GAHI

The Global Alliance for Humanitarian Innovation

INNOVATION 3.0

BUILDING A CREATIVE ECOSYSTEM TO TACKLE HUMANITARIAN AID'S MOST COMPLEX CHALLENGES

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Acknowledgements

GAHI would like to thank Professor Kirsten Gelsdorf of the Frank Batten School of Leadership and Public Policy at the University of Virginia for her strategic guidance and advising on the report. In addition, we wish to thank GAHI members and peer reviewers who provided critical insights and review in the development of this report, including Christopher Earney, Michael Eddy, Aidan Goldsmith, Ian Gray, Joanna Macrae, Jonathan Papoulidis, and Neil Townsend, as well as Anna Skeels and Kathryn Ripley from Elrha. The author would like to thank the GAHI team for their insights and suggestions during the development of the scale framework and completion of this paper. Thanks are also due to Makayla Palazzo, who served as a research assistant during the scoping of the report.

Finally, GAHI wishes to thank its donors for their continued support, including the UK Department for International Development; Australia Department of Foreign Affairs and Trade; Netherlands Ministry of Foreign Affairs; and Denmark Ministry of Foreign Affairs.

Suggested Citation

McClure, D (2019) 'Innovation 3.0: Building a Creative Ecosystem to Tackle Humanitarian Aid's Most Complex Challenges' Global Alliance for Humanitarian Innovation (GAHI).

Report design provided by Optima Graphic Design Consultants Ltd.

Report published in London.

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INNOVATION 3.0

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Executive Summary

The humanitarian aid sector needs to develop a new generation of sophisticated innovation practices. These capabilities are urgently needed to improve the ability to scale innovations and to address many of the sector's most important, and intractable problems.

This is not simply a call for "more innovation". Much progress has been made in making innovation a sector practice. The latest generation of "lean" innovation techniques, where innovators pilot ideas, fail fast, and engage in user centered design, have achieved widespread acceptance in the humanitarian sector. They were in turn built upon a prior generation of more structured innovation practices, where engineered innovations leveraged detailed analysis, advance project planning, and formal performance measurements.

This first and second generation of innovation techniques were in response to growing challenges in aid and lagging levels of support. The good news is that both methodologies are now well established within the sector and are driving certain types of change. What is less clear, is if they are sufficient to meet the most important and challenging problems in the sector.

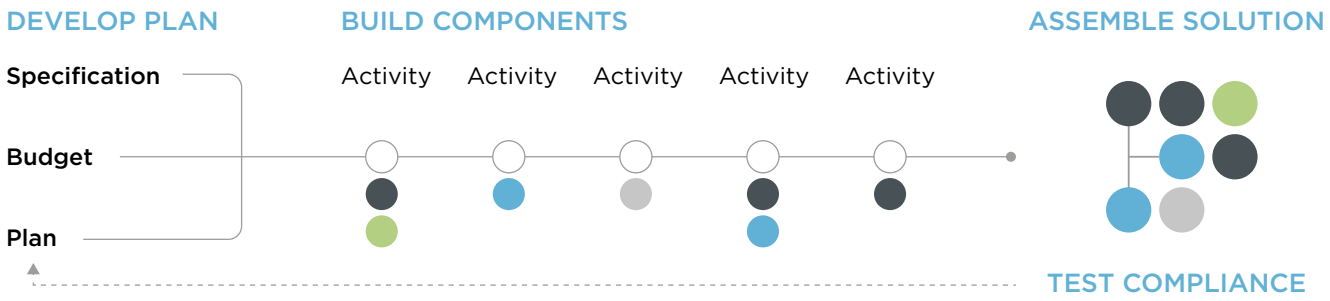
Need for a Third Generation of Innovation

The conclusion of this paper is that while the first and second generation of innovation techniques have made useful contributions, there is still a substantial gap in the ability of the sector to respond to many of its most important challenges.

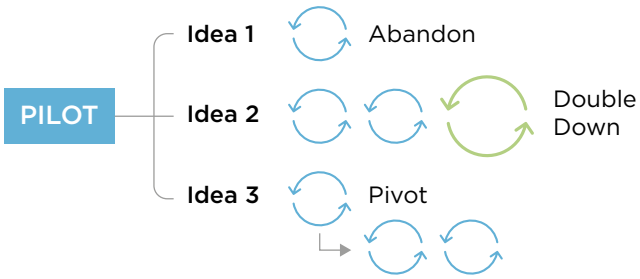
Promising pilot innovations still face substantial barriers when going to scale, leaving many good ideas underutilized in the field. Even worse, are complex unsolved challenges such as the localization of responses, breaking the cycle of perpetual aid, and dealing with "wicked problems" such as urban aid, aid in conflict zones and gender-based violence. These system-based challenges seem unresponsive to the current innovation techniques.

A third generation of innovation techniques is needed to deal with issues that are rooted in complex systems. Instead of being content to consolidate progress made with innovation's Generation 1.0 and 2.0, it is now essential for the sector to raise the bar on its creative aspirations and develop a new Innovation 3.0 capability based on system change.

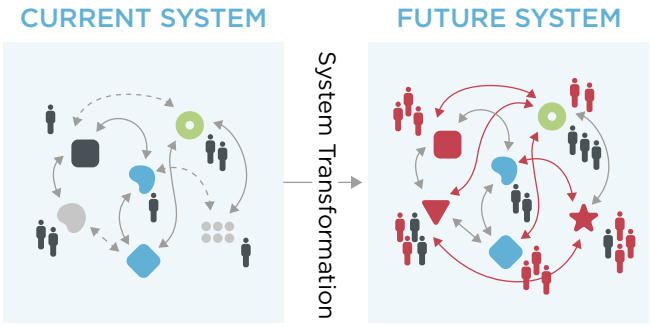
Generation 1: Reductionist Engineered Innovation



Generation 2: Exploratory 'Lean' Innovation



Generation 3: Complex System Innovation



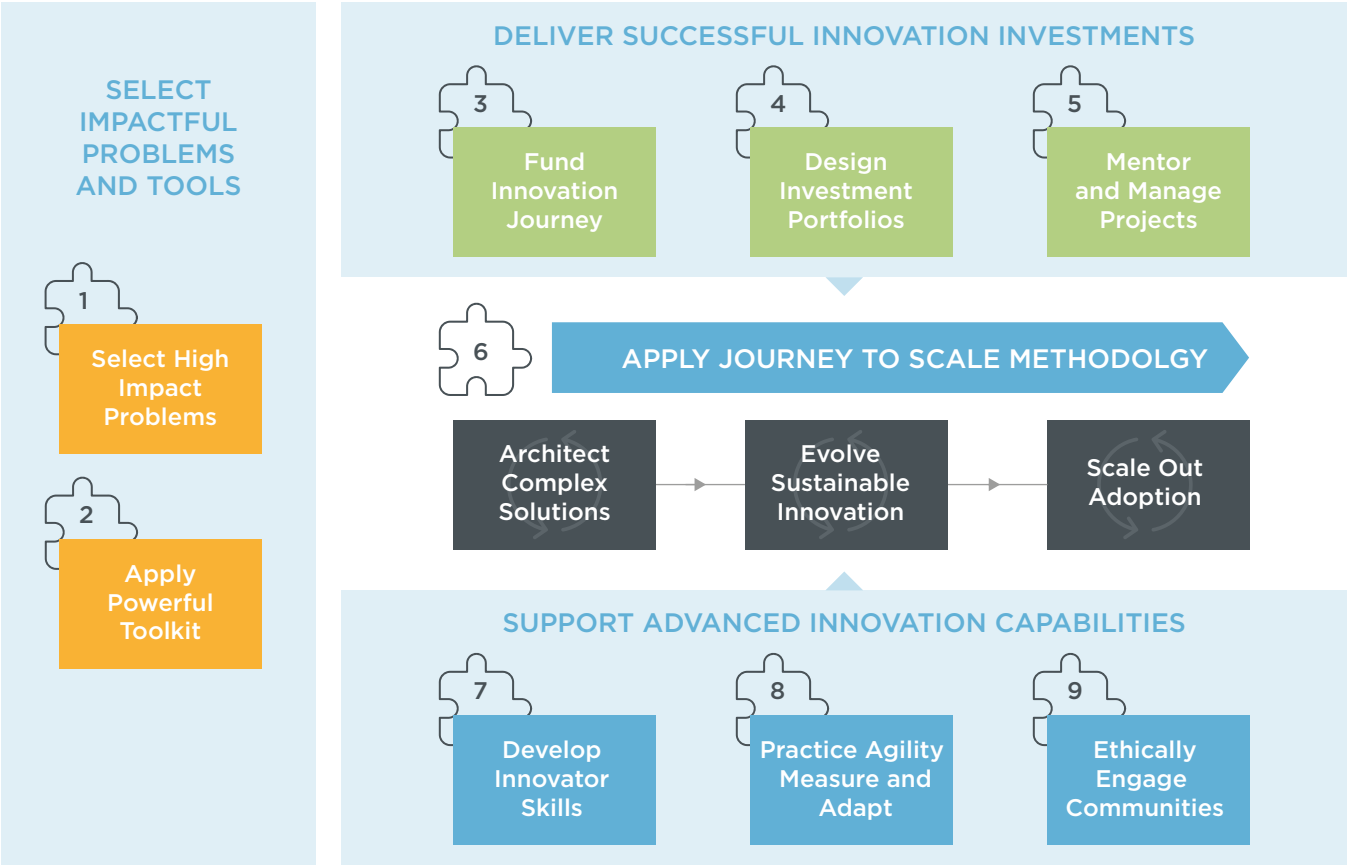
Building the Innovation 3.0 Ecosystem

Building this capability will be a significant challenge for stewards of the sector's innovation capacity. Unlike the earlier generations of innovation, which could be imported from established commercial practices, complex system innovation methodologies are being pioneered in fields like humanitarian aid. There are few ready-made road maps for either innovators or their sponsors.

A complete set of capabilities for Innovation 3.0 needs to be imagined, tested and deployed. This creates a need for a wide range of new methodologies, tools, and resources which span diverse domains such as; problem definition, financing, portfolio design, program management, innovator methodologies, measurement and even ethics.

The model shown on the right highlights these areas, which must build on and interconnect with each other. Taken together, the practices and institutions will form a creative ecosystem which is necessary for Innovation 3.0 to succeed.

Innovation 3.0: Creative Ecosystem



Shared Action

Building this ecosystem will require coordinated action across the sector and even beyond its normal bounds. Financial institutions, government donors, innovators, and local communities will all need to be involved. The first step in the journey to build an Innovation 3.0 ecosystem capable of these sophisticated forms of change will be understanding where capabilities are needed and how these differ from the innovation tools and techniques that have already been put in place with Innovation 1.0 and 2.0.

This paper examines each of these major capabilities, discussing how they have evolved through existing practices and then laying out what new abilities need to be developed. It provides an inventory of the work to be done to raise the innovation capacity of the sector by a full step. The Global Alliance for Innovation (GAHI), is leveraging this holistic view of innovation needs to identify areas where pioneering thinking is required and to highlight how diverse initiatives in original capacity building need to be integrated. This high-level model also provides a way to develop a shared view of broad innovation challenges with others who are collaborating on these efforts in the sector.

Where Is Humanitarian Innovation Today?

There is widespread recognition that business as usual is insufficient to deal with the growing number of crisis affected people and the complex challenges they face. While still lagging most parts of the commercial sector in the level of innovation investment, it is clear that innovation is no longer just a buzz word in the humanitarian aid. In recent years, substantial progress has been made in the adoption of lean startup practices pioneered in Silicon Valley. These fast-moving innovation techniques build on pre-existing innovation capacity which is based on a more formally structured approach to change.

Is the innovation capacity that has been created so far sufficient? It is now time to step back and ask; how far have these capabilities taken the sector in meeting its needs for creative change? Do we have the tools we need, in which case we should simply expand our investment in existing practices, or is there a need to push into new ground?

This paper proposes that existing practices, while useful for addressing some challenges, are not enough to deal with the most important issues facing the humanitarian sector. Even as there has been real progress in building innovation capacity, far too few promising innovations go to scale. Even more importantly, many of the most difficult issues in the sector, such as the complex system challenges laid out in the Sustainable Development Goals (SDGs), are not being effectively addressed by current innovation techniques.

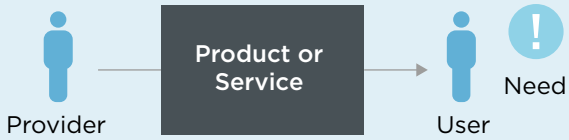
More must be done to develop a powerful and effective innovation capacity. Addressing the unsolved challenges of scale and complex system change requires a new and different generation of innovation capabilities. Unfortunately, there is not a waiting set of tools to pick up and use. Unlike prior generations of the innovator's craft, largely developed in the commercial sector and then borrowed by the aid sector, these advanced innovation capabilities will need pioneers in difficult fields like humanitarian aid, where complex system challenges are the norm.

If the humanitarian sector is to take on this challenge, action will be needed across a wide variety of fields. Creating a new level of innovation that deals with issues like scale and intractable, wicked problems, requires an entire ecosystem of supporting practices, resources and capabilities. This paper lays out a model for this next generation of complex system innovation, explaining what that creative ecosystem could look like.

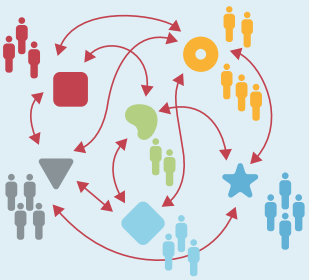
THE PROGRESSION TO BIGGER MORE DIFFICULT PROBLEMS

Problem 1.0 - Clockworks in a Box

Problem 2.0 - Narrowly Defined Product/Service



Problem 3.0 - Complex Multi-Actor System



Three Generations of Innovation

Explaining the current gap in innovation capacity begins with understanding that innovation is not just one set of techniques or tools. There are multiple innovation practices which are each designed to foster creative change for a specific type of problem. New innovation techniques have emerged as circumstances change and new types of problems need to be solved. Rather than seeing each new version of innovation as a replacement of old outdated forms, it's more helpful to think of them as tools in a toolkit, with each tool suited to a particular task.

Over the last ten years the humanitarian sector has built up capabilities in two very different forms of innovation. This is good progress but the sector is now in need of yet a third model of change, one that is suited to its uniquely complex challenges.

Innovation Generation 1.0: Reductionist Engineering

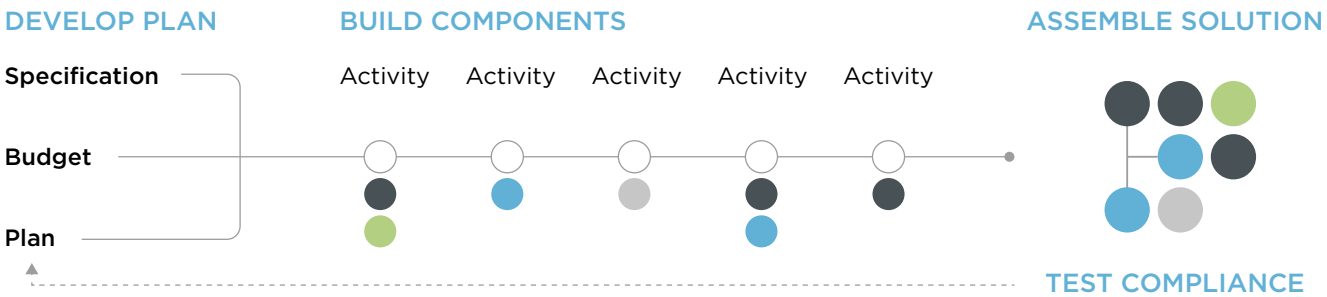
The oldest and best-established forms of innovation evolved through most of the 20th Century and was the foundation for a radical transformation of living standards through mass production, modern business management and a host of engineered systems in fields such as transportation, water, power and communication.

Think of this as Innovation 1.0. This generation of innovation techniques requires innovators to break complicated challenges into independent pieces that can be independently analyzed, planned and delivered. It is a reductionist approach that depends on the innovator's ability to understand a problem in detail and to treat each piece of the problem as its own challenge. Innovation 1.0 techniques require stable problems, detailed analysis, and careful planning. Engineers use this technique to design and build impressive works like roads, airplanes and business software systems. In the humanitarian field, the reductionist principles are used to organize the operations of large NGOs and structure supply chain operations that serve needs across the globe.

First generation innovators can tackle very large complicated problems by planning them in detail. The problem must remain stable over time and uncertainty and unknowns must all be squeezed out of the analysis. It's often a slow process, so this creative capability comes at a price. Once the work is underway, best practices focus on staying within the project plan and avoiding unanticipated change.

W. Edwards Deming[1] expanded the power of these techniques optimizing engineered systems. Instead of simply working to build a new facility or device, Deming tracked the performance of tightly controlled systems like factories. Knowing how the facilities operated under base conditions, he could then introduce small improvements and measure their effect. Techniques like those embedded in ISO 9000 standards or Toyota's total quality management (TQM) allow innovators to make a series of small incremental improvements to an otherwise stable system.

Generation 1: Reductionist Engineered Innovation



1 W. Edwards Deming was a leader in the development of statistical based process control. His work in the mid 20th Century enabling manufacturing operators to reduce costs while improving consistency and quality. His techniques were enthusiastically adopted by Japanese automakers before being widely implemented across many industrial and business service operations.

Innovation 1.0 practices are quite mature with widespread adoption across all forms of commercial, public, and non-profit organization. When donors ask for a log frame to track and manage the outputs of a defined project, they are leveraging Innovation 1.0 techniques and tools. Today, a full range of tested practices, as well as interlocking tools and services, are available to implement Innovation 1.0.

Innovation 2.0: Exploratory Lean Innovation

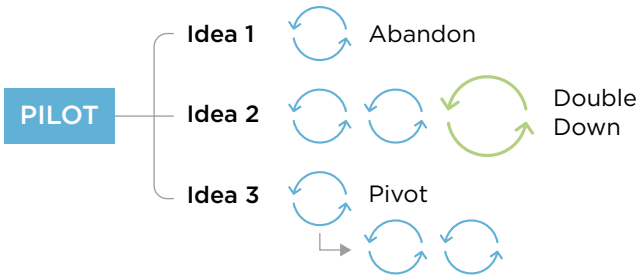
Not all innovation problems are suited to an Innovation 1.0 approach. For example, the advent of disruptive new technology platforms like the world wide web or mobile phones creates a wide open playing field for exploring new product ideas. A 1.0 innovator wanted a well-defined problem and time to solve it. In contrast, the 2.0 innovator that emerged during the late 1990s and 2000s was far more interested in discovering opportunities in problem domains that were as yet unexplored. Fortunes were made by commercial innovators who leveraged the fast-moving pilot process to develop products focused on specific users with specific needs.

Slow moving methodical innovation processes based on a thorough knowledge of a problem are inappropriate to this challenge. Ideas need to be generated and tested quickly. As a result, a second generation of innovation techniques was developed.

Books like Eric Ries' "The Lean Startup" and the recently published "Lean Impact" by Ann Mei Chung, encouraged innovators using 2.0 practices to fail fast, rapidly test hypotheses about user needs and iteratively refine product and service design. Fast moving investigation replaced slow methodical design. Instead of locking into a single pre-defined plan, innovators are expected to adjust course, pivoting their approach in response to new insights.

This creative nimbleness works best when innovators focus on narrower problems, discovering and testing product and service ideas that served a specific user need. Mobile apps provide an example of the generative capacity of these techniques. When combined with practices like User Centered Design (UCD), innovators can quickly hypothesize the existence of a need, develop a proposed solution (e.g. a piece of mobile technology) and then test it by engaging actual users. Success can be seen in the million plus mobile apps that have been created for each major mobile phone platform in under a decade.

Generation 2: Exploratory 'Lean' Innovation



Innovation 3.0: Complex System Transformation

Within the humanitarian sector, capabilities are now largely in place for both Generation 1.0 and Generation 2.0 innovation. Having invested in the new thinking that comes with the lean techniques of Innovation 2.0, the sector has reached something of a plateau.

On the positive side, it is possible to spend time and money consolidating the progress in both generations of innovation, fine tuning the institutions and resources that have evolved over the last 10 years in support of this work. Yet, before stepping back and declaring success, it is important to ask whether there are problems left unsolved by this two-part toolkit.

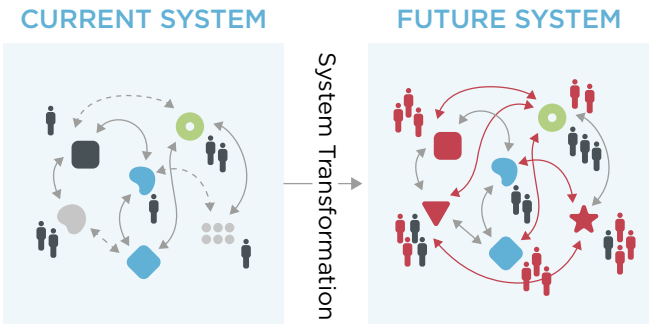
Here the results are much less encouraging. The aid sector has a disturbing number of problems whose scope and complexity appear to be beyond the reach of either Innovation 1.0 or Innovation 2.0 techniques. In three major areas, there are challenges that demand far more sophisticated system-based solutions. These include:

- **Wicked Problems:** These messy complex challenges involve multiple independent actors with dynamic interactions that are subject to continuous change. These real-life actors create a web of behaviors where each action potentially affects all the others. The 1.0 Innovator can no longer separate the parts of the problem into neat parts that can be analyzed individually. Nor can the 2.0 Innovation shrink the problem down to the size of an individual product solution. The problem must be dealt with as a whole complex system, a wicked problem that requires system transformations. Aid in urban contexts, economic and social resilience, and community-based challenges are all examples of important wicked problems.
- **Scaling Solutions:** Even well bounded product solutions can face unanticipated levels of complexity when moving from pilot to scaled-up use. Suddenly there is a need for training, supply chains, legal authority, business models, and management that expands the scope of the problem that the innovator must solve.
- **Last Mile Complexity:** Wicked problems don't have to be big issues affecting millions. A single community is filled with complex system challenges, a fact that has become increasingly evident as organizations move to pursue localization agendas. Crisis contexts are often areas of recurring need, specifically because they lack certain system capabilities (e.g. viable economies) or are burdened with dysfunctional systems (e.g. governance in conflict areas). Even well-functioning communities have varying culture and context that produce unique systems. Innovating in the "last mile" of aid inevitably engages this host of complex challenges.

These big intractable problems require solutions that leverage the transformative power of complex systems. This is the emerging third generation of innovation.

What is Innovation 3.0? It is using innovation to transform messy real-world systems so that they produce better outcomes. It addresses complex problems that are interwoven in systems with multiple actors pursuing varied goals motivated by different incentives, dynamically interacting through multiple interconnections.

Generation 3: Complex System Innovation



While many specific innovation practices, such as iteratively evolving designs in partnership with users are still useful even when dealing with these complex innovations, the existing toolkit provided by prior innovation methodologies is insufficient for system transformation problems. Generation 1.0 techniques are simply too structured and make too many demands for stable well understood problems. Generation 2.0 pilots are far more responsive to learning and insight, but lack the capacity to deal with extensive complexity, a shortfall that is reflected in the consistent difficulty in bringing pilots to scale.

Building a New Innovation Ecosystem

When organizations adopted second generation innovation skills, they had to master very different techniques and thinking. It should come as no surprise that sophisticated transformation of systems under Innovation 3.0 will also require a sophisticated new institutional capability that integrates a wide range of activities, resources, skills and methodologies.

Some superficial views of innovation focus on one or two skills, such as an innovators ability to generate original ideas. This substantially underestimates the range and scale of capabilities that must be in place for innovators to successfully bring an idea out into the world where it can generate impact. Many diverse elements must be integrated in support of the creative process. Funding must be available at the right time and under the right terms. Someone must manage the portfolio of innovators and the problems they are working on. Technologies must be available with a clear view into both their power and their risks. Ways to mentor, manage and evaluate innovators must be in place.

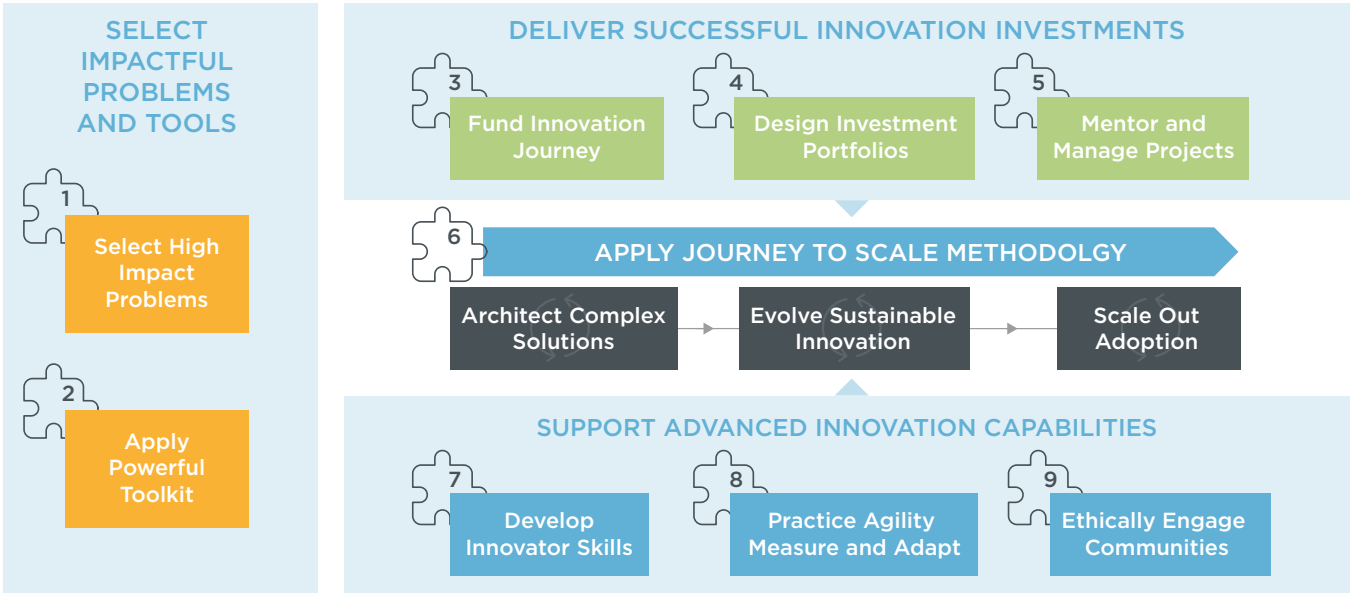
Think of these interlocking parts as a creative ecosystem. A high-level view of the emerging 3.0 Innovation ecosystem shows nine different areas of practice that need to evolve in order for this new generation of innovation to become adopted practice.

The prior generations of innovation needed to invest in their own creative ecosystems. In the late 90s and early 2000s the aid sector invested in building the Innovation 1.0 ecosystem, adopting tools and programs for managed creative process (think log frames) and applying them broadly across the sector. Over the last decade a great deal of effort has built out a second innovation ecosystem in support of Innovation 2.0.

Today a broad-based effort will be needed to define and develop a new Innovation 3.0 ecosystem in support of complex systems innovation. While there is growing awareness of the need for new innovation capabilities, comparatively little has been done to design or construct this new sophisticated innovation environment, by aid or any other sector.

This is an important change. In the past, the aid could wait on the commercial sector to develop these techniques. Borrowing other's innovation techniques is unlikely to work this time. While many others might eventually benefit from this systems-based innovation capability, the aid sector has far more of these complex messy problems than other domains. This puts the humanitarian and development sectors in a unique position, needing to step up as pioneers of the Innovation 3.0 ecosystem.

Innovation 3.0: Creative Ecosystem



Comparing Ecosystems: Three Generations of Innovation

In the remaining sections of this paper, each of the boxes on the ecosystem diagram is presented as a capability in the section below. To provide context, the approach of first and second generations of innovators is provided for each of the nine domains. This is compared to emerging views of the work needed to build a corresponding Innovation 3.0 capability.

Capability 1: Select Important Problems

Each generation of innovation techniques is well suited to solving particular kinds of problems, so that there is a relationship between the types of problems that can be pursued by an innovator and the nature of the innovator's methodologies. Within this range of challenges, the innovator must find a way to choose the best places to apply their talents and the investments of their sponsor.

Problems 1.0: Detailed Analysis

Analysis is the key problem analysis skill applied by 1.0 innovators. They solve well understood problems with clearly defined boundaries that remain stable over time, which encourages problem definitions that are quantitative, supported by rational decision making with concrete data. Tidy views of a problem are encouraged. When elements cannot be formally evaluated, or if they add excessive complexity, an innovator may narrow the bounds of an analysis so that they can force messy problems to look like clear cut technical studies.

Problems 2.0: Ideation

The Innovator 2.0 assumption of wide-open opportunity encourages much different behavior. There is often little information to analyze or study. Instead, creative ideation is seen as a key need for exploring a problem space. Organizations go to great lengths to prioritize the collection of original thinking. This entails workshops leveraging post-it note driven ideation and challenge grants that extend a wide net to find new ideas. Innovators are generally satisfied with narrowly focused product or service ideas that address a specific need for a specific user, rather than a systemic challenge.

Problems 3.0: Complex System Transformation

The complex problem areas that require Innovation 3.0, force the innovator to work with dynamic multi-actor systems. They transform a less functional system (e.g. an urban area facing ongoing poverty) into a system that produces better outcomes on a sustainable basis. To innovate within these systems, it is necessary to explore multiple dimensions of the problem space, seeing a holistic view of the challenge and not simply the needs of a single user.

Understanding this problem space requires a model of the existing systems. This requires an ability to capture and structure these chaotic insights, forming a "good enough" model of how the system works and where there might be levers for change.

These complex problem areas are inherently difficult to understand with little in place to provide structure and order for a flood of information. Critical information, such as the motivations of different individuals or the underlying attitudes that drive choices, will be hidden or unavailable. Even when key elements are uncovered, they are often contradictory or are continuously in flux.

Capability 2: Master the Solution Toolkit

One of the primary reasons that innovators can now contemplate addressing more complex problems is that the technical toolbox available to them is on the cusp of dramatic expansion. An entire suite of new technologies "is disrupting almost every industry in every country. And the breadth and depth of these changes herald the transformation of entire systems of production, management and governance."[2]

Toolkit 1.0: 20th Century Tools

The heavy industry toolkit of the 1.0 innovator is the source of 20th Century prosperity. It includes technologies and business practices that can be constructed into large complicated infrastructure projects, enterprise software applications and optimized business operations. These technologies and techniques have achieved widespread adoption due to their ability to support the thorough analysis and planning of projects of first-generation innovators.

Toolkit 2.0: Web and Mobile Platforms

The emergence of new digital technology platforms in the 1990s and 2000s, opened up greenfield areas of opportunity, such as the world wide web and mobile applications. How these new technologies could be used was far from obvious. The emergence of fast-moving Innovation 2.0 lean methodologies explored the potential of these new technology platforms.

Today, entire industries have been moved "online" and there are over two million "apps" available in each of the major mobile app stores[3]. While there are certainly opportunities to develop additional innovations with this toolkit, much of the original exploitation of this toolset has been achieved.

Toolkit 3.0: The Fourth Industrial Revolution

The upcoming wave of technical innovation will likely dwarf those of the last 20 years and potentially even rival the fundamental transformations that reshaped the 20th Century in developed countries. Broadly described by Klaus Schwab, Executive Chairman of the World Economic Forum, as The Fourth Industrial Revolution, these new tools will shift the potential solution space available to innovators, making it both far more powerful and far more complex.

The list of candidates for inclusion in the Fourth Industrial Revolution includes digital technologies such as the Internet of Things (IOT), Cloud Computing, Block Chains, and Artificial Intelligence. These blur into technologies capable of taking practical action in the world such as Robotics, Self-Driving Vehicles, Drones, and Maker Technologies. On top of this impressive list, are fundamental technology revolutions in other fundamental fields such as energy and genomics.

Several factors make this host of new tools exceptionally impactful, particularly when confronting problem spaces that previously proved to be intractable to earlier forms of innovation.

1. **Disruptive Power:** The sophistication and power of each of these new tools is such that they have the ability to completely sweep away current approaches to a challenge. Consider the single case of self-driving vehicles. Once fully deployed, they will devastate entire sectors of employment, drive a restructuring of cities and redefine what is possible in transportation. This has clear implications for development work, but even humanitarian responses will be impacted when the delivery of physical resources does not require human involvement.
2. **Synergies When Together:** While each of these technologies is powerful, they have the potential to multiply their impact when connected with other cutting-edge solutions. In these still early days of the Internet of Things, IOT sensors have now reached 7 billion devices.[4] These are useful as individual data sources but become truly transformative when given ubiquitous access to Cloud Computing and linked to Artificial Intelligence and Robotics.

2 https://www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond/

3 https://www.statista.com/statistics/276623/number-of-apps-available-in-leading-app-stores/

4 https://iot-analytics.com/state-of-the-iot-update-q1-q2-2018-number-of-iot-devices-now-7b/

3. **Extreme Rate of Change Everywhere:** Historically the deployment of new technologies proceeds at a moderate pace, with adoption favored in regions of strong economic development. In contrast, many of these new technologies will move with sudden speed, often being pioneered in areas without existing legacy technology. For example, truly Smart Cities are likely to emerge in areas where existing city infrastructure is limited, leap frogging older generations of technology.
4. **Unanticipated Risks and Dangers:** The complexity of the technologies combined with the wide range of rapidly evolving applications assures that new solutions will emerge without clear understanding of the potential risks and dangers.

While using these technologies is not a prerequisite to creating complex system solutions, they offer a rich source of additional creative power. Because they also come with potentially devastating risks and dangers, this adoption must be done with thoughtful consideration.

Capability 3: Provide Patient Funding

Innovators require funding to support them through a full creative lifecycle. Since few innovators generate revenue early in the innovation process, a particular harsh reality in the aid sector, the financier of ideas must have the patience to support their work through design, testing and ultimately deployment at appropriate scale.

Finance 1.0: Budgeted Projects

Promised clear outcomes and detailed project plans, investors can make large investments that have well understood risks. This makes Innovation 1.0 projects well suited to up front budgeting which can be planned out with a high degree certainty. Given the size and known risks of these projects, financial instruments have enabled large public projects to access private funding by shifting risks and revenues through Public Private Partnerships (PPPs or P3s).

Finance 2.0: Challenge Grants

The lightweight exploratory pilots developed by second generation innovators come with much greater uncertainty about both their potential value and acceptance. Fortunately, these fast-moving projects require far smaller units of investment. Financing is done in progressive steps, minimizing the cost of early learning by failing fast.

Because small initial investments are easily made with limited vetting, leveraging tools such as competitive grant programs, these short-term pilot opportunities are attractive to investors. In the commercial world, innovators with market-based business models can follow these early speculative investments with venture capital or self-funded operations. Yet, innovators without a clear customer who can afford to buy the innovation (a common situation in aid) have far fewer opportunities to find funding once a pilot is completed.

Finance 3.0: Sustained Support

If second generation innovators face funding shortfalls when trying to go to scale, then Innovation 3.0 innovators face even more substantial gaps when attempting to fund complex system transformation. Unfortunately, third generation system innovators present investors with a troubled proposition. While the long-term upside may be substantial, the innovators are still facing large complex transformations that have lots of moving parts, significant and persistent levels of uncertainty over a long timeframe, and ongoing dynamic change.

Available funding levels must be larger and engagement terms longer to support the more complex creative journey required for projects going to scale or solving complex wicked problems.

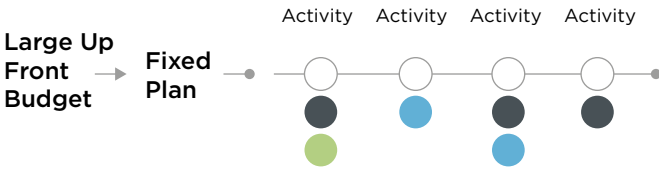
In addition to requiring greater stamina and patience from sponsors, there are often unique needs associated with financing at this level of innovation. The innovator's need for unrestricted funds increases and the ability to share funding with organizations and individuals that lack classic business qualifications can be essential to expanding the reach of innovations in local communities. New ways to view and manage risk, along with new financial instruments will be needed from investors who have a deeper understanding of the nature of risks and opportunities associated with complex innovation.

Fortunately, not every aspect of these investments is fraught. While complex systems are difficult to transform, they also offer many levers of change, making it possible to circumvent barriers, adjust goals and quickly pursue emerging opportunity. A liberally conceived financial instrument might mitigate investment risk by actively encouraging innovators to deviate from plan, pushing forward with newly discovered strategic options.

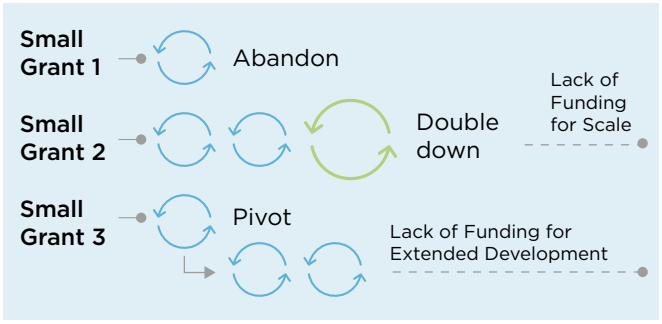
A Quick Clarification: Innovative Investments vs. Investments in Innovation:

Funding can be an area of innovation in its own right. For example, new models for funding crisis response operations can potentially improve the performance in response to a crisis, such as the rapid response funding that the Start Network has developed to fund the early reaction to a crisis response. These operational innovative investments are different from the new forms of investment in innovation discussed above.

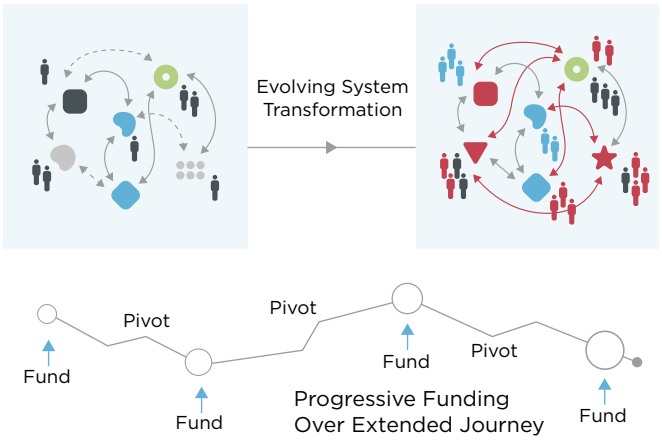
Finance 1.0: Large Upfront Budgets/Fixed Projects



Finance 2.0: Small Grants for Pilots



Finance 3.0: Sustained Finance for Complex Innovation



Capability 4: Design Investment Portfolios

Funds must be invested in problems that matter and potential solutions that can deliver an impact. Creating a portfolio of well-chosen projects is important, in part because few single innovations are guaranteed to be a success, and because there will often be many issues that need innovative solutions. How a high impact portfolio is developed can vary significantly depending on the generation of the innovation methodology.

Portfolio Building 1.0: Strategic Planning

First generation innovation portfolios are frequently developed through the use of structured strategy and planning processes. A large number of proposed projects are supported by detailed business cases spelling out costs, benefits, dependencies and risks. In large organizations it is not uncommon for months to be spent on each proposed project's business case.

The proposals are typically evaluated and ranked by senior leadership who then guide the allocation of investments. The extensive analysis and planning tends to produce portfolios which remain stable over time.

Portfolio Building 2.0: Winning Projects

In contrast, the fast-moving pilot projects of Innovation 2.0 are both smaller and lower cost. It may well be that dozens of Innovation 2.0 pilots could be purchased for the price of a single large first generation innovation project. The expectation of success is less stringent too. There is a recognition that a significant number of pilots will fail outright. Further, as a practical reality many of those that do demonstrate promise will still fail to scale.

The manager of an Innovation 2.0 portfolio can spend far less time scrutinizing each innovation. In the current challenge grant model of innovation investment, a large number of potential innovations compete for funds, with the "best" projects selected from among the group. This runoff style competition demands little consideration of how different candidates might interact with each other or fit within a broader view of the problem space. When this is the case, portfolios of individual pilot programs may all be top candidates but they may also produce little natural synergy among the cohort.

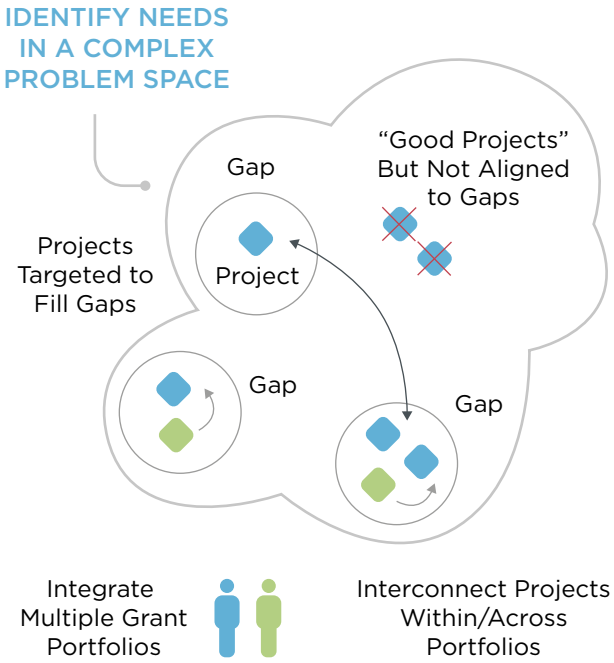
This is an effective strategy for commercial investors since they are looking for individual marketplace winners. However, even in the aid sector, sponsors leverage this approach by providing blocks of money to grant program administrators, delegating the portfolio development with little coordination across (and sometimes within) grant programs.

Portfolio Building 3.0: Problem Based Portfolios

Innovation 3.0 portfolios must take a far different path. Instead of selecting top scoring projects from a mixed list of candidates, dealing with complex system challenges requires a more thoughtfully constructed portfolio. One that is developed by targeting the projects that address specific needs within the problem space. This requires a much deeper understanding of the problem space itself in advance of the call for proposals (see Capability 1). With insight into the problem space, and the specific gaps that need to be filled, it becomes possible to craft a portfolio of projects that addresses them in order of potential impact.

The problem driven portfolio can also take into consideration how the projects interact with one another, intentionally laying the groundwork for potential synergies. Going even further, while there was little reason for 2.0 portfolio managers to work across the isolated siloes of funding and grant management, the 3.0 big picture view of the problem space supports a much larger and integrated response across grant programs.

Portfolio Building 3.0



Capability 5: Mentor and Manage Projects

At their core, innovations are projects that need to be developed and delivered. The sponsor of an innovation has both a fiduciary responsibility, providing management oversight for the investment, as well as an interest in seeing the innovator succeed.

As managers, they must track progress against these plans, and make adjustments when a project deviates from course. As a mentor, the role is more collaborative, with a partnership being built between the innovator and the program leader. As mentors to the innovators they have the opportunity to provide expertise, shape decisions, marshal resources, and plan pivots around barriers.

Project Management 1.0: Mostly Managing

First generation innovation portfolios are frequently managed in the same way that other business projects are handled in the sector. Detailed expectations are developed and recorded within tools such as log frames and managers use these fixed end points to track compliance with these plans. Failure is generally defined in terms of whether the tasks were successfully completed and the required outputs generated.

Because Innovation 1.0 projects are performed in domains where there is established knowledge, experts can be hired to deliver well understood work. Managers can remain as hands-off overseers of progress and compliance. This form of project management should seem like business as usual within most humanitarian sector organizations.

Project Management 2.0: Add Mentoring

One of the principle insights of the Lean Startup innovation methodologies is that hypothesis testing can be used to manage the risks inherent in the exploration of original new ideas. Whereas the 1.0 innovator would expect a formal project plan to track compliance against, the manager of an Innovation 2.0 program expects their teams to leverage iterative learning. Instead of pre-planning every step, the innovator adjusts and pivots around dangers.

The Innovation 2.0 manager tracks key metrics based on outcomes not outputs. How the innovation performs in delivering value or solving a problem is the primary criteria of progress. This places demands on the innovator. Not only are the techniques of failing fast and pivoting new to many potential innovators, the types of decisions they are asked to make often require a variety of skills and knowledge. To increase the innovator's chance of success, innovation programs have increasingly provided mentoring support.

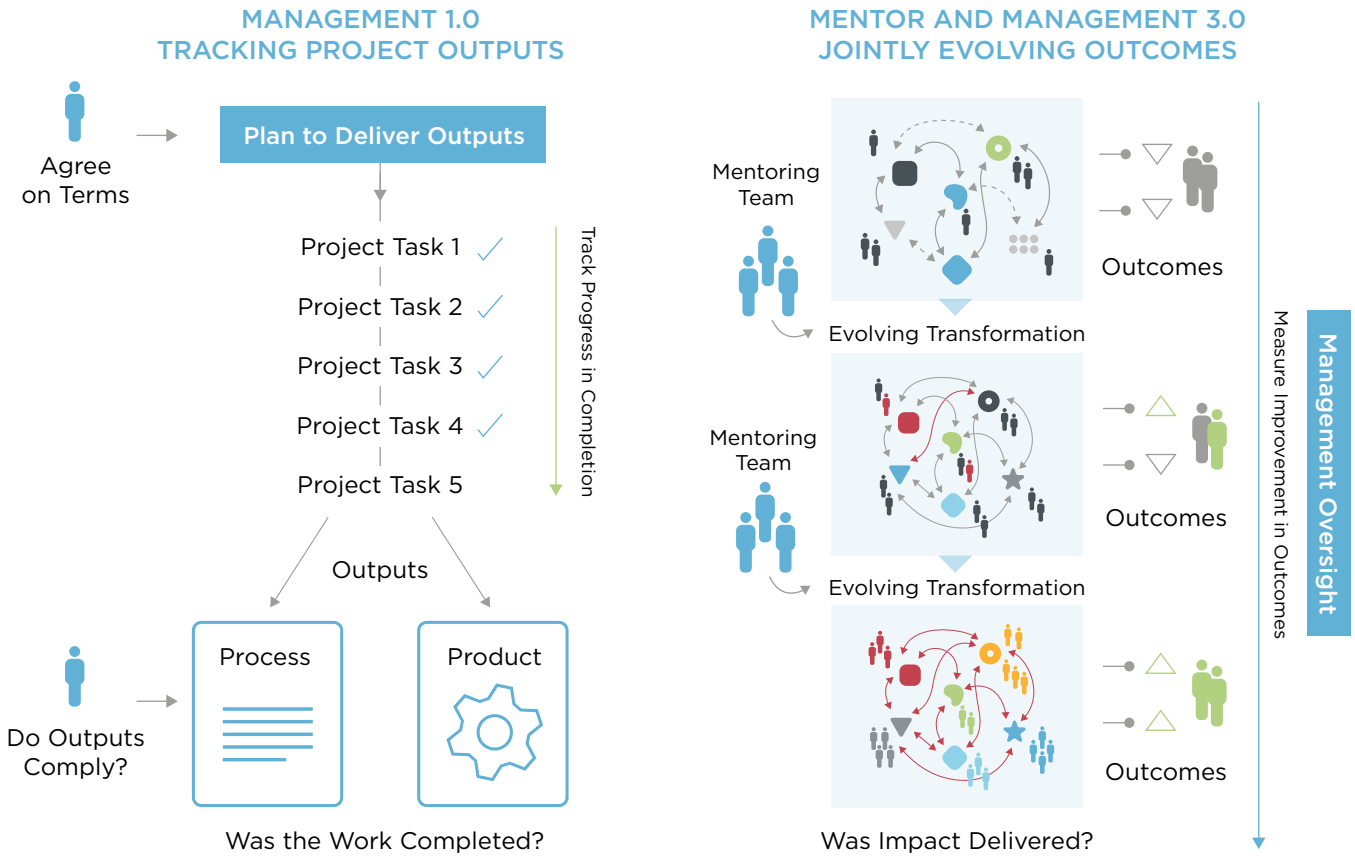
Project Management 3.0: Sustained Partnership

Innovation 3.0 projects are substantially more complex than the pilots developed at the 2.0 level. This complexity may be associated with the journey to scale or with the innovator's intent to tackle complex "wicked problems". This complexity is even less tractable to 1.0 techniques such as detailed advance planning or tracking fixed outputs. The multiple independent actors, webs of interaction, diverse incentives, as well as the high levels of uncertainty and unknowns leave the 3.0 innovator with far too many unanswered questions.

As a result, the iterative learning approach pioneered by 2.0 innovators needs to evolve. Instead of repeatedly testing specific product features, the complexity of the problems and difficultly of the solution shift the focus to evolving integrated pieces of the system. Expertise in many more subject domains is needed and the level of innovation skills required is vastly higher. Few innovators come with all the professional tools and the access to resources that they need.

This creates a crucial role for sophisticated innovation mentors with access to a wide network of resources and partnerships. The innovator and the mentor are effectively on the journey together, so as the innovator makes changes to complex systems, testing and learning from their impact, the mentor can help guide choices and provide needed support.

In an Innovation 3.0 environment, the manager role must change too. Long project lifecycles are common, so it is necessary to continually track the innovator's progress shaping a complex system. This system evolution may take several years, instead of the months that are common for Innovation 2.0 pilots. The manager role must provide a reasoned evaluation of the progress being made, assessing whether the journey is on track, without the benefit of predefined check points and fixed deliverables.



Capability 6: Innovation Journey

At the heart of the innovation ecosystem is the innovator's methodology for transforming an idea into a practical solution, which can then be adopted and provide impact. While every innovator has this broad goal, the practices developed for each generation of innovation radically differ from each other. When moving from one form of innovation to another, innovators must shift their expectations, priorities and techniques. This was true for innovators that moved from Innovation 1.0's highly structured analysis and planning to the fast-moving informal discovery of Innovation 2.0. The move to Innovation 3.0 will demand an even more dramatic change in innovation methodology.

Innovator's Journey 1.0: Planned Work

The formal processes associated with Innovation 1.0 are exceptionally mature, so in many organizations they may not even be recognized as "innovation" techniques. This is a "reductionist" process which engineers solutions by breaking problems into independent pieces. Risks are managed through a linear process with frequent check points. Innovators are required to carefully analyze each part of the proposed solution and then develop a step by step plan for executing the project.

These are proven techniques which have to be applied across a wide range of engineering projects from building a road, to designing an airplane to developing enterprise accounting software. In most organizations, these methodologies are tightly integrated with other complete innovation ecosystems. Activities like budgeting and project management are tied in with the innovation lifecycle and are supported by well recognized business roles and procedures.

Innovator's Journey 2.0: Exploratory Pilot

Innovation 2.0's methodology is the upstart teenager to Innovation 1.0's overly strict parent. Across almost every point in the lifecycle, the fast-moving pilot innovators of Innovation 2.0 apply processes that are diametrically opposed to their 1.0 counterparts. The 2.0 innovator is not worried about being wrong, they are far more concerned with being slow. Instead of planning in such detail that failure is impossible, the 2.0 innovator moves quickly so they can fail fast and discover new insights quickly.

User centered design is a key element of this practice, with design features and value propositions being tested with the potential users and buyers of the innovation. Instead of planning every detail of the project in advance, a series of iterative tests are used to drive the evolution of a product or service.

The 2.0 innovator intentionally leaves out pieces of the solution that might slow down their rush for exploration, often time resulting in pilots that seem to be assembled with rubber bands and paper clips. While being well supported with insight and evidence regarding its use and design, the innovation is often far from being ready to scale. In the commercial sector this scaling gap is filled by incubators and investors who take ideas through a series of investment stages in the hope of scoring a few "home run" investments.

Innovator's Journey 3.0: Many Complex Paths

Innovation 1.0 and 2.0 innovators can set clear cut boundaries around their work, which remove complexity and ambiguity. In effect, these innovators simplify their challenges so that they fit their methodologies. That is fine if the problems are well aligned with these approaches, but it can undermine success if the problem is more complex. Sadly, this is the situation 3.0 innovators face. The unifying factor of their work is that the problems can't be simplified to fit neatly into the approaches of either Innovation 1.0 or 2.0.

Fundamentally, Innovation 3.0 is about creating and transforming complex systems. One place this type of challenge is seen is in the journey to scale many current innovations face. For example, a 2.0 product innovator may need to create a complex system of supply chains, sales, training, and support around their relatively clear-cut invention. Still other innovators working to solve wicked problems like, persistent violation of rights, may have entire cultural, legal and economic systems they need to shift before they can even begin their work.

In the GAHI white paper, The Many Journeys to Scale, it was pointed out that this level of complexity can produce many different challenges. Innovators must deal with diverse factors associated with value, difficulty, sustainability and variability merely to bring a simple idea to scale. The work is even more varied and challenging when dealing with the transformation of systems associated with big, wicked problems.

Three major capabilities underlie the 3.0 innovator's ability to deal with complex system change.

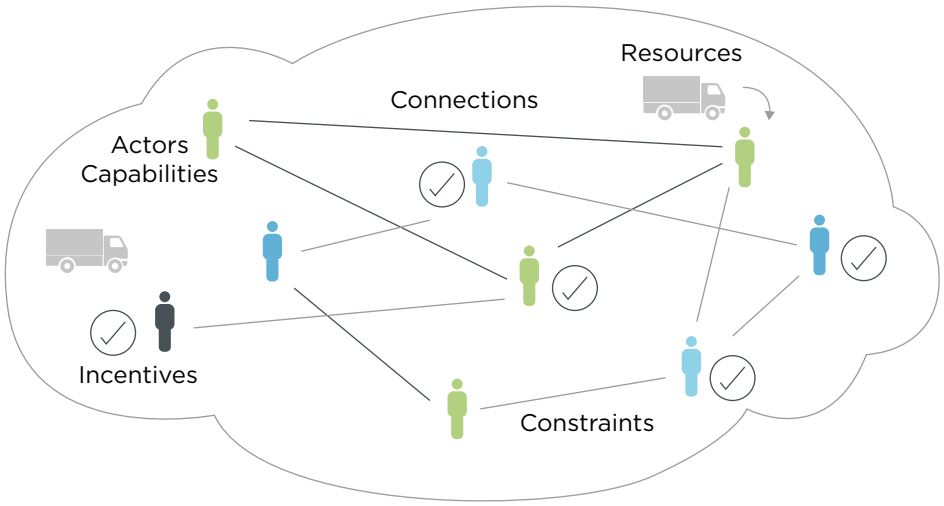
Part A: Architecting System Solutions

The complex problems that define system innovation require the innovator to understand the systems that currently work in the world. They need to understand the varied actors involved, how they are incentivized to perform their roles, what resources are available and how the different interests are balanced to produce current outcomes. Without this understanding of how the world works, it is extremely difficult to determine how existing systems should be changed. This robust understanding of how the world works (and what doesn't work) is part of Capability 1.

Supported by this nuanced view of the current world, the 3.0 innovator must then envision a new system that does a better job than the status quo. This is not simply a set of individual changes that can be proposed. The innovator must envision a new working system where the future participants are incentivized to deliver better outcomes over time.

System innovators seldom have the luxury of a greenfield project. Pre-existing parts of the status quo must be merged with new elements to create a transformed system.

The "Solution" is a System with Fuzzy Boundaries

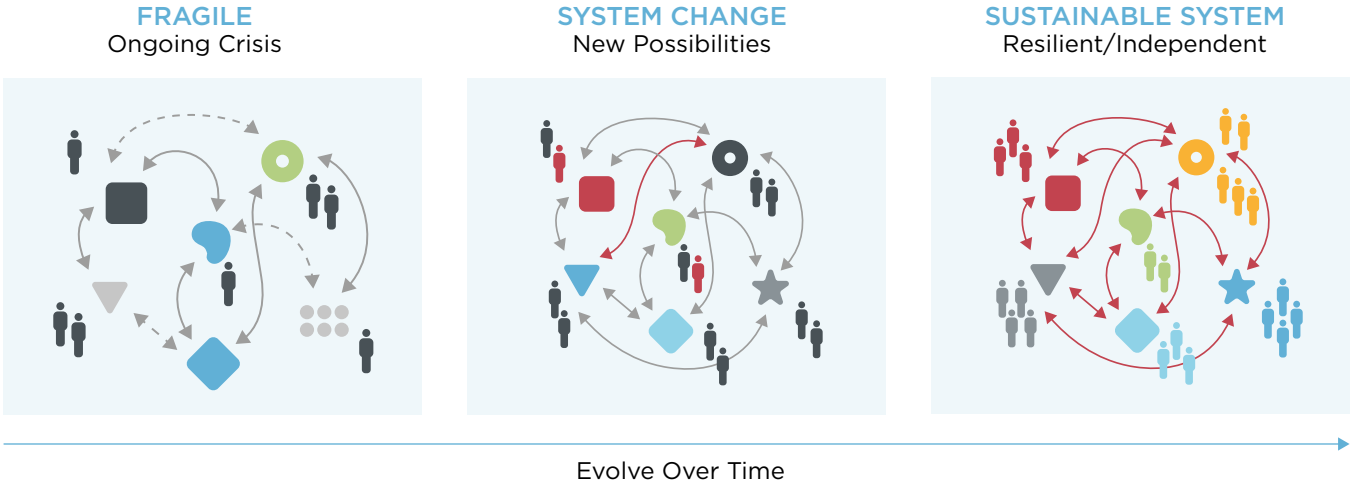


Part B: Evolving Sustainable Solutions

As might be expected, different system solutions can dramatically shift the direction of the innovation's evolution. An innovation that is dependent on grassroots adoption and crowdfunding will follow a much different path than a commercial innovation or one that is embedded in a major state government program.

Effectively each system innovation pioneers its own path through a series of unique system transformations. There are far fewer opportunities to use either rigorous planning or trial and error experimentation on this journey. It is impossible to fully plan and anticipate how the final system should be designed like a 1.0 innovator. There are simply too many uncertainties and unknowns to create fixed plans.

Unfortunately, simple experimentation won't provide the same benefits that a 2.0 receives. Because these are real life systems that are active in the world, each change creates a ripple effect that can't be reversed. The choices made during each iteration shift the paths that are available in the future. This "path dependence" means that while system change can still be pursued through a series of small changes, it can't be treated like a trial and error experiment.



As a result, evolving the solution requires complex pivots where multiple factors are balanced against one another. To further complicate the Innovation 3.0 system evolution, most of the design decisions will involve tradeoffs where there is no single unambiguous right answer. Some decisions will favor one outcome or one group of actors, while others will empower others.

The resulting Innovation 3.0 journeys to deliver an idea are typically long, often spanning years, with many difficult choices and unexpected turns. This long, slow, ambiguous journey is much different than those faced by existing 1.0 and 2.0 innovators

Part C: Deploying Systems Across Contexts

Many engineered facilities developed with Innovation 1.0 or technical products resulting from Innovation 2.0 can take advantage of common conditions across multiple contexts (such as the ability to deploy on a mobile phone) and so can be comparatively easily replicated. However, with system innovations this is the exception, not the rule. There are few complex innovations that are not interwoven within the local context.

As a result, deploying systems innovation across multiple contexts often requires the repeated solution of system problems. Local laws, community practices, available resources and a host of other factors can force the 3.0 innovator deploying a new context to implement special training, undertake local advocacy or simply start over with key aspects of their solutions.

Capability 7: Develop Innovator Skills

It is important to remember that ultimately, innovation is a craft practiced by individuals. Even within highly sophisticated organizations pursuing advanced agendas for change, the actual success and shape of an innovation program depends on the skills of individual innovators. Getting the right person with the right skills is extremely important, yet the nature of the individual innovator's skills varies substantially between the generations of innovation. It would be very unwise to train 3.0 innovators in the same way as existing innovators.

Innovator Skills 1.0: Professional Project Roles

The innovators roles in Innovation 1.0 are associated with large scale project definition, design, execution and management. The skills for this work are subdivided into specialist fields with clearly defined practices and responsibilities. As a very mature innovation practice, Innovation 1.0 roles as analysts, engineers, quality assurance and project management all have formal educational programs and clear job titles. In most organizations, the infrastructure to feed the professional pipeline for these roles is well established.

Innovator Skills 2.0: Design Thinking

Innovation 2.0 radically shifted the professional skills demanded of innovators. There was a swing away from managed engineering to creative ideation and user engagement in design. This opened up the role of innovator, placing the value of a good idea above any formal skill set. Increasingly, it was assumed that anyone with a good idea could become an innovator and innovation labs were setup to provide support to these inspired amateurs.

A professionalization of creative ideation and design has emerged in parallel with this amateur innovator movement. Specialists in user centered design shook the professional world of the 1.0 innovator when designers with art degrees began to out earn engineers. Today, the professional track in design and product innovation is supported by many formal educational programs. Well defined job roles exist in many organizations for User Experience Designers and others with these degrees.

Innovator Skills 3.0: Choreographers of System Change

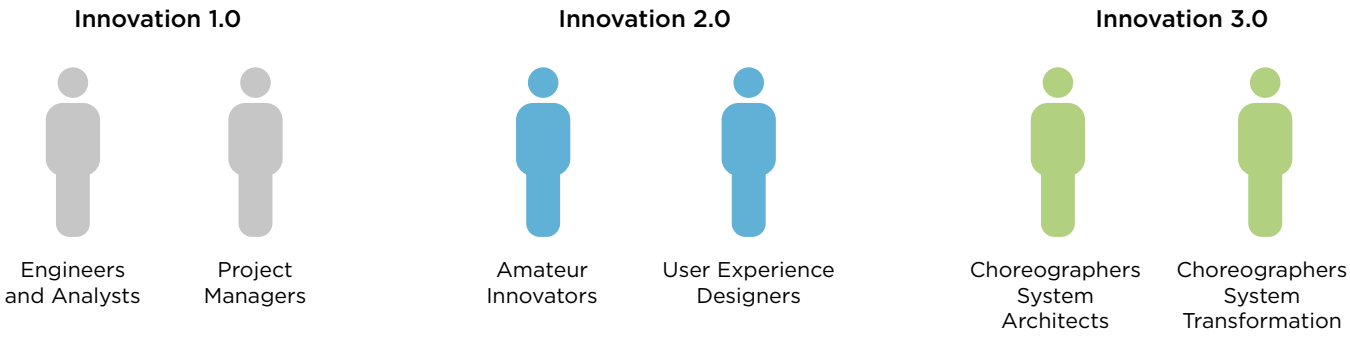
In contrast, architecting complex systems and then navigating their evolutionary journey of change demands a fundamentally new set of skills. Innovation 3.0 requires individuals with an ability to see and work with a big picture view of both problems and the solutions. These nimble architects of complex change have the ability to marshal evidence, create compelling stories, apply both formal and informal power and find win-win solutions to multi-actor challenges.

This role and the skills associated with it, lack an accepted name and place in the business world. Few organizations have positions for big picture thinking and action. Yet, this kind of role is found throughout the arts. Choreographers, film directors, composers, and television show runners are all prized for their ability to shape complex systems by shifting creative standards.

Since the position lacks a formal name or role in most organizations, we'll borrow the term "choreographer" to describe this key Innovation 3.0 skill set. An innovation choreographer's ability is rooted in her/his broad-based perspective that allows her/him to work across domains. They understand the complexity of the status quo, envision the future state of the system, drive diverse participants to action as a storyteller and evangelist, and over an extended journey, navigate pivots through messy, creative system change.

Compared to other existing innovation roles, there is much less training and professional support for the systems thinking work done by choreographers. Educational programs are uncommon or limited in scope, job roles are poorly defined and an understanding of the field as a distinct profession is largely missing. Much needs to be done to codify the skills, techniques and professional role of the choreographer. As a result, there is a poor supply of this critically needed role and limited capacity to expand the pool of experienced practitioners.

KEY ROLES



Capability 8: Measures and Adaptation

Measurement is essential to every generation of innovation. It is used to assess progress, diagnose issues, and determine impact. This information is in turn used to grade performance and guide actions. Measurement needs and the use of insights becomes progressively more complex with each generation of innovation, beginning with relatively straightforward measures of accountability in Innovation 1.0, but eventually requiring the balancing of multiple, potentially incomplete or conflicting measures in Innovation 3.0.

Measures and Adaptation 1.0: Project Accountability

Innovation 1.0 projects are based on detailed analysis and up-front planning. As a result, the innovator is expected to do their learning at the beginning of the project and capture all the relevant insights in project specifications. The design requirements are fixed in contract documents like log frames so that they can be used to verify actual delivery of the promised innovation. With such a limited role, it should not be surprising that collecting these final project accountability measures is often deferred until the project is near completion.

Measures and Adaptation 2.0: Agile Product Teams

Teams working within Innovation 2.0 projects have a far greater need for continuous information flows. Since they are exploring new pilot innovations, they must test hypotheses about needs and opportunities, continually shaping their innovation to the feedback they receive. Unlike the precise contract terms of the 1.0 innovator, this continuous flow of information can be "just good enough" to guide a product or service design decision by the innovators.

Measures and Adaptation 3.0: Adaptive System Transformation

Innovation 3.0 places substantially more demands on both the measurement and use of information. As complex systems proceed through an extended evolution, the innovator must assess the health and effectiveness of a complex system that has moving parts and diverse actors. This challenging measurement and adaptation isn't done just once or twice. There is a continuous need to assess and respond to the system's progress as the transformation develops over time.

Robust information is needed to guide this adaptive change, yet the varied actors, diverse interwoven links and the shifting nature of the context, may make many formal practices, such as randomized control trials, difficult to do. With incomplete and frequently contradictory information, 3.0 innovators must take bold action using the best insights they gather. Work is needed to determine how best to evaluate the complexity of these transformations.

Organizations supporting systems innovators must also build measurement and adaptation into their business approach. This requires breaking through structures designed to support the predictability of Innovation 1.0, a change that is disruptive to the core beliefs and goals of many staff and management. This drives strong opposition and defensive behavior among those that should be supporting the innovator.

Capability 9: Ethical Engagement

The Grand Bargain, which was a key output of the World Humanitarian Summit, calls for much greater involvement of local communities and affected people in the provision of aid. This inclusive thinking builds on themes present within the SDGs, which also focus on systemic change in local communities rather than repeated cycles of aid from the outside. For innovators, the challenges of local engagement come with additional ethical questions. How should innovative change be done and what form can it take, while still respecting both the rights and unique vulnerabilities of those in crisis?

Ethical Engagement 1.0: Consultation

Most Innovation 1.0 projects are driven by specialist teams of engineers, planners and financiers who can quite capably deliver large, complicated projects without involving local community voices. It may well be perceived that community engagement might disrupt their otherwise straightforward analysis and planning process. As a result, expectations for engagement are often set low. Upfront, honest consultation with representatives of a community regarding key project choices is often seen as an example of good practices.

Ethical Engagement 2.0: Product Testing

Recalling that Innovation 2.0 is primarily focused on designing and testing product and service innovations in close collaboration with end users, it is clear that a 2.0 innovator expects to nurture a much closer relationship with future users. Direct field testing of new innovations is an essential practice for these innovators.

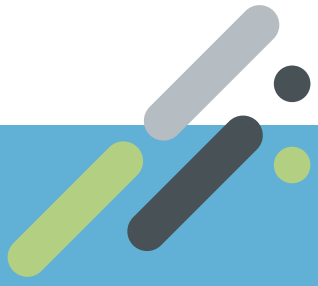
This can produce unexpected challenge for innovators who learned their craft in much less volatile, commercial business environments. The ethical considerations of information gathering, engagement and design are much more challenging in a crisis context, with a widely recognized need to protect the safety and rights of users during innovation.

Ethical Engagement 3.0: Murky Tradeoffs

Large complex system changes create additional engagement challenges for the 3.0 innovator. The intent to change systems that are interwoven with people's lives, is a change to the context of the community itself. This makes engaging on change much more difficult. Varied members of the community, who often have conflicting interests and views, need to be understood and involved in the change.

In addition, the potential scope of impact of system change is much greater with Innovation 3.0. A failed system change can be difficult to revert back to its prior state due to path dependence, unanticipated side effects and externalities that can spread out from the core of the system change. Mistakes will linger, so this not a form of change that can be undertaken casually.

When all these issues are taken together, there are far fewer clear standards for ethical behavior and choice. While obvious harm needs to be prevented, any system change is likely to produce both winners and losers. Questions of power, cultural tradition and values lack clear-cut answers, but will still need to be considered in a fair and consistent way when shaping system solutions.



A Call to Action: Create Big Solutions

Developing a creative ecosystem in support of a complex practice like system innovation is a difficult challenge. Previously, even with the aid sector having had the benefit of copying established practices from commercial innovators, it took years to build a working capability in a new generation of innovation.

There isn't an option to wait that long (or potentially even longer given the amount of original work needed). Powerful forms of innovation are necessary for meeting the aid sector's obligations to millions around the world. If the sector remains limited by its skills in Innovation 1.0 and 2.0 practices, crucial challenges associated with scaling for impact, addressing wicked problems and reaching across the last mile to engage affected people will remain unsolved.

It is perhaps ironic that building the ecosystem to support Innovation 3.0 is itself a complex system innovation. Creating the varied functions will require a collaborative effort that engages many actors. Yet, the sector's existing foundation of innovation focused institutions provides a good underpinning for making progress. A shared effort with multiple initiatives imagined and developed in parallel, will accelerate the rate of progress and allow elements of the ecosystem to evolve in connection with each other.

There are big problems that need big solutions. It's time to create an ecosystem to support the advanced forms of innovation we need.

Global Alliance for Humanitarian Innovation (GAHI) is hosted by Elrha. Registered office 1 St John's Lane, Farringdon, London, EC1M 4AR

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This report was made possible with direct support from the following donors including: The Government of Denmark, The Ministry of Foreign Affairs of the Netherlands, Australian Aid and The Department of the International Development (DFID) - United Kingdom.

We would also like to thank our host Elrha for making this report possible.

This report is published by the Global Alliance for Humanitarian Innovation and does not reflect the direct views of our donors.