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Reciprocal coproduction as a basis for the diffusion of global health innovations

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ABSTRACT

Global health reciprocal innovations originate in low-income and middle-income countries as well as high-income countries before their developers communicate about them with potential adopters in other countries as a transnational team. While communication technology has enabled a more rapid and broader sharing of information about innovations to prevent disease and improve health, innovations of various types have spread among countries, at all levels of income, for many centuries. In this article, we introduce the idea of reciprocal coproduction as a basis for the international sharing of information about innovations that exhibit potential for improving global health. Reciprocal coproduction occurs through two relational team-based processes: developer-led reinvention of an innovation so that it retains its desirable causal effects and implementer-led adaptation of that innovation so that it is compatible with new contexts into which it is introduced. Drawing on research and our own experiences across a range of health issues, we discuss common barriers to reciprocal coproduction and the diffusion of reciprocal innovations. We conclude with lessons drawn from dissemination and implementation science about the effective translation of reciprocal innovations from country to country so that researchers, policy-makers and social entrepreneurs can best ensure equity, accelerate adoptions and heighten the likelihood that global health reciprocal innovations will make a positive difference in health.

SUMMARY BOX

⇒ Innovations including those outside the health domain have spread from country to country for many years as archeologists and anthropologists working in the early 20th century demonstrated in tracing the diffusion of cultural artifacts, language, and customs and how tools, words, and practices have not only spread but often been adapted by local populations.
⇒ The coproduction of reciprocal innovations occurs through two relational processes in which team members participate either simultaneously or sequentially: developer- and advocate-led reinvention of an innovation so that it retains its desirable causal effects yet reaches more potential adopters; and implementer-led adaptation of that innovation so that it is compatible with new organizations and the specific communities into which it is introduced.
⇒ We offer 10 lessons learned from our experience about the effective translation of reciprocal innovations from country to country and the dissemination and implementation science literature so that researchers, policymakers, and social entrepreneurs can best ensure equity, accelerate adoptions, and heighten the likelihood that global health reciprocal innovations will make a positive difference in health.

> The future is already here—it's just not very evenly distributed.
>
> William Gibson, science fiction author[1]

The sociological and geographical diffusion of innovations can be interpreted as a many centuries-long history of injustice. Innovations tend to be first adopted by those persons, organisations and jurisdictions with more economic, intellectual or social capital.[2] Overtime, what were once small differences in capital can grow more disparate and become reinforced in societies as hardened structural barriers to equality. The haves continuously outpace the have-nots. The task facing many social entrepreneurs, egalitarian policy-makers, public health and healthcare providers, and committed academics, becomes advocating and testing workarounds, approaches and incentives[3] to counter what is for all practical purposes a natural social force of inequality.

After the US National Institutes of Health workshop about global health reciprocal innovation when we were separate presenters 24 October 2022–26 October 2022, we decided that a collective article about how dissemination and implementation (D&I) science could help the reciprocal spread of innovations from country to country was a worthy endeavour, especially in light of calls for guidance concerning the diffusion of evidence-based interventions to new contexts.[4 5] With backgrounds in clinical rehabilitation psychology, HIV prevention, social justice, physical activity, sociology, health systems research, and diffusion of

innovations, and field research experience in Asia, Africa, Europe and North America, we here address the topic of global health reciprocal innovations, defined as practices, programmes, policies and technologies perceived to be new that have the promise of improving health as they are communicated and modified, and then spread among and within countries.

Reciprocal innovations are characterised by: (1) partnership across countries rooted in the values of reciprocity, mutual learning and equity across partner institutions in low-income and middle-income countries (LMICs) and high-income countries (HICs), (2) a bidirectional and co-constituted approach to identifying shared health challenges across settings in long-term engagements and (3) identification of innovations worthy of being shared from global health partnerships for demonstration so that others may learn about, evaluate, make decisions, adapt to local context and implement to good effect[6] In this paper, we suggest how the concept of innovation coproduction through developer-led reinvention and implementer-led adaptation activities adds value to an innovation that otherwise may be ill suited to achieve its objectives in multiple other countries. We conclude by listing lessons learnt from D&I science that can be enacted on behalf of worthy reciprocal innovations to help close disparity gaps in LMICs as well as in HICs.

RECIPROCAL SPREAD IS A GENERIC PROCESS ACROSS SOCIETAL DOMAINS

In a social psychological sense, there may be little that is unique about health innovations. Innovations including those outside the health domain have spread from country to country for many years as archaeologists and anthropologists working in the early 20th century demonstrated in tracing the diffusion of cultural artefacts, language, and customs and how tools, words and practices have not only spread but often been adapted by local populations.[7] Consider, for example, the educational innovation of kindergarten created by Friedrich Froebel in Germany in 1840. Its acceptance, slow in Germany, took off in other countries where Froebel's ideas were a better fit.[8] In the cultural domain of music, early 1900s jazz spread from country to country and back again, fusing and changing as its musicians encountered one another while also being strongly determined by the music industry and innovative activity in its performance hubs of Paris, New York, London, Buenos Aires and Sydney.[9] In the realm of political governance, democracy diffused from its beginning prior to 1800 to eventually reach 75 percent of the world's countries by 2004, a global spread that was likely affected by malleability from concept to practice.[10] Innovative practices and programmes that allow or even encourage adaptations by users in the ways that they are implemented —such as kindergarten—diffuse more readily across social systems than do innovations that are designed to discourage or prohibit modification as is the case with many technologies.[11]

While diffusion across countries is sometimes the result of one-way dissemination of information from a developer in one country to an adopter in another country—a point-to-point transfer—diffusion is often stimulated by changes made to an innovation as a result of iterative prolonged communication in which clarifying descriptive questions are asked ('What is it?') followed by explanatory questions ('How does it work?') and contingent questions ('We don't have the staff to do it the way you did, but do you think it could work like this?'), the answers to which can form an impression that an innovation is worth trying in another country if certain changes are made. New ideas such as kindergarten, jazz and democracy can go through a bit of a push and pull as innovation developers, formally or informally, think through issues of external validity and extrapolation, wondering how much the components of their innovation can be changed—their degree of plasticity—while still retaining enough original functionality and resulting benefit to be worthwhile.[12] Kindergartens were altered in student-contact hours, curricula and the emphasis on social integration, as well as other ways; jazz in terms of novel instrumentation, tempo,and in the borrowing from other styles of music; democracy in its institutional scope and degree and types of elected representation. Deploying or initiating implementation in another country implies a tough test of external validity since the problem to be addressed, the population to benefit, the organisations to host the innovation and field it, the time of introduction and the community setting all vary, perhaps considerably. Moreover, the form of the innovation, its dose and how and to what extent its implementation and sustainment are supported may differ from the experience in an initial country. For example, Ciclovia, commonly known as Open Streets initiatives in the USA that periodically close streets to automobiles so that pedestrians can more freely walk, run, skate and pedal began in Bogota, Columbia in 1974 and have over 50 years been adopted by municipalities in many countries,[13] with considerable adjustments along the way. In Detroit, Ciclovia take place during summer months along a single lengthy winding parkland on weekend days. In Los Angeles, just several times per year but along alternating long circuitous routes with tens of thousands of residents participating. In Portland, Oregon, Ciclovia are coordinated by the city transportation department for the express reasons of increasing the engagement and acceptance of immigrant communities by bringing Portland residents into immigrant communities. Each alteration made by a municipality to an innovation like Ciclovia can serve as another test of the intervention's external validity. Will it still work, or not?

RECIPROCAL SPREAD CAN TAKE CONSIDERABLE TIME

While new ideas sometimes diffuse very rapidly via modern communication platforms and technologies, global health innovations can take a long time to spread because of perceptions of the innovation (primarily about cost, compatibility, complexity and effectiveness),

imitative effects (who has previously adopted or rejected the innovation) and contextual conditions (especially what meaning is used to frame the innovation and when it is introduced).[14] The practice of drinking lemon juice to control scurvy took 150 years to become routine practice in just one although far flung organisation, the British Navy.[15] The use of radio soap operas to communicate improved home and health practices spread from Jamaica beginning in the 1960s to Kenya, Tanzania, India, The Gambia, Mexico and Costa Rica decades later.[16]

The well-known case of Grameen Bank similarly took many years for transnational diffusion to help reduce inequality not only in LMICs but in HICs, too. Grameen extends microfinance loans to impoverished women who use the small loans to generate money to improve family health. Microfinance institutions can effectively deliver health interventions that improve health status in communities[17] by enabling women to improve family nutrition, behavioural health, decrease social isolation and other positive outcomes as a result of access to microfinance. The Grameen idea was begun by Muhammad Yunus at the University of Chittagong in Bangladesh in the wake of the Bangladesh famine of 1974 with a low-interest personal loan of US$27 to a group of 42 families so that they could produce simple handmade products for sale and thus earn money. Grameen Banks rely on peer pressure and social influence within small groups of women. Each microloan recipient in a group is encouraged by other women in her group to rapidly pay back her loan so that others can receive their loans, producing cycles of small loans that are repaid because of supportive group norms. Over time, loan amounts escalate, thus increasing income for poor women as they take on more and more ambitious entrepreneurial projects. As of December 2018, Grameen was operating in 93% of the villages in Bangladesh with 2568 bank branches and more than nine million borrowers, achieving a repayment rate of 99.6%. The innovation had spread to 64 other countries with involvement from the World Bank.[18] Grameen Bank and Muhammad Yunus shared the Nobel Peace Prize in 2006 for helping to alleviate poverty. In the USA, over a 10-year period from 2008 to 2017, Grameen America had microfinance operations in 13 cities that had extended 347 000 loans worth US$820 million to 97 000 women.[19] In 2018, a Miami Grameen Bank opened, with Houston following in January 2019.[20]

In adopting a pro-social innovation from another country, the stakeholders in each new implementing country can be understood as passing through two time-consuming learning processes. They must first learn what a particular innovation is and how it works and with what effects; this is a form of outward-facing exploratory learning. Then, if they decide to try it, they must learn how to implement the innovation with context-fitting adaptations so that they can extract as much value as possible from its use; this is a form of inward-facing exploitative learning. Each type of learning can take considerable time to conclude, for each new implementing country. The learning that occurs during exploration and exploitation processes is often due to what has been called coproduction of an innovation as developers and innovation advocates in one country communicate with potential adopters and implementers in one or more other countries.

A CONCEPTUAL BASIS FOR RECIPROCAL INNOVATIONS: COPRODUCTION

The term reciprocal innovation, such as frugal innovation[21] and reverse innovation,[22] signifies movement or transference from one country to another, particularly from an LMIC to an HIC, though as with the global diffusion of kindergarten and Cyclovia and Grameen, many countries can adopt and implement a single reciprocal innovation, often changing it along its way. As they spread from country to country, global health innovations are malleable depending on the extent that they are products, services or both.[23] While much of healthcare has come to rely on sophisticated technologies that are not easily amenable to change, services imply relationships among people. Services are coproduced, often iteratively.

Coproduction is the contribution of different parties to the creation and customisation of service-based innovations and has been identified as a means by which value is added to public services such as fire protection, sanitation and education, as well as to commercial products and services that require consumer activity such as adherence, protocol enactment, assembly and completion.[24] In general, the coproduction of reciprocal innovations occurs through two relational processes in which team members participate either simultaneously or sequentially:

1. Developer-led and advocate-led reinvention of an innovation so that it retains its desirable causal effects yet reaches more potential adopters.
2. Implementer-led adaptation of that innovation so that it is compatible with new organisations and the specific communities into which it is introduced.[14]

In working together in cross-national teams, developers and implementers each contribute expert knowledge by collaborating in an ‘innovation ecosystem’[25] in which they bridge across countries as one team to explore whether and how to best modify an innovation. Especially in loosely connected teams, coproduction does not always result in alignment or agreement between innovation developers in one country and those who adopt and implement in a second country. Necessarily, perhaps, initial development of health innovations by developers occurs in a limited number of settings; thus, the potential range of adaptations that may be necessary for an initially demonstrated, internally valid innovation to be externally validated in other sites will not have been observed by its developers, leading to reluctance on the developers’ part to modify their innovation.[26]

The changes made to an innovation by implementers can run counter to the expectations of its developers, sometimes negatively so. For example, the global

health reciprocal innovation of yoga was brought to the USA from India more a century ago and introduced as a spiritual means of meditation and transcendence. Yoga as practised in the USA was faithful to this anti-materialistic orientation until the 1990s when commercially driven magazine publishers, studio and exercise gym owners, and entrepreneurial clothing and accessory companies adapted the practice into a multibillion dollar industry largely devoid of spiritual associations.[27] In other cases, adaptations by implementers in a second country will simply be a response to different opportunities and policies, as in the way that energy independence solutions in rural Nigeria may need to be altered for implementation in rural America where the same problem exists.[28]

Personal relationships, especially those that are team based, are very often important to the spread of global health reciprocal innovations. It is through personal relationships that people who work in different countries communicate about reciprocal innovations even if initial awareness of an innovation by potential adopters occurs through hearing a presentation, reading a report or another impersonal means.[29] After meeting one another, developers and those who may adopt and implement in another country share information in the form of stories and data about the principles by which an innovation works, where and with whom an innovation has been effective or ineffective, and what sorts of modifications have been made to it in early implementations. With research-based innovations, this sharing of information is often rigorously structured. Often it is detail about initial implementation site characteristics that is so important. How vital was buy-in from organisational leaders? Was community readiness in terms of motivation and capacity essential? Did political resistance surface? What about competition and demand? Detail such as this can be crucial for helping potential adopters assess whether a global health innovation is likely to survive and thrive in a new setting, or not, especially for complex interventions for which successful deployment in subsequent countries will depend on the extent and quality of interpersonal communication within a cross-national team among developers and implementers about feasibility, core (causal) components, formative, process and outcome evaluation, we well as the multiple issues to consider and resolve about implementation.[30]

Communicating about reciprocal innovations not only can lead to a shared understanding about why a health innovation works, but also lead to lasting relationships as in the case of the Cardiff Violence Prevention Model that debuted in Cardiff, Wales, in which researchers and government officials in different countries shared information about how emergency medicine and police can work together with affected neighbourhoods to reduce alcohol-related injuries.[31] Similarly, researchers at the Karolinska Institute in Sweden and Dartmouth College in the USA have worked together for years, coconstructing a reinvented version of the Swedish Rheumatology Quality Registry that can function effectively in the US healthcare context and for patients with different diseases.[32]

Reinvention by developers and adaptation by implementers based in new locations are often critical activities to respond to the local health needs of populations and best address health disparities. But identification of need is not the same as determining what communities want. The latter taps into consumer (market) pull rather than producer push and is fundamental to social marketing. For example, the digital health innovation, Weltel, a bidirectional texting platform that facilitates personalised communication between patients and their providers, was originally demonstrated to improve medication adherence and viral suppression in people living with HIV in Kenya.[33] To address HIV prevention needs and gaps in the USA, this innovation was redesigned and adapted to support adherence to oral pre-exposure prophylaxis (PrEP), a preventive medication highly effective when taken but underutilised by priority populations. Through a human-centred design process involving young sexual minority men participating in codesign sessions with researchers, the new intervention PrEPmate included novel messaging content and algorithms tailored to address patient needs along the PrEP journey.[34] Identified as the first evidence-based intervention to support PrEP users by the Centers for Disease Control and Prevention,[35] PrEPmate has subsequently been culturally and linguistically tailored to meet the needs of Spanish-speaking Latinx populations and transgender and non-binary individuals, additional populations heavily impacted by the HIV epidemic.

While implementation scientists have spent considerable time studying intervention fidelity and changes made to interventions, the overwhelming emphasis in this literature has focused on implementer-led adaptations, not reinvention by developers.[36] We see both reinvention and adaptation as vital for the spread of global health reciprocal innovations because of the common desirability of research teams and innovation developers to maintain a degree of control over use of an intervention they created, and wide variance in contextual conditions from country to country. Both types of changes are made by members of cross-national teams. Team dynamics and interpersonal relations have been incorporated into some implementation science frameworks that were developed for designing and delivering interventions in new communities to reduce health disparities.[37] For example, the Transcreation Framework, grounded in community-based participatory research principles of engagement, can help facilitate trust within partnerships, shared decision-making, build on community strengths and incorporate resourceful solutions they have developed, which can also facilitate sustainment of interventions and sustainability of their health effects.[38] All of these conditions are important for effective coproduction of reciprocal innovations.

BARRIERS TO THE COPRODUCTION AND SPREAD OF RECIPROCAL INNOVATIONS

Cross-national teams face barriers to coproducing and then diffusing global health reciprocal innovations. Aside from legal, policy and geographical barriers[39] that form part of the context that such teams must navigate, their time together—both virtual and in-person—as a far-flung team is imbued with knowledge exchange, knowledge deliberation and knowledge combination challenges.[40] Such teams are necessarily heterogeneous which means that team members have to make extra efforts to understand one another, to establish some bases of commonality (such as professional concerns and desired end-states) given cultural, linguistic and experiential differences, and to explore how their collaboration can best produce synergistic outputs.

Compared with health innovations more generally, innovations borne from collaborative design processes and teams that span countries may face delays in reinvention and adaptation since the contexts of developers and of implementers can be unknown to the other party. A lot of cultural translation can be required just to reach a state of mutual understanding within the team. Yet heterophily, while requiring high levels of effort by diverse people to understand one another, is also the source of richness in insights and creativity because of the possibility of novel associations. When those with technical knowledge are curious and respectful of those with community context knowledge and vice versa, true reciprocity infused by mutual learning can occur.[41]

Getting to the point when a cross-national team becomes greater than the sum of its members requires surmounting the barriers of attention and learning, neither of which are easy when similarity with others is not obvious. The designers of what will become a reciprocal innovation will be steeped in all they have gone through in confronting a health problem in their country. They will be ready with the rationale for the inclusion of each main component of their intervention. They may have experience-based strong opinions about why their innovation has been shown to work in the designers' home country and what governments and communities need to contribute and maintain so that the innovation will have sustained positive effects when implemented in a new context. The adopters and implementers in another country will not have this degree of commitment to the innovation's history and form. Their commitment will be to make sure that the innovation will be compatible with host organisations and the communities where those organisations will field the innovation for community benefit in a second country. Adopters and implementers in a second country may see the necessity for designers to redesign the innovation—for example, by reducing its cost or changing the format of delivery from posted flyers to text messaging—and for they themselves to further change the innovation through on-the-ground adaptations so that compatibility with field conditions is best assured. Designers, on the other hand, may well resist suggestions to redesign their innovation and not allow adopters in another country to make adaptations to it without research evidence that proposed adaptations will not detract from effectiveness.

So, it is not only heterophily in life experiences, countries and culture that will serve as barriers to coconstruction; different expectations and beliefs about the reciprocal innovation itself will be a barrier to the collective work and translation that is coconstruction. Innovation designers may argue against change based on their beliefs about study results and rigorous training standards. Innovation adopters and implementers may argue for change because of their experiential expertise and the uniqueness of their communities and residents which can surface questions of 'ownership' of a global health innovation. When global health reciprocal innovation teams do not solve such differences through goodwill and relational skill and time spent together, reliance on managerial leadership and organisational systems is unlikely to produce a lasting partnership as shown in a study of health innovation partnerships in eight countries.[42]

HOW CAN D&I SCIENCE HELP?

Dissemination science is the study of how innovations can best be communicated to potential adopters and implementers to produce trial adoption and effective and sustained use.[43] A potential adopter is someone identified by a change agency to make a decision about whether to try an innovation. While some dissemination activity is directed to individuals who are themselves at risk of disease or injury, such as people who ingest the synthetic opioid fentanyl knowingly or unknowingly, many dissemination efforts carried out by change agencies are aimed at intermediaries who serve people at risk, such as social workers, nurses, radiologists and elementary school teachers. And in some dissemination efforts, adoption decisions and implementation activity are needed at multiple levels—that of the service provider(s) and of the person at-risk—for an intervention to function effectively.

The idea of implementation science has evolved to represent a broader construct, including both the a priori planning for the effective translation of innovations, and all that may transpire after adoption. Unlike dissemination science, which sometimes focuses solely on individuals at-risk in order to inform and persuade them, implementation science concerns organisations, frequently complex organisations with countervailing agendas and interests, sophisticated stakeholder relations, imperfect coordination across divisions and offices, constant employee churn, and challenges of leadership, management, training and reskilling, resource constraints, and uncertainty. While most implementation scientists train their sights on implementation issues prior to dissemination, a smaller proportion of implementation researchers concern themselves with postdissemination implementation behaviour among practitioners.

An implementer is someone who will change his or her behaviour to use an innovation in practice.

Here we offer 10 lessons learnt from our experience about the effective translation of reciprocal innovations from country to country and the D&I science literature so that researchers, policy-makers and social entrepreneurs can best ensure equity, accelerate adoptions and heighten the likelihood that global health reciprocal innovations will make a positive difference in health.

Before launch

1. Formative research with community stakeholders—both intermediaries and beneficiaries—can enlighten both developer-led reinvention and implementer-led adaptation for the purpose of best framing the meaning of an innovation. How individuals understand the meaning of an innovation affects their receptivity to it. A global health reciprocal innovation from an LMIC may be seen negatively by people in an HIC[44] though HIC communities that value immigration and internationalisation sometimes welcome such innovations.[45] An innovation to be implemented in a healthcare system may, for example, be introduced as a way to improve patient safety, care quality, patient experience or affordability. Learning from stakeholders prior to innovation introduction which meaning has 'the most positive associations and the least negative ones' can result in the dissemination of messages that reduce negative reactions while increasing responses of attention, interest, curiosity and inquiry.
2. Getting off on the right foot with the launch of a reciprocal innovation can make all the difference. With innovation introductions, starting correctly is especially important since an innovation's trajectory can be determined early on.[46] Innovations frequently succumb to 'path dependence'; that is, launch trajectory affects where they go and how far. Early reactions in response to dissemination efforts affect how many others will try the innovation and how quickly they will do so. While path dependence is affected by messages and framing of an innovation, it also is a response to the social structural points of entry in a new country that a cross-national team decides on. Which in-country trade associations or agencies will they partner with? Will opinion leading communities be identified and recruited to act as social models for other less influential communities as a way to accelerate adoptions?
3. Cross-national coproduction teams can proactively circumvent uncertainty among reciprocal innovation stakeholders and potential adopters. Awareness of an innovation produces a degree of uncertainty. What is it? How does it work? Does it work well? Studies about perceptions of innovations[47] show that several perceived characteristics are especially important in evaluative judgements: cost, the perceived monetary, time or other resource expense of adopting and implementing an innovation; effectiveness, the extent to which the innovation is perceived to work better than that which it will displace; simplicity, how easy the innovation is to understand and use; compatibility, the fit of the innovation to established ways of accomplishing the same goal; observability, the extent to which outcomes can be seen; and trialability, the extent to which the adoption decision is reversible or can be staged. Developers can attend to these characteristics as desirable positive attributes as they reinvent by aiming to reduce cost, maintain effectiveness, improve simplicity, increase compatibility and observability, and offer ways to try an innovation without immediate loss of resources.
4. Privilege the perspectives of potential adopters and implementers in communities—the demand side rather than the supply side. The success of many social marketing campaigns throughout the world is partly due to their attention to consumers rather than the producers of innovations. That's where decisions are made to try innovations, or not. Researchers and innovation developers often make the mistake of substituting themselves for the voice of second country intermediaries such as clinicians and beneficiaries such as patients. Pro-social innovation developers and advocates can do well to learn from commercial companies and the large proportions of R&D monies they frequently invest in consumer research.

After launch

5. Bridging organisations can facilitate transnational collaborations and diffusion. Transnational organisations increasingly function to bridge countries by sharing information and providing resources and services concerning effective practices, programmes, technologies and policies for improving health. Intermediaries range from non-profits such as Ashoka[48] that identify and select worthy entrepreneurial efforts that have demonstrated effectiveness and invest in them, to for-profits such as Johnson & Johnson Corporation which has funded the provision of mobile messaging systems for low-income pregnant women and new mothers in Bangladesh, China, India, Mexico, Nigeria and South Africa,[49] to databases that list what has worked where and how those efforts have been funded,[50] to government agencies that fund reciprocal innovations and report on evidence of effect.[51] Consultancies both for-profit and non-profit also play key roles in diffusing reciprocal innovations among countries, such as the activities of South Africa-based Reach Digital Health to bring health solutions through mobile media to poor people in LMICs.[52] A key contribution of such organisations that work on behalf of global health reciprocal innovations is to surface common objectives among transnational team members and establish commonly agreed on rules and operating procedures so that decision-making can proceed and knowledge transfer can accelerate.[53]

6. Use of a 'learning framework' can benefit reciprocal teamwork. Coconstruction of reciprocal innovations implies a two-way dynamic relationship. Hence partnership and engagement are crucial and need careful attention and relational management, especially in a context where there are (hidden) power imbalances. For example, in the SMART2D project,[54] key facilitators were horizontal leadership and partnership strengthening through joint ownership, a pro-active learning environment and team building strategies. To facilitate process management, structuring the reciprocal learning process in cycles around a specific theme and using a learning framework worked well. The use of a framework allowed for a balancing between evidence, stakeholder needs and contextualisation. Interdependence of actors on each other for performing tasks both between and within teams resulted in delays and interpersonal friction and should be anticipated and planned for.
7. Use intervention mapping to responsibly adapt innovations from country to country. One way to increase the likelihood that implementation in a new context will achieve the desired results observed in prior implementations is to list and compare the similarities and differences between prior and latter implementations.[55] Intervention mapping can be done coconstructively by innovation developers and advocates from a country where the innovation has previously been implemented in collaboration with stakeholders from a country that will newly implement the innovation to explicitly draw out which of the innovation's causal components can remain unchanged and which components can benefit from adaptation. Visual mapping exercises done together can elicit assumptions and expectations thus strengthening group process.
8. Continued engagement with communities will improve implementation and sustainment. In adopting and implementing countries, community openness to an innovation can range from rejection to tolerance to explicit demand. Implementing organisations can heighten the likelihood of an open or positive reception by formatively assessing and engaging impacted communities to determine their level of interest in trying an innovation and then maintaining communication through feedback and check-ins. In the Ciclovia experience, deep understanding of local context was imperative. The establishment of the Ciclovia route in a community, for example, necessitates ample communication with and agreement from neighbourhood residents and merchants, a process that can support and improve community connections by drawing together communities that otherwise may not collaborate. Many studies of health innovation implementation have shown that early and continued engagement with communities contributes to sustained success. With Ciclovia, residents and interested individuals learn to advocate for continued, and expanded, implementation that takes the form of more frequent Ciclovia days, longer hours and longer routes. On the macrolevel, political will and support for Ciclovia serve to encourage and support interdepartmental involvement with the initiative, such that implementation typically benefits, and even requires, support from multiple city agencies (eg, Public Health; Transportation; Police). In some contexts, Ciclovia activists reported government-level policy changes (eg, public safety staff scheduling), indicating another level of support and institutionalisation.[13] Staying in touch with implementing communities also enables relearning by innovation developers since communities can improve on innovations overtime through adaptations.
9. 'Distribution organisations' that have reach into disadvantaged communities can quickly increase the number of implementations taking place across communities. National or regional professional societies or trade organisations can be ideal organisational partners in cross-national reciprocal innovation teams because they often connect many member-organisations based in local communities.[56] This approach of segmenting service delivery organisations of a common type as a societal sector means that one or more reciprocal innovation(s) can be disseminated efficiently to many plausible and potential adopting organisations to benefit their clients, users or customers who are at risk of disease or need help. A national association partner can add credibility to messages about innovations and lead to higher rates of interest by their member-organisations to learn more about innovations.
10. Consider novel policy and payment approaches for piloting reciprocal innovations. Policy allowances may be necessary to allow groups to pilot reciprocal innovations in a new setting. Small demonstration projects, for example, using an iterative quality improvement implementation strategy can be important in spreading an innovation in a highly regulated healthcare context. While an innovation may have been executed by specific types of providers in an initial setting, an entirely different personnel structure in the new environment might require multiple phases of adaptation and rethinking about how to successfully deploy the innovation. Healthcare funders could consider alternative payment strategies to allow examination of innovations before permanent funding structures are established. Also possible is temporary relief from regulations to stimulate trial implementation. For instance, unusual provider groups or interventions might provide value but need to be incorporated into existing payment structures.

CONCLUSION

Our emphasis has been on elucidating coproduction as a team-based relational process for both developer-led reinvention and implementer-led adaptation of global

health innovations. The close identification by developers of reciprocal innovations paired with the wide variance of cultural and community conditions in implementing countries creates an interesting dynamic that can be a challenge for cross-national teams to resolve and build on. Accordingly, we have suggested a few ways that lessons drawn from our experience and D&I science research may be applied to diffusion processes for global health reciprocal innovations. The result can be the effective diffusion of global health reciprocal innovations.

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