Diffusion of Innovations in Health Service Organisations

A systematic literature review

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FOREWORD BY
Sir Liam Donaldson
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In the mid-1990s, long before I became Chief Medical Officer, I met Michael Peckham who had just been appointed as the first Director of Research and Development for the National Health Service (NHS). He was scoping the role of the new research and development function. I suggested that he should give priority to health services research, and also that he should find a place for a programme looking at how, why and when research can be translated into beneficial change (either in clinical practice or in the provision of health services). We spent a couple of hours talking through this concept (which had not featured in Michael Peckham’s other meetings), and becoming increasingly fascinated by its potential for improving the NHS.

Subsequently, as a member of the Central Research and Development Committee, I did the preparatory work that led to the formation of the NHS Service Delivery and Organisation programme. ‘The SDO’, as it has come to be known, has funded numerous empirical research studies into the organisation and management of health services, as well as several systematic literature reviews. This review by Trisha Greenhalgh and her colleagues was part of a wider SDO-funded research programme on change management.

For those who are already working in a relevant field – the adoption of innovations, the implementation of best practice or the translation of research findings into service improvements – this book is of major significance. Not only does it synthesise the diverse fields of research that have a bearing on this complex issue, it genuinely breaks new ground in conceptualising and mapping a vast intellectual terrain in a way that provides insight and adds practical value. It summarises and builds on the excellent work done by Everett Rogers who wrote the original textbook Diffusion of Innovations in the 1960s. It focuses especially on the kind of complex and multifaceted innovations that we often need to introduce in health services, drawing extensively on the organisational and management (O&M) and knowledge management (KM) literature.

For those unfamiliar with the territory, who may be both enticed and somewhat confused by vocabulary such as the ‘innovation adoption curve’, ‘early adopters’, ‘laggards’, ‘opinion leaders’ and ‘champions’, this new work provides an accessible and balanced account of an immensely complex subject.

This book is a towering work of remarkable scholarship. It bathes in light what was previously a shadowland of opacity, misconception, theory-hopping and misplaced enthusiasm.

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How to read this book

This book is a detailed write-up of an extensive systematic review of over 1000 papers on the diffusion, spread and sustainability of innovation in health service organisations. The review raised methodological questions about how to undertake systematic reviews of complex bodies of evidence. The best way to read this book is probably to study the Summary Overview (page 1) and then turn to the chapter(s) that interest you most. Table 1.1 (page 23) also provides a useful overview of the different research literatures that contributed to this review.

If you want a quick revision of classical diffusion of innovations theory as developed by Everett Rogers and colleagues, turn to Section 1.1 (page 20). If you want to read about why the UK Department of Health were keen to explore the diffusion of innovations literature in 2002 when this work was commissioned, see Section 1.2 (page 22). The scope of this study – i.e. a broad-brush summary of what we included in, and what we omitted from, our research – is set out in Section 1.3 (page 25) and the definitions we used (such as ‘innovation’, ‘diffusion’ and so on) are given in Section 1.4 (page 26).

If you are particularly interested in the methodological issues raised by this review, for example if you plan to tackle a complex area of literature, you should read Chapter 2 (page 32). Chapter 3 (page 48) gives a brief overview of each of the 13 research traditions that we explored for this review. This is a long chapter and is useful for orientating yourself around the many different contributions to the literature on diffusion of innovations. You do not need to read it all before going on to the main results chapters, but you may like to return to it periodically.

The main results of the review are set out in the subsequent six chapters, divided into innovations (Chapter 4, page 83), adopters and adoption (Chapter 5, page 100), diffusion and dissemination (Chapter 6, page 114), the inner (organisational) context (Chapter 7, page 134), the outer (environmental) context (Chapter 8, page 157) and implementation and institutionalisation (Chapter 9, page 175). Each chapter includes a summary of key points on the first page.

In Chapter 10 (page 199), we offer a unifying model of diffusion of innovations in health service organisations (see page 201 for a summary diagram), and apply this model to four case studies of organisational innovations in health services. Chapter 11 (page 219) discusses the strengths and limitations of our method, suggests how it may be applied in a service context (page 220) and makes detailed suggestions for future research (including setting out areas where we believe further research is not needed—see page 225 et seq.).

Finally, we have provided additional detail for reference in the appendices, including our quality criteria for evaluating empirical studies (pages 234–242); the tables of included sources (pages 247–254); and the results from secondary and primary studies (pages 257–292). For the criteria we used to grade levels of evidence, see Box 2.4 (page 42).
Introduction and methods

Background. This book describes a systematic review of the literature on the diffusion, spread and sustainability of innovations in the organisation and delivery of health services. It was commissioned by the UK Department of Health via the National Health Service (NHS) Service Delivery and Organisation (SDO) Programme and undertaken between October 2002 and December 2003. The brief for the project was to inform the modernisation agenda set out in the white paper the NHS Plan and related policy documents. Although an earlier (draft) version was produced as an internal report for the SDO Programme, this book includes minor factual amendments and refinements of style and presentation but covers the same empirical material.

Scope. Our systematic review covered a very wide range of literature. It focused primarily but not exclusively on research studies in the service sector, and the health care sector in particular. In areas where this literature was sparse, or where a wider literature provided important theoretical, methodological or empirical information, we broadened the scope of the review accordingly. Given the breadth of the research question and the limitations of time and resources (funding was limited to £80 000 and the contract required a definitive report after 9 months), we did not attempt an encyclopaedic coverage of all possibly relevant literature. Throughout this book, we have indicated areas where we believe additional work should be undertaken.

Definitions. We define a systematic literature review as one undertaken according to an explicit, rigorous and reproducible methodology. Innovation in service delivery and organisation refers to a novel set of behaviours, routines and ways of working, which are directed at improving health outcomes, administrative efficiency, cost-effectiveness, or user experience, and which are implemented by means of planned and coordinated action. We distinguish between diffusion (a passive phenomenon of social influence), dissemination (active and planned efforts to persuade target groups to adopt an innovation) and implementation (active and planned efforts to mainstream an innovation). There is an ambiguity in the notion of sustainability (the more an innovation is sustained or ‘routinised’ in an organisation, the less the organisation will be open to new innovations). These definitions and inherent tensions are discussed in Section 1.3 (page 25).

Search strategy. We used a broad search strategy (described in detail in Section 2.3, page 35), covering 15 separate electronic databases as well as hand searching 30 journals in health care, health services research, organisation and management, and sociology literature. Despite this, our initial yield of relevant quality papers was disappointing. Searching references of references, using electronic tracking to forward track citations, and seeking advice from experts in the field added considerably to our yield. Details of included sources are given in Tables A.1–A.5 (pages 245–254).

Inclusion criteria. Our initial intention was to include studies that (a) had been undertaken in the health service sector; (b) had addressed
innovation in service delivery and organisation; (c) had looked specifically at the spread or sustainability of these innovations; and (d) had met stringent criteria for methodological quality as set out in Appendix 2 (page 234). In practice, as explained above, we used a pragmatic and flexible approach to inclusion that took account of the availability of research in different topic areas. We did not approach the literature as a whole with a strict and unyielding ‘hierarchy of evidence’. Rather, we used an iterative and pluralist approach to defining and evaluating evidence, as set out below.

**Making sense of the literature.** Our search strategy led us to scan over 6000 abstracts and identified around 1000 full-text papers and over 100 books that were possibly relevant, of which some 500 contributed to the analysis and are referenced in this book. It was initially very difficult to develop any kind of taxonomy of the literature, and indeed previous reviewers had used expressions such as ‘a conceptual cartographer’s nightmare’ to describe its theoretical complexity. In order to aid our own exploration of the literature, we developed a new technique, which we called ‘meta-narrative review’, described in detail in Chapter 2 (see in particular Box 2.1, page 33). In the initial mapping phase, we divided the literature broadly into research traditions and traced the historical development of theory and empirical work separately for each tradition. Within each tradition, we identified the seminal theoretical and overview papers using the criteria of scholarship, comprehensiveness, and contribution to subsequent work within that tradition, as described in detail in Box 2.2 (page 37). We then used these papers to identify, classify and evaluate other sources within that tradition.

**Data extraction and analysis.** We developed a data extraction form (adapted for different research designs), to summarise the research question, research design, validity and robustness of methods, sample size and power, nature and strength of findings, and validity of conclusions for each empirical study. We adapted the critical appraisal checklists used by the Cochrane Effective Practice and Organisation of Care Group for evaluation of service innovations, and added other checklists for qualitative research, mixed-methodology case studies, action research, and realist evaluation (these checklists are reproduced in Appendix 2, pages 234–242).

**Grading strength of evidence.** The grading system for strength of evidence is a modified version of the WHO Health Evidence Network system for public health evidence and is explained in more detail in Box 2.4 (page 42). Briefly, we classified evidence as strong (plentiful, consistent, high-quality), moderate (consistent and good quality), or limited (inconsistent or poor quality) and as direct (from research on health service organisations) or indirect (from research on other organisations).

**Data synthesis.** We grouped the findings of primary studies under six broad themes: (a) the innovation itself; (b) the adoption process; (c) diffusion and dissemination (including social networks, opinion leadership, and change agents); (d) the inner (organisational) context; (e) the outer (interorganisational) context; and (f) the implementation/sustainability process. Within each of these themes, we further divided data from the primary studies into subtopics. We built up a rich picture of each subtopic by grouping together the contributions from different research traditions. Because different researchers in different traditions had generally conceptualised the topic differently, asked different questions, privileged different methods, and used different criteria to judge ‘quality’ and ‘success’, we used narrative, rather than statistical, summary techniques. We highlighted the similarities and differences between the findings from different research traditions and considered reasons for

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*As explained on page 38, a research tradition is defined as a coherent body of theoretical knowledge and a linked set of primary studies in which successive studies are influenced by the findings of previous studies.
any differences from both an epistemological and an empirical perspective. In this way, heterogeneity of approaches and contradictions in findings could be turned into data and analysed systematically, allowing us to draw conclusions that went beyond statements such as, ‘the findings of primary studies were contradictory’ or that ‘more research is needed’.

**Developing and testing a unifying conceptual model.** We developed a unifying conceptual model based on the evidence from the primary studies. We applied this model to four case studies on the spread and sustainability of particular innovations in health service delivery and organisations. We purposively selected these case studies to represent a range of key variables: strength of evidence for the innovation, technology dependence, source of innovation (central or peripheral), setting (primary or secondary care), sector (public or private), context (UK or international), timing (historical or contemporary example), and main unit of implementation (individual, team or organisation). The case studies are described in Chapter 10 (page 199).

**Outline of research traditions**

We identified 13 major research traditions that had, largely independently of one another, addressed (or provided evidence relevant to) the issue of diffusion, dissemination or sustainability of innovations in health service delivery and organisations. We classified four of these as ‘early diffusion research’:

1. **Rural sociology**, where Rogers used his highly influential diffusion of innovations theory. In this tradition, innovations were defined as ideas or practices perceived as new by practitioners; diffusion was conceptualised as the spread of ideas between individuals, largely by imitation. The adoption decision was perceived as centring on the imitation of respected and homophilous individuals. Interventions aimed at influencing the spread of innovations focused on harnessing the interpersonal influence of respected individuals within a social network,* especially opinion leaders and change agents. Research in this tradition mapped the social network and studied the choices of intended adopters.

2. **Medical sociology**, in which similar concepts and theoretical explanations were applied to the clinical behaviour of doctors (most notably, the classic study by Coleman et al. on the spread of prescribing of newly introduced antibiotics). Early studies in medical sociology set the foundations for network analysis – the systematic study of ‘who knows whom’ and ‘who copies whom’ – and led to the finding that well-networked individuals are generally better educated, have higher social status, and are earlier adopters of innovations.

3. **Communication studies**, in which the innovation was generally new information (often ‘news’) and spread was conceptualised as the transmission of this information by either mass media or interpersonal communication. Research centred on measuring the speed and direction of transmission of news and on improving key variables such as the style of message, the communication channel (spoken or written, etc.) and the nature of the exposure of the intended adopter to the message.

4. **Marketing and economics**, in which the innovation was generally a product or service, and the adoption decision was conceptualised as a rational analysis of costs and benefits by the intended adopter. The spread of innovations was addressed in terms of the success of efforts to increase the perceived benefits or reduce the perceived costs of an innovation. An important stream of research in this tradition centred on developing mathematical models to quantify the influence of different approaches.

Early diffusion research as addressed by these traditions produced some robust empirical findings on...