Global Implementation Research and Applications
https://doi.org/10.1007/s43477-025-00161-x

# What We Wish We Knew: Getting Started in the Science of Scale-Up

**Tara Tancred[1] · Sharifullah Alemi[2] · Shafiqullah Hemat[2] · Ramona Hiltensperger[3] · Asri Maharani[4] · Uday Narayan Yadav[5,8] · Biyaya Nwankwo[6] · Darcelle Schouw[7]**

Received: 6 June 2024 / Accepted: 14 March 2025


**Abstract**
Scale-up science is complex, but essential in ensuring routine implementation of life-saving interventions at a population-level. Practical constraints in research timelines, availability of resources, and capacities of research teams and wider stakeholders may limit scale-up in real terms. Here we describe our key lessons learned as a cohort of early- and mid-career researchers (EMCRs) with implementation science expertise who had recently completed advanced training in scale-up science. As a group of trainees and implementation science practitioners who are actively engaged in scale-up, we present here some shared learning around "what we wish we knew" before getting started in scale-up, as a means of supporting capacity strengthening of other EMCRs in scale-up science. We present some key learning around: scale-up science terminology; stakeholder engagement in scale-up; and useful theories, models, and frameworks for scale-up. In this commentary, we reflect on some of the key challenges in scaling-up, sharing resources for scale-up that may be especially helpful for the EMCR community, as well as researchers and practitioners engaged in scale-up more broadly.

**Keywords** Implementation science · Scale-up · Capacity strengthening · Training

## Introduction

Scalability research is the study of the methods and strategies used to bridge the gap between evidence and sustainable practice in real-world conditions at scale while maintaining their effectiveness and quality (Peters et al., 2013). Without robust implementation plans that can be taken to scale, evidence-based interventions will not benefit those who need them. Therefore, it is imperative to develop the capacity of early- and mid-career researchers (EMCRs) in the methods and approaches of implementation science applied at scale.

Our cohort of EMCRs was brought together due to our shared experience of having participated in the Global Alliance for Chronic Disease's "Implementation Science Masterclass", which focused on scale-up science. Due to the eligibility criteria for this program, we all had prior experience in implementation science and applied to the training program with proposals for scaling up ongoing initiatives. After completion of the training, the authors (a subset of 8/20 of the total trainee EMCRs, six of whom are originally from or currently working for institutions within LMIC contexts) began—independent of the program—meeting informally as a writing group to consolidate our learning in scale-up science. We recognized that there were some

✉ Tara Tancred
tara.tancred@lstmed.ac.uk

1 Department of International Public Health, Liverpool School of Tropical Medicine, Liverpool, UK

2 Department of Global Health Entrepreneurship, Tokyo Medical and Dental University, Bunkyō, Japan

3 Department of Psychiatry II, Ulm University, Ulm, Germany

4 Mental Health Research Group, Division of Nursing, Midwifery and Social Work, School of Health Sciences, Faculty of Biology, Medicine, and Health, University of Manchester, Manchester Academic Health Science Centre, Manchester, UK

5 Department of Applied Epidemiology, National Centre for Epidemiology and Population Health, Australian National University, Canberra, Australia

6 College of Health Sciences, University of Abuja, Abuja, Nigeria

7 Division of Family Medicine and Primary Care, Stellenbosch University, Stellenbosch, South Africa

8 International Centre for Future Health Systems, University of New South Wales, Sydney, New South Wales, Australia

Published online: 30 April 2025

shared gaps in knowledge that were strengthened among us through the course of the training and from learning from one another. As a writing group, we reviewed masterclass recordings (plenary and smaller group sessions) to identify key areas of growth in understanding amongst trainees, and reflected on these as a writing group, reaching consensus around what we determined may be useful areas of learning for anyone looking to strengthen their capacities or get a start in scale-up science, especially other EMCRs. These insights are synthesized below.

## Key Learning

### Terminology for scale-up

Terminology generated a lot of discussion, with different trainees sometimes conceptualizing scale-up differently. We generally found that the WHO's definition for scale-up from two reports (Meuse-Rhin & World Health Organization, 2016; World Health Organization, 2009)—"deliberate efforts to increase the impact of health service innovations successfully tested in pilot or experimental projects to benefit more people and to foster policy and program development on a lasting basis"—was preferable, as it is applicable to various settings and contexts. We also developed another definition of scale-up as a group that reflected our recognition of the need for scale-up to be inclusive, extending benefits to marginalized and vulnerable populations who may need interventions the most: "to make an intervention or initiative available to a larger group of the target population, whilst applying ethical and social justice principles". Other key terms that were widely discussed are summarized in Table 1.

### Stakeholder Engagement in scale-up

We learned a lot—often from sharing our own experiences—about the importance of involving researchers, decision-makers and potential beneficiaries of the research in scale-up, as they have the insights and roles that are needed in scale-up (Nguyen et al., 2020). We noted that stakeholder engagement works differently in scale-up projects because of systems-level complexities. For instance, the larger the scale of the project becomes, the more diverse the stakeholders are, and it is important to consider the differences among stakeholders and to provide information specific to each group (Mugo et al., 2020).

Co-planning the project and co-designing implementation strategies with stakeholders from the outset were recognized as crucial to later scale-up efforts, an aspect highlighted consistently in literature (Triplett et al., 2022). Key learning about stakeholder engagement for scale-up, drawing from the practical experience of trainees included: the importance of active engagement of influential political stakeholders early on; creating a mutually agreed narrative that policymakers and politicians can easily understand that is inclusive of scaling up implementation strategies; involving the media, where possible, to strengthen broader public interest and investment to better facilitate scale-up; and involving charismatic advocates ("champions") with effective interpersonal communication skills to "sell" the implementation strategies in support of scale-up to stakeholders and the public.

### Useful Theories, Models, and Frameworks for scale-up

Many of the EMCRs came into the Masterclass having had some experience using theories, models, and frameworks (TMFs), largely to support the design and implementation of interventions and to study these, though we agreed these can sometimes be a bit overwhelming.

We discussed the relevance of some widely-used TMFs with respect to scale-up. We have included practical exemplars of the application of these TMFs to scale-up in Table 2, alongside additional useful resources. These included:

– The Consolidated Framework for Implementation Research (CFIR) (Damschroder et al., 2009), which was

**Table 1** Key scale-up terminology

| Term | Definition |
|---|---|
| Bottom-up scale-up | Scale-up that relies on community stakeholders or grassroots movements to guide scale-up. |
| Scalability | Evaluating whether the intervention that has shown effectiveness in a small population and in controlled conditions can be delivered to a larger population in real world conditions without losing effectiveness before planning for scale-up or scale-out (Zamboni et al., 2019). |
| Scalable unit | The "micro system" or "meso system" that can be replicated during scale-up (Barker et al., 2015). |
| Scale-out | In contrast to "scaling up" within a specific population, this refers to scaling out of an evidence-based intervention to new populations and health systems (Aarons et al., 2017). |
| Sustainability | Longer-term maintenance of the benefits resulting from change, and the change itself (e.g., a scaled-up intervention) (Buchanan et al., 2006). |
| Top-down scale-up | Scale-up that is directed from the top-down (e.g., led by the Ministry of Health), often with regional or national leadership. |

**Table 2** Recommended resources and useful reading for scale-up

| Resource | What it is and why we think it is helpful |
|---|---|
| **Implementation and scale-up science more broadly** | |
| Damschroder LJ et al. The updated Consolidated Framework for Implementation Research based on user feedback (Damschroder et al., 2022)<br>Damschroder LJ et al. Conceptualizing outcomes for use with the Consolidated Framework for Implementation Research (CFIR): the CFIR Outcomes Addendum (L. J. Damschroder, Reardon, Opra Widerquist, & Lowery, 2022) | Journal articles providing an updated—and viewed as simplified and more user-friendly—CFIR |
| Edwards NR et al. The Importance of Context in Implementation Research (Edwards & Barker, 2014) | A journal article establishing how to make and integrate contextual considerations |
| GACD Capacity Development webpages (Global Alliance for Chronic Diseases, 2024) | Offers training courses, workshops, etc. on different topics related to implementation science, including scale-up—very helpful for staying abreast in implementation science discourse |
| GACD Implementation Science e-Hub (Global Alliance for Chronic Diseases, 2022) | The online hub where many open-access implementation and scale-up science resources are collated by GACD |
| Implementation Science (journal) (BioMed Central, 2024) | The most prominent journal for implementation science, where many practical examples of scale-up research are found |
| Leeman J et al. Beyond "implementation strategies": classifying the full range of strategies used in implementation science and practice (Leeman et al., 2017) | A journal article providing a useful synthesis of some of the most common implementation strategies that are used |
| McCarthy EA et al. Training and HIV-Treatment Scale-Up: Establishing an Implementation Research Agenda (McCarthy et al., 2006) | A journal article highlighting very practical considerations around training/capacity strengthening for scale-up |
| Powell BJ et al. A refined compilation of implementation strategies: results from the Expert Recommendations for Implementing Change (ERIC) project (Powell et al., 2015) | Another very useful journal article providing a useful synthesis of implementation strategies that are used |
| Proctor EK et al. Implementation strategies: recommendations for specifying and reporting (Proctor et al., 2013) | An excellent journal article for getting to grips with what implementation strategies are |
| Waltz TJ et al. Use of concept mapping to characterize relationships among implementation strategies and assess their feasibility and importance: results from the Expert Recommendations for Implementing Change (ERIC) study (Waltz et al., 2015) | A very useful journal article offering a helpful analysis of different implementation strategies and how they may be most meaningfully applied |
| WHO TDR Implementation Research Training Resources (TDR, 2024) | The toolkit is a set of open-access implementation research resources that helps in gaining a general understanding of implementation research principles, ethics, and implementation strategies |
| **Examples of the application of theories, models, and frameworks to scale-up** | |
| **CFIR**<br>White, M. C., Randall, K., Capo-Chichi, N. F. E., Sodogas, F., Quenum, S., Wright, K., … & Leather, A. J. M. (2019). Implementation and evaluation of nationwide scale-up of the surgical safety checklist. *Journal of British Surgery*, *106*(2), e91-e102. (White et al., 2019) | See Table S2 in supplementary information for a more clear depiction of how CFIR was used |
| **EPIS**<br>Becan, J. E., Bartkowski, J. P., Knight, D. K., Wiley, T. R., DiClemente, R., Ducharme, L., … & Aarons, G. A. (2018). A model for rigorously applying the Exploration, Preparation, Implementation, Sustainment (EPIS) framework in the design and measurement of a large scale collaborative multi-site study. *Health & justice*, *6*, 1–14. (Becan et al., 2018) | Perhaps one of the most well-known and robust applications of the EPIS framework, it usefully highlights how the framework may be utilized in all phases to ultimately lay the groundwork for bringing and intervention to scale |
| **RE-AIM**<br>Walker, A., Boaz, A., Gibney, A., Zambelli, Z., & Hurley, M. V. (2020). Scaling-up an evidence-based intervention for osteoarthritis in real-world settings: a pragmatic evaluation using the RE-AIM framework. *Implementation Science Communications*, *1*, 1–7. (Walker et al., 2020) | A helpful article that shows how RE-AIM can support scale-up, especially when considering a range of outcome measures of relevance |

noted for its comprehensive integration of internal and external contextual factors.
- The Reach, Exposure, Adoption, Implementation, Maintenance (RE-AIM) framework (Glasgow et al., 2019), which was seen as especially useful for evaluating scale-up in the "Maintenance" aspect of the framework.
- The Exploration, Preparation, Implementation, Sustainment (EPIS) framework (Aarons et al., 2011; EPIS Framework), which was lauded for its ease of use and support to planning;
- The Implementation Research Logic Model (IRLM) (Smith et al., 2020), which was also seen as a very useful tool to indicate how and where the evidence-based intervention will be implemented to produce the intended outcomes to support scale-up planning.

We noted the tension that often exists between fidelity of implementation and the need for adaptation to respond to moderating contextual factors that will likely impact upon scale-up or scale-out. Therefore, specifically for adaptation of interventions, we also reflected on the use of FRAME (an expanded framework for reporting adaptations and modifications to evidence-based interventions (Wiltsey Stirman et al., 2019) and the Model for Adaptation, Design, and Impact (MADI (Kirk, Moore, Wiltsey Stirman, & Birken, 2020). Though other sociological theories like Diffusion of Innovations (Rogers, 2010) and Normalization Process Theory (Murray et al., 2010) were known to many of us, some of the more detailed frameworks above, as opposed to broader theories, had greater perceived application to scale-up.

We reflected on our shared learning around making decisions on which TMF to use, which should pragmatically take into account different cultures, contexts, and policies and should incorporate systems learning.

## Discussion

### Reflections on Challenges in scale-up

We came to understand and appreciate that while scaling-up interventions, tools, and programs is important, it is far from straightforward. This is due to: (1) The very limited timeframe for conducting research (scale-up and corresponding studies of this require more time, often beyond the scope of what a grant allows); (2) Limited resources (scale-up involves a much larger population and involvement of new stakeholders) (Carboni et al., 2024; Spicer et al., 2014); (3) Complex socio-political and economic contexts (these are ever-changing, necessitating adaptations across both what is implemented and how scale-up happens) (Carboni et al., 2024; Koorts et al., 2022; Sherman & Ford, 2014); and (4) Lack of expertise in scale-up amongst

**Table 2** (continued)

| Resource | What it is and why we think it is helpful |
|---|---|
| **IRLM**<br>Tiruneh, G. T., Nigatu, T. G., Magge, H., & Hirschhorn, L. R. (2022). Using the Implementation Research Logic Model to design and implement community-based management of possible serious bacterial infection during COVID-19 pandemic in Ethiopia. *BMC health services research*, *22*(1), 1515. (Tiruneh et al., 2022) | An example of how the IRLM can be applied to navigate complex contexts to improve high-fidelity implementation and integration of a community-based treatment of bacterial infections within the primary healthcare system in Ethiopia, highlighting the necessity of active engagement of stakeholders |

researchers and practitioners carrying out and studying scale-up (Norton et al., 2012).

Literature highlights the importance of a strategy for scale-up (Bulthuis et al., 2020; Koorts et al., 2022), which identify many things, including: the scalable unit(s); individuals and organizations to capacitate; stakeholders to engage; resources to be used; opportunities for scale-up in terms of both widespread operationalization and expansion; and scale-up timelines (Spicer et al., 2014; World Health Organization, 2010). The availability of resources needed within scale-up—and to study sale-up—are persistent bottlenecks (Bulthuis et al., 2020). Further, aspects of scale-up that were less-discussed by us as EMCR trainees, but that are reflected in literature are the *need* for the innovation to be scaled up, as perceived by stakeholders, and organizational and community culture shifts in thinking and doing to facilitate the embedding of change at scale (Best et al., 2013; Bulthuis et al., 2020; Papoutsi et al., 2024).

### Speaking as a Novice: Useful Resources

Helpfully, there are a plethora of resources and training opportunities available to support capacity strengthening for implementation research, though there is considerably less emphasis across these in scale-up science specifically. Here we have included a summary of some scale-up resources that we, as a cohort, have found most useful. This list is compiled in Table 2.

## Conclusions

Scale-up is complex and critically important to support the uptake of evidence-based practice, globally. Therefore, prior to beginning scale-up research, as a cohort of EMCRs, we felt it is of particular value to: seek clarity around scale-up terminology; grow understanding of the importance of early and sustained stakeholder engagement in scale-up; and recognize the utility of models, theories, and frameworks for scale-up, selecting and adapting those that may be of greatest relevance. Importantly, there are many tools, learning materials, and networks available to strengthen capacities to carry out high-quality scale-up that EMCRs and others preparing for scale-up should capitalize on.

**Acknowledgements** We thank all of the Masterclass early and mid-career researchers for their insights that we built from throughout this publication. We also wish to highlight the contributions of Brian Oldenburg and Isobel Bandurek for their helpful guidance and reflections on drafts of this manuscript.

**Author Contributions** All authors had shared responsibility for analysing data and pulling together the results in this manuscript. TT generated the first draft and all authors contributed to subsequent drafts.

**Funding** The Masterclass and access fees for this publication were funded by the Global Alliance for Chronic Disease. There was otherwise no dedicated funding to support the development of this publication.

**Data Availability** Not applicable to this commentary.

## Declarations

**Competing Interests** All authors were trainees of the Global Alliance for Chronic Disease's Implementation Science Masterclass.



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