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# Mobilizing pilot-based evidence for the spread and sustainability of innovations in healthcare: The role of innovation intermediaries

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## ABSTRACT

An endemic challenge facing healthcare systems around the world is how to spread innovation more widely and sustainably. A common response to this challenge involves conducting pilot implementation studies to generate evidence of the innovation's benefits. However, despite the key role that such studies play in the local adoption of innovation, their contribution to the wider spread and sustainability of innovation is relatively under-researched and under-theorized. In this paper we examine this contribution through an empirical examination of the experiences of an innovation intermediary organization in the English NHS (National Health Service). We find that their work in mobilizing pilot-based evidence involves three main strands; configuring to context; transitioning evidence; and managing the transition. Through this analysis we contribute to theory by showing how the agency afforded by intermediary roles can support the effective transitioning of pilot-based evidence across different phases in the innovation journey, and across different occupational groups, and can thus help to create a positive feedback loop from localized early implementers of an innovation to later more widespread adoption and sustainability. Based on these findings, we develop insights on the reasons for the unnecessary repetition of pilots – so-called 'pilotitis' – and offer policy recommendations on how to enhance the role of pilots in the wider spread and sustainability of innovation.

## 1. Introduction

A deep-seated challenge facing healthcare systems globally is the question of how to spread service innovations more widely, rapidly and sustainably over time. Typically, such innovations, which are predominant in the healthcare environment (Greenhalgh et al., 2004), blend clinical, technical and organizational elements, and cannot be simply applied 'off the shelf' but require strenuous efforts to integrate them into the pathways and local contexts of adopting organizations. There are many instances of such innovations not being spread widely or used routinely despite impressive evidence of their benefits (Horton et al., 2018; Dearing and Cox, 2018; Shaw et al., 2017).

One widespread response to overcoming this challenge involves the conduct of pilot studies, broadly defined here as formally designated, discrete events aimed at generating evidence on various aspects of an innovation. Such studies may be labelled variously as feasibility studies, trials or evaluations, and are used for different purposes in healthcare, from research to policy development (Ettelt et al., 2014). Our focus here

is on how the evidence from certain types of pilot studies is mobilized by intermediary organizations to support innovations on their journey to spread and sustainability, that is, encompassing both the wider adoption of an innovation and its continued implementation beyond its initial pilot stage (Côté-Boileau et al., 2019; Martin et al., 2012). Intermediary organizations have been developed in a number of countries with what can be characterised as the broad aim of supporting innovation in healthcare by reducing barriers to the flow of new forms of knowledge into practice. Pilot-based evidence is a vital component of this mission and can range from Randomised Control Trials (RCTs) of an innovation's clinical efficacy to so-called 'real-world evaluation' providing evidence of the innovation's implementation in specific healthcare settings (The AHSN Network, 2022; NICE, 2022). These studies are usually funded as part of local or national initiatives, frequently making them an expensive and resource intensive activity (Barlow, 2016).

Recent literature suggests that the contribution which such pilot studies make to the wider uptake and sustainability of an innovation is under-researched and open to debate (Barlow, 2016; Charif et al., 2017).

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In particular, a number of studies have highlighted the risks of what has been termed ‘pilotitis’ (Bégin et al., 2009); that is, the unnecessary repetition of multiple pilots of the same innovation across different settings without ever leading to widespread adoption and sustainable implementation. From a policy perspective, this time-consuming and wasteful phenomenon has been observed across a range of different types of healthcare innovation (Bhatia et al., 2020) and a variety of healthcare systems internationally, both in high-income and low- and middle-income countries (Lundin and Dumont, 2017; Huang et al., 2017; Taylor et al., 2015; Clifford, 2016; Desveaux et al., 2019).

This paper aims to contribute to much needed theorizing on the role intermediaries play in mobilizing pilot-based evidence in spreading innovation. At the same time, we seek to inform policy development in this area (Shaw et al., 2017; Greenhalgh and Papoutsis, 2019). To do this we draw on, and integrate, different strands of existing literature, including work on what we broadly term ‘evidence mobilization’ and ‘the innovation journey’, to explore the role that pilots play in mobilizing evidence for the spread and sustainability of healthcare innovations at different points. The notion of evidence mobilization is defined here as a proactive effort to transform existing practice through the production and circulation of evidence amongst different stakeholders (Swan et al., 2016; Balas and Chapman, 2018; Rhodes and Lancaster, 2019). Although ‘evidence-based’ change and innovation are highly valued in healthcare, research shows that evidence does not speak for itself. Rather evidence needs to be proactively mobilized and ‘framed’ through the agency of different groups as an important aspect of co-constructing the meaning of an innovation (Ferlie et al., 2005; Barnett et al., 2011; Lehoux et al., 2012; Dearing and Cox, 2018; Sobo, 2009).

The concept of the innovation journey, meanwhile, is a shorthand way of characterizing the evolution of an innovation from initial invention through to widespread adoption across organizations and sustained implementation within organizations (Van de Ven et al., 1999; Côté-Boileau et al., 2019; Bowman et al., 2008). In this paper, we define spread as the replication of an innovation in a different setting via ‘local, bottom-up adoption’ (Shaw et al., 2017: p. 88; Greenhalgh and Papoutsis, 2019), and sustainability as the embedding of innovation in routine practice (Martin et al., 2012). As we outline below, a better understanding of the role played by pilot-based evidence in the journey contributes to our theoretical understanding of the interplay between the sustained implementation and spread of innovations. From a healthcare standpoint, it helps to unpack the significance of changes in the forms of evidence and the way in which such evidence is ‘framed’ to different stakeholders.

Our empirical investigation explores this topic within the wider context of the English NHS. This provides an excellent setting for our study, not least because the challenges of spreading innovation sustainably over time in the NHS, including pilotitis, have been well documented (Taylor et al., 2015; Castle-Clarke et al., 2017; Horton et al., 2018). Here, our study is able to benefit from the experience of Academic Health Science Networks (AHSNs) within the NHS. These intermediary organizations are defined as key facilitators for spreading innovation in the NHS, and thus have experience of mobilizing evidence to support the deployment of a wide range of innovation pilots across different sites in England. While previous studies have emphasized the agency of a range of different groups in adopting and implementing innovation, including the key role played by professionals and managers, our study highlights the change agency exercised by innovation intermediaries whose position in the healthcare system enables them to work across boundaries in mobilizing evidence and framing the meaning of innovations amongst different groups and organizations (Currie et al., 2014).

Our paper contributes both to theory development and policy discussion. Theoretically, our analysis contributes to a growing body of work which argues that existing models fail to address the impact of implementation experience on the spread and sustainability of

innovations (Ansari et al., 2010; Compagni et al., 2014). The communication of such experience may take a variety of forms, including narratives of success and failure, but in healthcare environments centres very largely on the generation and sharing of evidence (Greenhalgh et al., 2004; Balas and Chapman, 2018). In this paper, we contribute to this theoretical development by focussing on the role of intermediaries in mobilizing evidence around pilot implementation studies as a linking mechanism between different phases of an innovation’s journey into more extensive use. In addition, from a policy perspective, we provide new insights into the underlying causes of pilotitis by showing how managing evidence transitions in the innovation journey requires early involvement and shared learning amongst key stakeholders. This has relevance not only to the challenges faced by the NHS but also to health systems internationally (WHO, 2011).

## 2. Theoretical background

In Roger’s diffusion model (2003), widely used in healthcare studies (e.g. Greenhalgh et al., 2005; Balas and Chapman, 2018), the spread of innovations is seen as a cumulative process in which adoption by a few individuals or organizations can act as a signal to other prospective adopters, leading to a critical mass being reached when spread becomes self-sustaining. Knowledge and awareness of the innovation is spread to prospective adopters via peer networks, opinion leading individuals and ‘change-agents’ leading to eventual widespread adoption and implementation (Dopson et al., 2002). A vital underlying mechanism (Davis and Marquis, 2005) in this model is the recursive relationship – a feedback loop, in effect – between the cumulative decisions of individual, early adopting organizations and the widespread adoption and implementation by other organizations (Dearing and Cox, 2018).

The applicability of this diffusion model to healthcare has been criticized, however, for over-emphasizing adoption and understating the barriers to the implementation of innovations in this sector (Ferlie et al., 2005; Dearing and Cox, 2018). In response, there have been recent moves to develop a more integrative understanding that looks beyond adoption to incorporate the experience of innovation implementation (Martin et al., 2012; Greenhalgh and Papoutsis, 2019; Scarbrough and Kyrtasis, 2021). The wider theoretical case for this rethinking of the diffusion model is made by Ansari et al. (2010) who highlight the limitations of the interorganizational focus of existing diffusion theories in the face of ‘the emergent, processual, and recursive character of implementation and diffusion’ (p.84).

### 2.1. The pilot paradox

Distinctive features of healthcare which limit the applicability of the classical diffusion model include the influence of professional groups on innovation adoption, and the wider policy and regulatory environment (Dopson et al., 2002; Ferlie et al., 2005; Balas and Chapman, 2018). Since these features give greater weight to the need for innovations to be evidence-based, they tend to increase the importance of pilot studies in the spread of innovations. At the same time, however, the outcomes achieved from integrating innovations into existing services are often highly context dependent (Asthana et al., 2019). This creates a paradox; on one hand, pilot studies play a vital role in generating evidence to support the adoption of service innovations, but on the other, the perceived generalizability and acceptability of such evidence amongst prospective adopting organizations and professionals may be limited (Rhodes and Lancaster, 2019).

This paradox is reflected in previous empirical work. Some studies affirm the importance attached to such evidence (e.g. Hendy and Barlow, 2013), with one study finding that evidence played a ‘crucial role’ throughout the innovation journey, being ‘visible at multiple time points in the initiation, implementation and diffusion of service innovations.’ (Barnett et al., 2011: p.5). On the other hand, such evidence is seen to be ambiguous, contestable and subject to scrutiny by a range of

occupational groups (Greenhalgh et al., 2004; Martin et al., 2012; Asthana et al., 2019), requiring the generation of multiple forms of evidence (Vasileiou et al., 2012).

These observations underline the need to better understand the role of pilots in mobilizing evidence to support the innovation journey. Although innovations are widely piloted within healthcare systems, the existing literature focuses on pilots as evaluating specific instances of adoption and does not consider their implications for more widespread adoption. The few studies which have addressed this question tend to reinforce the above-noted paradoxical relationship between the need for evidence and its generalizability. Barlow (2016), for example, notes that pilot projects 'often fail to provide good evidence about the likely impact of an innovation once it has become part of mainstream practice' (p. 186). The rationale for this view centres on the exceptional character of pilot studies. They are seen as exceptionally well resourced and managed in very controlled and supportive local environments (Barlow, 2016). They are also championed by highly committed individuals who are focussed on implementing them successfully within a strict time-frame (Taylor et al., 2015). The argument runs that these exceptional features and short-term focus of the local setting make such pilot sites and the evidence they generate atypical of the wider healthcare system and therefore of limited perceived generalizability and sustainable value.

## 2.2. Evidence mobilization for the spread of innovations

As highlighted by this previous work, pilot-based evidence around healthcare innovations does not speak for itself but needs to be mobilized to support the spread and sustainability of service innovations (Fitzgerald et al., 2002; Swan et al., 2016; Balas and Chapman, 2018). Such mobilization efforts are subject to the mediating influence of different occupational groups, (Hendy and Barlow, 2013; Martin et al., 2012). Currie and Spyridonidis (2019), for example, emphasise that healthcare professionals are not 'passive recipients, but active participants' in the process of innovation. In their study, they highlight the interdependency between the role played by managerial and professional groups, observing how the leadership roles shifted between them over different phases of innovation diffusion.

Studies show how a variety of occupational groups bring distinct perspectives or epistemologies to bear on the mobilization of knowledge and evidence (Evans and Scarbrough, 2014; Currie and Spyridonidis, 2019), with clinicians in the English NHS for example, viewing randomised clinical trial (RCT) as the 'gold standard' for evidence (Ferlie et al., 2005), while managerial groups are more concerned with cost effectiveness. In respect of the adoption of specific service innovations, however, all groups seek to relate evidence to their own local context. Thus, clinicians 'contextualize evidence within the delivery environment, adjusting it to patients' needs and profiles' (Vasileiou et al., 2012, pp. 94–96), while for managerial groups, 'evidence will be adapted and translated ... and cannot be easily separated from the organizational context in which it is being applied (Hendy and Barlow, 2013, pp. 219–220). As Martin et al. (2012) conclude in their study of the sustainability of innovations in the NHS, evidence per se may be less important than ensuring that 'broader notions of a service's value' are acknowledged and accounted for by those in decision-making positions. They highlight how various discourses of value are constructed within the local context to achieve this, backed by a network of support from a range of stakeholders in clinical and managerial roles.

In partial response to the challenges which the scrutiny or resistance of these different occupational groups and perspectives have posed for the spread of healthcare innovations, recent decades have seen the creation of various forms of innovation intermediary organizations, both in the UK and internationally, which seek to accelerate that spread by working across established boundaries (Evans and Scarbrough, 2014; Durrant et al., 2023). Depending upon their constitution and purpose, such organizations may be able exploit their position within healthcare

systems to broker knowledge and evidence, and to develop collaborative practices across disparate groups in support of innovation (O'Mahony and Bechky, 2008). The agency afforded by their intermediary role differs from the mediating influence exerted by occupational groups such as clinicians, nurses and managers whose responses to particular innovations are more situated within a particular organization (albeit with the ability to transcend some boundaries within and beyond that organization), but rather encompasses to some degree the wider healthcare system, creating a distinctive perspective which is more supportive of the spread of innovations.

In summary, one of the underlying mechanisms in the classical model of diffusion involves a feedback loop from adoption by early adopter organizations to more widespread diffusion at later phases of the innovation journey. In healthcare environments, on the other hand, this mechanism is brought into question by the much greater significance attached to evidence supporting the innovation. Although pilot studies provide an opportunity for intermediary organizations to mobilize evidence at different points in the innovation journey, its limited generalizability and contestable relevance to the different groups involved means that it is unclear from the existing literature how far such evidence can sustain a positive linkage between early implementation sites and later phases of the innovation journey.

In light of the limited coverage and contending views in the existing literature, therefore, this paper aims to address the broad question: how do innovation intermediaries use pilot-based evidence to support the spread and sustainability of innovations in healthcare? By doing this, we aim to increase our theoretical understanding of this topic and at the same time help to inform responses to policy challenges such as pilotitis.

## 3. Research context and methods

The NHS in England is a publicly-funded healthcare system accountable to the UK government. Despite its more unitary structure compared to other national systems, the NHS has been identified as suffering similar barriers to the spread of innovations as experienced elsewhere, including pilotitis (Castle-Clarke et al., 2017; Horton et al., 2018). It therefore provides an excellent setting for our empirical study. Although the role of pilots in spreading innovation is a difficult phenomenon to observe empirically, being highly distributed across different sites and actors, we sought to overcome these challenges by focussing our data collection on the work of AHSNs. These intermediary organizations are a key spread facilitator for any type of innovation in the English NHS, and work to develop innovations with a wide range of innovators, such as companies, clinicians or academic institutions, from the early phase of the innovation journey onwards. AHSNs assist with initial proof of concept work and support stakeholders in their local health and care system to adopt innovations which have been proven to work elsewhere. AHSN members' unusual positioning as change agents along the whole innovation journey means that they are exposed to a wide range of pilot studies and contexts as they seek to generate the evidence needed for innovations to be adopted locally (Rogers, 2003). Investigating the work of this group thus provides us with a unique opportunity to situate the mobilization of pilot-based evidence within the wider landscape of the innovation journey.

The AHSN Network is organized into 15 regional AHSNs covering the whole of England, each working across a distinct geography and population but encompassing a broadly similar pattern of innovation and implementation activity (Ferlie et al., 2017). AHSN staff play a variety of different roles depending on each AHSN's structure but can be broadly categorised into those who deliver projects, and those who direct such projects. In the period of our study, AHSNs were promoting the spread of innovations across a range of areas such as cardiovascular disease, maternity and neonatal services, mental health, medicines, and respiratory conditions. These innovations took on a variety of forms including new technologies, changes in practice, and organizational innovations. For the most part, however, they can be summarised as

service delivery innovations.

3.1. Research methods

Given the exploratory nature of our study, we followed an abductive qualitative approach to our research question (Mantere and Kekokivi, 2013; Tavory and Timmermans, 2014). Abduction combines elements of both inductive and deductive approaches to allow for data and theory to augment each other and is particularly useful in exploring phenomena where ‘there is an absence of an existing or sufficient theoretical explanation for data’ (Ashworth et al., 2019).

The research team are all academic researchers working at UK universities and not within the AHSNs or working within the healthcare system. They represent different disciplines including organization studies (HS), health services research (CS), health sciences and psychology (KRS), and implementation science (AZ).

3.1.1. Data collection

This research builds on an initial study conducted between March 2020 and November 2020 focussing on the work of AHSNs in spreading innovation. It had a broad focus on increasing understanding of the activities undertaken by AHSNs in promoting the wider adoption of innovations (their ‘approaches to spread’), and the nature of the work carried out by their members. This study included one-to-one semi-structured interviews with 143 participants across all 15 AHSNs. The semi-structured interviews were sensitive to the context of each AHSN, with numerous probes to explore particular aspects of AHSN members’ approach to spread. In an iterative way, our initial analysis of these interviews highlighted the important role of pilot-based evidence in the work of AHSN members to support the spread and sustainability of innovation. Therefore, to explore this topic via more in-depth questions and ensure greater balance and representation in our overall dataset we decided to add to the initial data a further supplementary set of 8 semi-

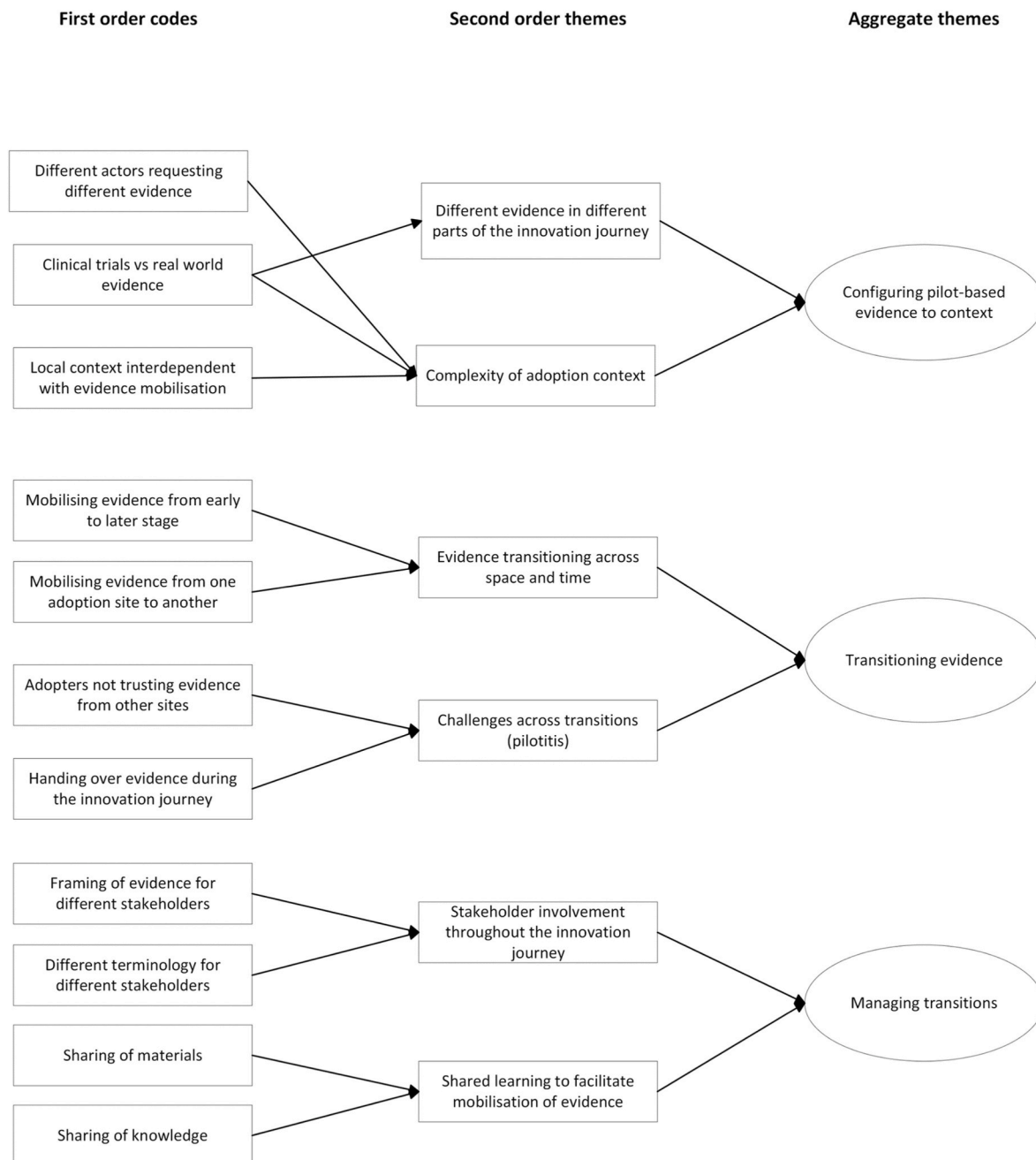


Fig. 1. Data structure.

structured interviews with commercial leads in senior roles across different AHSNs (for the interview guide see Supplementary Material). With a more fine-grained understanding of the phenomenon, we then revisited the entire data set (143 from the initial data collection and the additional 8) so as to situate the role of pilot studies within the wider spread efforts of the AHSN staff. Excluding from our analysis transcripts that did not explicitly discuss the role of pilot-based evidence in supporting spread activities, we focussed our analysis on a total of 53 transcripts encompassing a cross section of staff members from all 15 AHSNs. Based on their job descriptions, 22 were at the senior level, while 31 were in operational posts. For 26 of the participants, their role was mostly in innovation adoption, 15 were in supporting commercial partners, eight were in the area of patient safety, two were in business support and communication and we had one clinical lead and one CEO. There were no financial or other incentives to participate and no participant dropped out or refused to participate. All interviews lasted on average 1 h, were conducted in a remote working/home office context over the phone, were audio recorded and then professionally transcribed verbatim.

### 3.1.2. Data analysis

All transcripts for this sample were coded and analysed using abductive thematic analysis (Thompson, 2022; Tavory and Timmermans, 2014) supported by Dedoose software (Dedoose, 2018). First KRS, CS, and AZ familiarised themselves with the transcripts and then individually generated first-order codes. KRS, CS and AZ then came together to discuss the initial first-order codes they had identified and created a codebook and completed the final coding. KRS and CS then consolidated the codes using the theoretical lenses from innovation journey and evidence mobilization to develop second-order themes. Finally, the research team met together to discuss the codes and themes identified, examine relevant literature, leading to the development of three overarching aggregate themes presented in Fig. 1. Together these aggregate themes result in our primary theoretical contribution.

## 4. Findings

Three aggregate themes were identified from our analysis: configuring of pilot-based evidence to context; transitioning pilot-based evidence; and managing transitions (see Fig. 1). These interacting themes speak to the experience of how AHSNs use pilot-based evidence to support the spread and sustainability of innovations within the NHS. The first theme, *configuring pilot-based evidence to context*, reflects the AHSN concern with how pilot-based evidence fits, responds and adapts within complex contexts involving different stakeholders and types of innovation. The second theme, *transitioning pilot-based evidence*, speaks to the AHSNs' experience of mobilizing pilot-based evidence across different transitional points within the innovation journey. The final theme, *managing transitions*, speaks to the strategies AHSNs use to support the mobilization of pilot-based evidence across these transition points. Together, these three interacting themes highlight the challenges in mobilizing pilot-based evidence to support spread and sustainability across key transition points in the innovation journey.

To fully address our research question, we need to understand what AHSNs consider as pilot-based evidence. Similar to previous research (Ettelt et al., 2014), our analysis shows that for AHSNs, there is no consensus definition of the term 'pilots'. Rather, participants used a constellation of terms (e.g., local demonstrator, real-world evaluation, business-case, pilot RCT) to denote what we have inclusively labelled 'pilots'; i.e. studies or activities that help to generate evidence supporting the spread and sustainability of innovations. Again, reflecting the variety of forms which it takes, we define the evidence generated from such pilots as forms of explicit knowledge which are generated through evaluation of the outcomes (economic, clinical, implementation) achieved (Tarlier, 2005; Vasileiou et al., 2012).

### 4.1. Configuring pilot-based evidence to context

A recurring theme in AHSN members' work experience around pilots was the need to configure them to meet the needs of a particular local context and timeframe. This involved careful attention to the local setting. One participant, for example, observed:

*We have to be considerate of our local context. I guess as much as you might have a one-size-fits all project, there are going to be local variances and local barriers that we need to address, and part of our role is to facilitate the appropriate discussions with the appropriate people to try to come to some sort of agreement that's mutually beneficial and I guess a win-win for all. (Innovation Adoption, Senior)*

Participants described how in mobilizing different forms of evidence they sought to assemble a 'jigsaw puzzle' made up of interdependencies between types of innovation (e.g. digital, device, diagnostic), and the stakeholders within particular local contexts.

Configuring to context involved generating and framing different forms of evidence according to the stakeholder audiences involved and the type of innovation. This required understanding and working with the perspectives applied by different groups. One participant noted of doctors 'What they're looking for is the clinical evidence/clinical utility ... how it improves patients' lives'. In contrast, 'with managers, and procurement managers ... it's the financial return of investment'. Faced with these different perspectives, AHSN staff sought to ensure that multiple, different but complementary forms of evidence were produced from pilots that would enable the innovation to move forward in its journey. As one AHSN member put it, they sought to work with different groups so as to 'get in their heads in the right space ... so you can then guide around the data, information and evidence that they're going to need to produce, in order to achieve that next step. Quite often, clinical teams are focused on patient outcomes and efficacy. Forget about the fact that there's going to need to be somebody paying for this, at some point in the future, and miss out the business element'.

Configuring was also dependent on the innovation's positioning in the innovation journey. In the early phases, the main emphasis of pilot studies was on proof of concept, focussing on producing early evidence of efficacy and effectiveness. Depending on the type of innovation, evaluation designs might encompass experimental designs, e.g., Randomised Control Trials, or observational or descriptive designs. In subsequent phases, the purpose of pilots shifted towards producing evidence on real-world feasibility and acceptability among users, e.g., staff and patients.

### 4.2. Transitioning evidence

Movement along the innovation journey involved the capacity to transition evidence over time and different contexts. AHSN members' capacity to do so benefitted from their intermediary status, and the longer time horizon associated with spreading innovations. As one noted;

*Moving that forward into future projects, data evaluation and collection of qualitative or quantitative data is something I make sure is very, very early within our project proposals ....which then in turn allows us to improve impact and implement things in a sustainable way, which we can then lead to further-wider adoption and spread. (Innovation Adoption, Operational)*

Such transitioning work involved a close understanding of different perspectives, and the ability to re-frame the evidence so as to co-construct the meaning of innovations with different groups or contexts. As one AHSN member observed;

*I think we do some work with that ... so that when people get their data that we are able to help them articulate what that really means. ... Being really clear about the type of value you're providing, whether it's bed*

days, nursing hours or days, or patient ... saving 100 bed days is quite a good pitch if you're talking to an investor. They get excited about that, but someone in procurement will go, 'Bollocks!' So you need to adjust your pitch. (Commercial Director, Senior)

AHSN staff also sought to codify and 'package' the evidence to make it comprehensible and meaningful in different settings. As one observed;

*If you can provide them with that one-pager about the offering and the benefits, they can then use that one-pager to go to the boss and go, 'Great, we've got a fantastic innovation, I think it sounds really good, here's a one-pager.'* (Commercial Director, Senior).

To pre-empt the need for further pilots, our AHSN participants emphasized the value of 'real world' evidence:

*What the real-world validation does is it shows you how you can do it in the next place and the next place and the next place, and it gives the business with the product the opportunity to say, 'No, we don't need to pilot this, because we did it in this environment in that Trust.'* (Commercial Director, Senior)

The importance of this kind of transitioning work can be conveyed most clearly through a vignette from our study in which one of our participants described how an innovation aimed at preventing urinary tract infections (UTIs) moved from development to spread across England, as follows.

### 1. Early phase (development)

'We started off really small with four care homes trying to reduce urinary tract infections with care home residents, and in getting a test change that we can put in place that actually is achievable within the care homes [...] We identified the four care homes with the highest urinary tract infections in the region and then we put in place a simple innovation of just seven structured drinks around every day [...] Basically, we did that, we tested that, refined the changes, did that for about eight months, saw improvements [...] so you have to like scale it to get that benefit. [...] We measured reduction in antibiotics, so we thought okay, this is going well [...] we'd adapted to what they said worked well, they said it was easy to implement, it was cost neutral, so then we spread it to another five care homes'.

### 2. Middle phase

'We took the highest ones with UTI admissions to hospital, baselined their data for UTIs requiring antibiotics, and then looked at the data for 18 months, so pilot one, and then probably eight months or pilot two, found that we had consistent improvement. That's when we decided to take it further to basically to spread it throughout the whole of [the region's] care homes, and then what we did is we got a grant from Health Education England'.

### 3. Late phase

'We did some training alongside it [...] Then we designed a toolkit if anybody nationally wanted to then run the same project, we released our measurement tools, our how to do it, a toolkit on how to do it, all of our posters that we used, stuff like that, so we literally put it into a package so that it could be realized. Then, because we were getting loads of interest through social media, we won certain awards for it, so that obviously generated interest. It was really great to be able to point people towards if you want to roll this out here, this is what you do [...].'

This vignette shows how the transitioning of evidence from pilots helped to carry the innovation forward across various phases in the innovation journey. In the early phase, we see the configuring of evidence to context; what is 'achievable within care homes', a 'simple innovation' and 'easy to implement', with evidence collected using

specific measures of efficacy and effectiveness. The innovation's benefits were thus realized and evidenced by adapting it to a localized context. Transitioning from the early to the middle phase involved transforming that localized evidence via a series of pilots within an AHSN region to meet the needs of a wider range of 'real-world' contexts. In the move to the late phase, transitioning involved the packaging of evidence and supporting materials for implementation – for example, training - which could help to spread the programme to a wider audience on a national level. At the same time, we also observe the feedback effect from early to later adopters as implementation of the innovation itself helps to generate further interest; '... if you want to roll this out here, this is what you do'.

#### 4.2.1. Challenges across transitions

The above examples discussed the transitioning of evidence along the innovation journey. Where such transitioning failed, however, and evidence failed to travel across contexts or be sustained over time, participants typically characterised it in terms of 'pilotitis'. This might mean a lack of sustainability:

*They used to say there were more pilots than British Airways, and they were right. [...] So, we had pilots that ran for years that were never rubber stamped to say, 'Business as usual.' I think that's the bottom line.* (Commercial lead, Senior)

Or pilotitis might denote the unnecessary repetition of pilots in different contexts:

*There are always the people who want to see evidence that's been generated in their area ... We'll capture evidence around it. We'll measure it again. Then, we'll make a decision. Rather than taking and trusting evidence which has been generated elsewhere and assuming that will be transferrable into their area.* (Business support, operational)

From the AHSN perspective, pilotitis arose because stakeholders were unwilling to accept the transferability of 'evidence which has been generated elsewhere'. Where this happened, innovators were seen to be locked in a vicious circle:

*The challenge that we have seen around that is usually innovators they go through a perpetual cycle of trying to show, every time, that actually the innovation works in the clinical setting they're addressing. They go through a series of pilots without actually being able to spread. It's every time, starting from zero.* (Commercial lead, Senior)

What this extract makes clear, however, is that pilotitis was symptomatic of underlying tensions in the mobilization of evidence for innovations; between the demands, respectively, of configuring evidence to context, and of transitioning evidence along the innovation journey. Where pilot studies are configured, as in the above quote, on 'trying to show ... that actually the innovation works in the clinical setting they're addressing', the ability to transition that evidence to other settings may be compromised. Rather than transitioning, the evidence at subsequent sites in the innovation journey is 'starting from zero'.

#### 4.3. Managing transitions

This theme highlights how AHSN staff sought to avert pilotitis by using their intermediary role to manage the transitions of evidence. This involved creating the social and cognitive underpinnings that would allow evidence to travel and be trusted in other settings. It involved, first, creating greater connectivity between phases of the innovation journey by building social networks across organizational boundaries and involving key groups, including later phase stakeholder groups, in pilot evidence production. As one commercial lead noted;

*I think one of the key elements that I see that we need more and more is who are the key players from the early conversations involved for an evaluation for a pilot? If you just involve only the clinical lead and the*

*innovation, then you're missing out the data that can support around procurement and return of investment. If you have a pilot with a transformation lead, but you are missing the clinical lead, again, you are missing ... I think all of these parties need to be involved in order to capture evidence that, actually, will speak to their language and to their needs.* (Commercial Director, Senior)

Participants discussed the need to build more widely-based communities around an innovation to facilitate future spread and sustainability. For example, another Commercial Director discussed 'a year-long, real-world evaluation working with clinicians, working on the building the health economic case, working on building up a stakeholder community'. Building such communities would help to pre-empt the need for additional pilots; 'They're taking it as face value, as it were, that the evidence that we've provided is sufficient and there is enough of an effect on patient outcomes that it should just be done.'

While stakeholder communities could help to facilitate the spread of innovations through shared understandings of their value, a further strand of work sought to do so by brokering knowledge between groups. AHSN staff sought to share the learning from pilot implementation studies via implementation guides. They also ensured that the learning from the experience of pilot implementations was widely communicated to other prospective adopters to build knowledge and awareness. As one AHSN senior manager put it;

*It's easy to sell to one or two hospitals but there's 200 of them, so if you have to go to 200 and hand-hold them through a bespoke process every time, it's impossible. What you do actually need to do is to build an understanding of the challenges around implementation that mean it's transferable to the next organisation. You almost have to describe how to adapt the product within a pathway when it goes to another organisation.* (Commercial Director, Senior)

This desire for real-world validation shows how AHSN staff sought to manage transitions more effectively by framing the innovation at each phase of the innovation journey appropriately for relevant groups. By balancing the generalizability and context specificity of pilot-based evidence in this interpretive work, some of the tensions between configuring to context, and transitioning the evidence, could be mitigated.

## 5. Discussion and conclusions

Our study makes a number of contributions to theoretical and policy development in this area. First, our study sheds new light on the role of pilot-based evidence by highlighting the transitioning of such evidence between groups and contexts. While previous studies have acknowledged the contextually contingent role of pilot-based evidence in spreading and sustaining evidence (Fitzgerald et al., 2002; Martin et al., 2012; Hendy and Barlow, 2013), these accounts have not drawn out the implications of these insights for the wider innovation journey. As our findings show, however, transitioning pilot-based evidence required transforming the evidence from an initial local context to satisfy later phase contexts of the innovation journey. This may be characterised as a process of 'decontextualization' and 'recontextualization', such that data generated in one context is repurposed as meaningful evidence in a new context (Green et al., 2023; Durrant et al., 2023), thereby supporting what Martin et al. (2012) term 'discourses of value'. As we observed, such transitioning work enabled the evidence-base to track the innovation's journey, shifting from an initial focus on clinical efficacy and resource efficiency to real world concerns centred on implementation outcomes, thus mitigating to some degree the context-dependency constraint on the spread of innovations in healthcare.

Second, we extend previous work (Taylor et al., 2015; Barlow, 2016) by showing how the limited generalizability of pilot-based evidence is not an inescapable consequence of their exceptional status within the healthcare system, but, at least in part, a product of how the tensions are

managed between the demands of evidence generation in the initial local context, and the transitioning of evidence to later phases of the innovation journey.

Third, we contribute to a greater understanding of the role of different forms of agency in healthcare innovation. Much work has focussed on the agency of managerial and professional groups in creating the need for a plurality of evidence forms through the deployment of distinct occupational perspectives. In contrast, our study shows how the intermediary positioning of AHSNs within the healthcare system helped them in their efforts to proactively manage the tensions and dilemmas of working across and with a plurality of evidence and perspectives. Our findings here speak to the Durrant et al. (2023) call for greater understanding of the practical craft of mobilizing evidence by those in intermediary roles. Importantly, a feature of their positioning along the innovation journey was a longer-term temporal orientation which counteracted the short-term timescale of localized pilot studies, and enabled AHSN staff to engage in the necessary transitioning of evidence along the innovation journey. This finding highlights the importance of the sometimes neglected temporal dimension in evidence mobilization for innovation spread and sustainability (Martin et al., 2012), and complements work on the temporal ordering of leadership roles in innovation (Currie and Spyridonidis, 2019).

Fourth, our study shows how, under certain conditions, evidence can be transitioned to create a positive linkage between early adopting sites and the wider spread and sustainability of innovations – helping to establish, as per our earlier vignette, some kind of momentum. In this respect, our findings contribute to the wider effort to theorize the interplay between the implementation and spread of innovations by showing how in the healthcare environment this is dependent not only on inter-organizational conditions but also on the inter-occupational dynamics of evidence mobilization (Ansari et al., 2010; Greenhalgh et al., 2017; Scarbrough and Kyrtasis, 2021). In particular, while classical diffusion theory views early adoption as providing clear signals to later adopters, our study suggests that the capacity of pilot-based evidence to provide such a linking mechanism may be dependent on the particular forms of intermediary work highlighted in our study.

From a policy and practitioner standpoint, the analysis of our findings points the way towards actions which may serve to enhance the role of pilots in spreading innovation and to mitigate the risks of pilotitis. In particular, a greater understanding of the role of pilots in spreading innovations can help compensate for their outlier status and support the bridging of transitions. This runs counter to the observed tendency, highlighted previously, for pilots to be designed and conducted in a way which meets the immediate needs of local implementation but which creates greater barriers to the onward mobilization of evidence. Designing pilots within highly controlled and supportive settings may facilitate more successful outcomes locally, but makes them less representative of the wider healthcare system, and therefore potentially less effective as an early site for mobilizing evidence and shared learning to a wider audience of prospective adopters. On the other hand, our study shows that there are ways in which intermediary organizations can help smooth the mobilization of pilot-based evidence across transitions by involving, and sharing learning with, a wider group of stakeholders and prospective adopters (Horton et al., 2018; Lemieux-Charles et al., 2002). In a similar vein, our study suggests that the evaluation methods used in pilots may also need to be reviewed to become more oriented towards onward spread rather than local implementation efforts. This involves a greater focus on real world evidence, addressing the outcomes of implementation more holistically, to overcome the shortcomings of traditional controlled research designs (WHO, 2011; Skivington et al., 2021).

### 5.1. Limitations and future research

The relative lack of empirical evidence and previous literature on the role of intermediary groups in spreading innovation via pilot-based

evidence required a broad exploratory focus. Future research opportunities may encompass both more systematic large-scale work, as well as more detailed longitudinal or micro-level investigation. Our study is also bounded by our reliance on the perceptions of AHSN members only and not other stakeholder groups in the wider innovation ecosystem. In discussion of pilotitis, for example, we recognize that what may seem to be an unnecessary obstacle to AHSN staff may seem to be a necessary step to others. Further research could explore the views of other groups, including other intermediaries, innovators and adopters.

### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### Data availability

The authors do not have permission to share data.

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### Appendix A. Supplementary data

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### References

- Ansari, S.M., Fiss, P.C., Zajac, E.J., 2010. Made to fit: how practices vary as they diffuse the *Academy of Management Review* (AMR), 35 (1), 67–92.
- Ashworth, R.E., McDermott, A.M., Currie, G., 2019. Theorizing from qualitative research in public administration: plurality through a combination of rigor and richness. *J. Publ. Adm. Res. Theor.* 318–333.
- Asthana, S., Jones, R., Sheaff, R., 2019. Why does the NHS struggle to adopt eHealth innovations? A review of macro, meso and micro factors. *BMC Health Serv. Res.* 19, 984.
- Balas, E.A., Chapman, W.W., 2018. Road map for diffusion of innovation in health care. *Health Aff.* 37 (2), 198–204.
- Barlow, J., 2016. *Managing Innovation in Healthcare*. World Scientific.
- Barnett, J., Vasileiou, K., Djemil, F., et al., 2011. Understanding innovators' experiences of barriers and facilitators in implementation and diffusion of healthcare service innovations: a qualitative study. *BMC Health Serv. Res.* 11 (1), 1–12.
- Bégin, H.M., Eggertson, L., Macdonald, N., 2009. A country of perpetual pilot projects. *Can Med Assoc* 180 (12), 1185.
- Bhatia, A., Matthan, R., Khanna, T., Balsari, S., 2020. Regulatory sandboxes: a cure for mHealth pilotitis? *J. Med. Internet Res.* 22 (9), e21276.
- Bowman, et al., 2008. Measuring persistence of implementation: QUERI series. *Implement. Sci.* 3 (21).
- Castle-Clarke, S., Edwards, N., Buckingham, H., 2017. Falling short: why the NHS is still struggling to make the most of new innovations. In: *Nuffield Trust* (Issue December).
- Charif, A.B., Zomahoun, H.T.V., LeBlanc, A., et al., 2017. Effective strategies for scaling up evidence-based practices in primary care: a systematic review. *Implement. Sci.* 12 (1), 139.
- Clifford, G.D., 2016. E-health in low to middle income countries. *J. Med. Eng. Technol.* 40 (7–8), 336–341.
- Compagni, A., Mele, V., Ravasi, D., 2014. How early implementations influence later adoptions of innovation: social positioning and skill reproduction in the diffusion of robotic surgery. *Acad. Manag. J.*: amj 1184, 2011.
- Côté-Boileau, E., Denis, J.L., Callery, B., Sabean, M., 2019. The unpredictable journeys of spreading, sustaining and scaling healthcare innovations: a scoping review. *Health Res. Policy Syst.* 17 (1), 84.
- Currie, G., Spyridonidis, D., 2019. Sharing leadership for diffusion of innovation in professionalized settings. *Hum. Relat.* 72 (7), 1209–1233.
- Currie, G., El Enany, N., Lockett, A., 2014. Intra-professional dynamics in translational health research: the perspective of social scientists. *Soc. Sci. Med.* 114, 81–88.
- Davis, G.F., Marquis, C., 2005. 'Prospects for organization theory in the early twenty-first century: institutional fields and mechanisms. *Organ. Sci.* 16 (4), 332–343.
- Dearing, J.W., Cox, J.G., 2018. 'Diffusion of innovations theory, principles, and practice. *Health Aff.* 37 (2), 183–190.
- Dedoose, 2018. *Web Application for Managing, Analyzing, and Presenting Qualitative and Mixed Method Research Data* (8.0.35). SocioCultural Research Consultants, LLC.
- Desveaux, L., Soobiah, C., Bhatia, R.S., Shaw, J., 2019. Identifying and overcoming policy-level barriers to the implementation of digital health innovation: qualitative study. *J. Med. Internet Res.* 21 (12), e14994.
- Dopson, S., FitzGerald, L., Ferlie, E., et al., 2002. No magic targets! Changing clinical practice to become more evidence based. *Health Care Manag. Rev.* 27 (3), 35–47.
- Durrant, H., Havers, R., Downe, J., Martin, S., 2023. Improving Evidence Use: a Systematic Scoping Review of Local Models of Knowledge Mobilisation. *Evidence & Policy*, pp. 1–23.
- Ettelt, S., Mays, N., Allen, P., 2014. The multiple purposes of policy piloting and their consequences: three examples from national health and social care policy in England. *J. Soc. Pol.* 44 (2), 319–337.
- Evans, S., Scarbrough, H., 2014. 'Supporting Knowledge Translation through Collaborative Translational Research initiatives: 'Bridging' versus 'blurring' boundary-Spanning Approaches in the UK CLAHRC Initiative' *Social Science & Medicine*.
- Ferlie, E., Fitzgerald, L., Wood, M., Hawkins, C., 2005. The nonspread of innovations: the mediating role of professionals. *Acad. Manag. J.* 48 (1), 117–134.
- Ferlie, E., Nicolini, D., Ledger, J., et al., 2017. NHS top managers, knowledge exchange and leadership: the early development of Academic Health Science Networks – a mixed-methods study. *Health Serv. Deliv. Res.* 5 (17), 1–204.
- Fitzgerald, L., Ferlie, E., Wood, M., Hawkins, C., 2002. Interlocking interactions, the diffusion of innovations in health care. *Hum. Relat.* 55 (12), 1429–1449.
- Green, S., Hillersdal, L., Holt, J., Hoeyer, K., Wadmann, S., 2023. 'The practical ethics of repurposing health data: how to acknowledge invisible data work and the need for prioritization' *Medicine, Health Care and Philosophy* 26 (1), 119–132.
- Greenhalgh, T., Papoutsi, C., 2019. Spreading and scaling up innovation and improvement. *BMJ* 365, l2068.
- Greenhalgh, T., Robert, G., Macfarlane, F., Bate, P., Kyriakidou, O., Peacock, R., 2005. Storylines of research in diffusion of innovation: a meta-narrative approach to systematic review. *Soc. Sci. Med.* 61 (2), 417–430.
- Greenhalgh, T., Robert, G., MacFarlane, F., et al., 2004. Diffusion of innovations in service organizations: systematic review and recommendations. *Milbank Q.* 82 (4), 581–629.
- Greenhalgh, T., Wherton, J., Papoutsi, C., et al., 2017. Beyond adoption: a new framework for theorizing and evaluating nonadoption, abandonment, and challenges to the scale-up, spread, and sustainability of health and care technologies. *J. Med. Internet Res.* 19 (11), e367.
- Hendy, J., Barlow, J., 2013. Adoption in practice: the relationship between managerial interpretations of evidence and the adoption of a healthcare innovation. *Health Policy Technol.* 2 (4), 216–221.
- Horton, T.J., Illingworth, J.H., Warburton, W.H., 2018. Overcoming challenges in codifying and replicating complex health care interventions. *Health Aff.* 37 (2), 191–197.
- Huang, F., Blaschke, S., Lucas, H., 2017. Beyond pilotitis: taking digital health interventions to the national level in China and Uganda. *Glob. Health* 13 (1), 1–11.
- Lehoux, P., Hivon, M., Williams-Jones, B., Miller, F.A., Urbach, D.R., 2012. How do medical device manufacturers' websites frame the value of health innovation? An empirical ethics analysis of five Canadian innovations. *Med. Healthc. Philos.* 15, 61–77.
- Lemieux-Charles, L., McGuire, W., Blidner, I., 2002. Building interorganizational knowledge for evidence-based health system change. *Health Care Manag. Rev.* 27 (3), 48–59.
- Lundin, J., Dumont, G., 2017. Medical mobile technologies—what is needed for a sustainable and scalable implementation on a global scale?'. *Glob. Health Action* 10 (Suppl. 3), 1344046.
- Mantere, S., Kekokivi, M., 2013. Reasoning in organization science. *Acad. Manag. Rev.* 38 (1), 70–89.
- Martin, G., Weaver, S., Currie, G., Finn, R., McDonald, R., 2012. Innovation sustainability in challenging healthcare contexts: embedding clinically led change in routine practice. *Health Serv. Manag. Res.* 25 (4), 190–199.
- NICE, 2022. *NICE real-world evidence*. Available from: <https://www.nice.org.uk/corporate/ecd9/chapter/overview>.
- O'Mahony, S., Bechky, B.A., 2008. Boundary organizations: enabling collaboration among unexpected allies. *Adm. Sci. Q.* 53 (3), 422–459.
- Rhodes, T., Lancaster, K., 2019. Evidence-making interventions in health: a conceptual framing. *Soc. Sci. Med.* 238, 112488.
- Rogers, E.M., 2003. *Diffusion of Innovations*. Simon and Schuster, New York.
- Scarbrough, H., Kyratsis, Y., 2021. From spreading to embedding innovation in healthcare: implications for theory and practice. *Health Care Manag. Rev.* 47 (3), 1–9.
- Shaw, J., Shaw, S., Wherton, J., et al., 2017. Studying scale-up and spread as social practice: theoretical introduction and empirical case study. *J. Med. Internet Res.* 19 (7), e244.
- Skivington, K., Matthews, L., Simpson, S.A., et al., 2021. A new framework for developing and evaluating complex interventions: update of Medical Research Council guidance. *BMJ* 374, 374.
- Sobo, Elisa, 2009. *Culture and Meaning in Health Services Research*. Routledge, New York.
- Swan, J., Newell, S., Nicolini, D., 2016. *Mobilizing Knowledge in Health Care: Challenges for Management and Organization*. Oxford University Press.
- Tarlier, D., 2005. Mediating the meaning of evidence through epistemological diversity. *Nurs. Inq.* 12 (2), 126–134.

- Tavory, I., Timmermans, S., 2014. *Abductive Analysis: Theorizing Qualitative Research*. University of Chicago Press, Chicago.
- Taylor, J., Coates, E., Wessels, B., et al., 2015. Implementing solutions to improve and expand telehealth adoption: participatory action research in four community healthcare settings. *BMC Health Serv. Res.* 15 (1), 1–11.
- The AHSN Network, 2022. **Real-world evaluation to facilitate adoption at scale.** Available from: <https://www.ahsnnetwork.com/wp-content/uploads/2022/12/R58-Real-world-evaluation-to-facilitate-adoption-at-scale.pdf>.
- Thompson, J., 2022. A guide to abductive thematic analysis. *Qual. Rep.* 27 (5), 1410–1421.
- Van de Ven, A.H., Polley, D.E., Garud, R., Venkatraman, S., 1999. *The Innovation Journey*. Oxford University Press, New York.
- Vasileiou, K., Barnett, J., Young, T., 2012. The production and use of evidence in health care service innovation: a qualitative study. *Eval. Health Prof.* 36 (1), 93–105.
- WHO, 2011. *Beginning with the End in Mind: Planning Pilot Projects and Other Programmatic Research for Successful Scaling up*.