes sure an innovation is ready to be addressed in a complex problem space, which in turn makes big picture architectural views useful as framing tools (2). These require a Passionate Owner who can leverage holistic thinking to drive an iterative journey (3) to an end state vision. That takes time, so contracts (4) must be longer and have fewer disruptions. Such committed support will only be possible if the measures of success (5) match the actual nature of the work and if the complexity of the entire effort is enabled with suitable mentoring (6) and expertise.

It is in effect we need a system of complexity for dealing with systems of complexity. Pull it all together, and it might look like this.



A BIG PICTURE VIEW OF SCALING UP

A DEEPER DIVE INTO SCALING UP AND EXPLORING SCALING OUT

Two additional papers are planned for this subject. This paper talks about the journey to Scale Up a sustainable solution. The next takes a deeper dive into the sources of complexity in the design and implementation of the solution itself.

The Scale Out portion of the effort takes a fully functioning innovation and then makes the changes needed to create a replicable solution that can be applied in many contexts. That is in many ways a fundamentally different challenge from Scale Up and so is covered in its own paper.

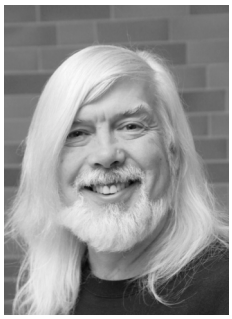
THE AUTHORS

The authors are hands-on practitioners of innovation at scale, with experience crossing players in social impact, commercial and government domains. As a result we have been guided first by our own experience on the ground with the points of failure and clever solutions that emerge in this messy space dominated by wicked problems. Examples are then provided to help illustrate the themes.

Of course, this is not a comprehensive manual with tools and techniques fully spelled out. That is content which could easily fill several books. This is one of a series of papers that explore the world of *Scaling: Innovations Missing Middle*. It therefore seeks to be a support to structured thinking about the management of one part of this area, *Scaling Up*.

Taken individually the elements of this journey are not rocket science. It's not our intent to conjure some new trick of management science. Rather, we hope to provide some practical insights into the mechanics of actually managing the *Scale Up* journey, something that there is very little written on, unlike the areas *of* Invent *and Optimization. Scaling* requires an innovation model that embraces complexity as its primary challenge. That's what we believe is needed for finally finding a way to navigate the scaling journey through the missing middle.

We are personally excited about this age of change and innovation. A great deal can be done to improve the world, providing we have the thinking, tools, and techniques to take our inspiration through the entire lifecycle of invention, scaling up, scaling out and optimization.



Dan McClure has spent 30 years designing and applying innovation practices across a diverse range of enterprises. He specializes in the architecture of complex systems of creative innovation. Today, he leads Innovation Design initiatives for ThoughtWorks, where his clients include humanitarian and public good organizations working to advance their ability to drive disruptive change.

Ian Gray has spent 15 years in the Humanitarian and Development Sectors, with the majority of that time in senior leadership positions. He has led Humanitarian, Policy, Innovation and Strategy groups, developing innovations in the areas of humanitarian and development programming, policy and digital tools. His consultancy supports clients in the private sector, government, UN, NGOs and the Red Cross Movement in the areas of Innovation, Strategy and Cross-Sector Partnerships.

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