Reviewer’s report

Title: The unpredictable journeys of spreading, sustaining and scaling healthcare innovations: a scoping review

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Reviewer: Gemma Hughes

Reviewer's report:

OVERVIEW

This paper reports on a scoping review aimed at distilling knowledge to support and operationalize the 3S (spread, sustainability and scale-up) of healthcare innovations. The paper provides definitions of the 3S, the mechanisms that underpin the 3S, and the conditions that can enable and limit 3S. The authors first identify four groups of common challenges to healthcare innovation (substance, processes, stakeholders and context), then, based on this knowledge, provide a framework comprising five themes to support spread, sustainability and scale-up.

STRENGTHS

There are a number of strengths of this paper: a very useful set of definitions of the 3S, a nice synthesis of the related mechanisms and conditions, and a practical framework. The development of the framework from the findings of the scoping review is clearly set out and easy to follow, with supporting diagrams to illustrate the narrative.

MAJOR IMPROVEMENTS

Whilst already a strong paper, I have two main suggestions that I feel could improve this paper, as well as some minor suggestions. The first main suggestion is that the authors further refine, discuss, critique and then defend their use of the analogy of an innovation 'journey' line or pathway. There appears to be a key tension in the literature between the notion of an 'innovation-to-transformation pathway' (line 48) and a more dynamic, non-linear and unpredictable understanding of the processes of the 3S (line 162). By concluding (line 409) with the view that innovation is a journey, there is perhaps an implicit alignment with a more linear conception of innovation. Of course journeys can be unpredictable and so on but this analogy does evoke a degree of certainty in terms of destination, as well as a linear (albeit potentially dynamic) process. I think it would be helpful for the authors to briefly qualify their use of the 'journey' analogy and in doing so make explicit their position on this tension and/or acknowledge
this tension. Throughout (see lines 188 and 201 for example) the authors refer to THE innovation journey, implying a standardised process. Might a reference to innovation journeys (plural) or A (specific) journey reflect better the more uncertain and contextualised nature of innovation? And the iterative and overlapping nature of the innovation journey described in line 188?

On a related, but separate (more minor) point, the title refers to 'Opening the black box', yet the idea of the black box is not defined or explored in any detail. There is only one mention of black box in the text at lines 34-36 ('The innovation journey…remains something of a black box'). This reads to me as a rather mixed metaphor which should be re-worked. Perhaps even a new title could be chosen that reflects the way in which this paper maps out the previously uncharted journey of how the 3S lead to innovation? There is (again a minor point) a further mention of 'box' at line 384, not a black box this time, but an exhortation to 'think outside the box', yet it is not clear in the following lines exactly how or what new perspectives we are being asked to embrace.

The second main suggestion I would make would be to tighten up the framework itself. Some suggestions are:

1) Tighten up the distinction between the themes of the framework produced and/or acknowledge any overlaps between themes

2) Give a short description of the relationship between the themes if these are to be used to guide 3S - for example are the themes mutually reinforcing or are some themes more relevant for some projects than others?

3) Consider providing shorter theme titles and/or numbering each theme

4) Further refine the themes 'Innovation work is demanding for people, organizations and communities' (line 316) and 'The pace of the innovation journey is important' (line 226) as there seems to be some overlap between the two themes. Is the key point of 'Innovation work is demanding for people' that it takes time (and effort) to make changes, or is it about the way in which the innovation itself will invariably change over time, in which case the key point is perhaps about the balance between adaptability and fidelity? I also wonder if the mention of incentives (line 349) might fit better in the previous theme? With regards to 'Innovation work is demanding for people, organizations and communities' I would suggest inclusion not only of the work (described by the authors as emotional and behavioural adjustments) but the related infrastructure and resourcing issues (see for example Barker et al, 2016).

5) The theme 'The innovation journey as a social exchange process' covers (amongst other things) context, dialogue between delivery and policy, social relations and distributed leadership.
I think this theme needs to be tightened up (perhaps simplified?) and a clearer key message developed.

MINOR IMPROVEMENTS

Some minor points to further strengthen this paper are suggested below:

* I am not sure of the relevance of reference 8 to healthcare innovations - this relates to an anti-social families project. Are the authors talking about spread beyond one sector (healthcare) into another? If so perhaps make this more explicit - if not are there other references within healthcare that might be more relevant for people.

* Lines 97-151 - Perhaps some of the search strategy and results details could be moved to an appendix so as to improve the flow of the narrative (and possibly reduce word count if needed to accommodate other revisions)?

* Page 8 line 165 The authors state 'Spread is commonly defined as passive and deliberate…' I think this tension between 'passive' and 'deliberate' needs to be explored/explained or at least described as 'passive OR deliberate'.

* Lines 165-174 Is there a clear distinction between spread and scale-up or are there any blurred edges/overlaps and if so should this be acknowledged?

* Line 182 - The authors state that 'Evidence on […] scale-up […]emphasizes the need to balance 'hard' assets […] and 'soft' assets…' - to what end does this balance need to be achieved? Is this to balance fidelity and spread or for other reasons?

* Line 186 - Consider qualifying this statement, given that the role of policy environments and governance is included in the NASSS framework (Greenhalgh et al, 2017) as part of the domain of 'wider context'.

* Line 234 - I think a slightly more nuanced reference to Heikkila and Gerlak (2016) should be provided here in relation to collective processes leading to collective products including cognitive products which MAY lead to behavioural products rather than the current reference which gives the more deterministic statement: 'This happens by producing cognitive and behavioural changes among stakeholders.' Further, if the authors are referring to collective learning amongst stakeholders, they might also wish to consider discussing this in the stakeholder section.

* Line 255-259 The discussion of context cites Berwick, however the authors could also refer to the theoretical background (line 64) and the legacy of DIM, and the concepts of social practice and contexts as discussed by Shaw et al (2017).
I think the statement '…the 3s seem to lack a solid theoretical foundation' needs to be qualified in the light of significant theoretical work on this area, including for example Shaw et al's (2017) work on scale-up and spread which draws heavily on social practice theory, and Greenhalgh et al (2017)'s theoretically-informed framework which includes social practice and complexity theory (amongst others).

Page 35 Table 2 - for Greenhalgh et al (2004) the authors state that 'none mentioned' for 'mechanisms involved', however this is not in fact the case (see for example page 593 which includes in fig 3 'assumed mechanisms').

**FORMATTING/TYPOS**

- Line 208 - health care or healthcare?
- Headings of themes need to be bold, numbered, or otherwise distinguished as headings in some way

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