

Diffusion of Innovations in Health Service Organisations

A systematic literature review

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FOREWORD BY

Sir Liam Donaldson

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Blackwell Publishing, Inc., 350 Main Street, Malden, Massachusetts 02148-5020, USA

Blackwell Publishing Ltd, 9600 Garsington Road, Oxford OX4 2DQ, UK

Blackwell Publishing Asia Pty Ltd, 550 Swanston Street, Carlton, Victoria 3053,
Australia

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First published 2005

Library of-Congress Cataloging-in-Publication Data

Diffusion of innovations in health service organisations : a systematic literature review/
Trisha Greenhalgh ... [et al.]; foreword by Sir Liam Donaldson.

p. ; cm.

Includes bibliographical references and index.

ISBN-13: 978-0-7279-1869-7 (alk. paper)

ISBN-10: 0-7279-1869-9 (alk. paper)

1. Medical care—Quality control. 2. Health services administration—Quality control. 3. Diffusion of innovations. 4. Medical care—Research—Methodology.

[DNLM: 1. Delivery of Health Care—trends. 2. Diffusion of Innovation. 3. Health Services Administration—trends. W 84.1 D569 2005] I. Greenhalgh, Trisha.

RA399.A1D54 2005

362.1'068'5—dc22

2005004104

ISBN-13: 978-0-7279-1-8697

ISBN-10: 0-7279-1869-9

A catalogue record for this title is available from the British Library

Set in 9.5/12pt Sabon by Kolam Information Services Pvt. Ltd, Pondicherry, India

Printed and bound in India by Gopsons Papers Ltd, Noida

Commissioning Editor: Mary Banks

Development Editor: Nick Morgan

Production Controller: Debbie Weyer

For further information on Blackwell Publishing, visit our website:

<http://www.blackwellpublishing.com>

The publisher's policy is to use permanent paper from mills that operate a sustainable forestry policy, and which has been manufactured from pulp processed using acid-free and elementary chlorine-free practices. Furthermore, the publisher ensures that the text paper and cover board used have met acceptable environmental accreditation standards.

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Acknowledgements

We are especially grateful to Richard Peacock for librarian input to this study.

This work would not have been possible without the support of the Department of Health Ser-

vice Delivery and Organisation Programme and the input of the following colleagues, friends and peer reviewers:

Amanda Band
Lindsay Forbes
Andrew Moore
Marcia Rigby
Anna Donald
Martyn Eccles
Chris Henshall

Mary Dixon-Woods
David Patterson
Mike Dunning
Diane Ketley
Mike Kelly
Francis Maietta
Paul Plsek

Gene Feder
Ray Pawson
Helen Roberts
Sandy Oliver
Huw Davies
John Øvretveit
Jennie Popay

Sarah Fraser
Jeremy Grimshaw
Stephanie Taylor
Jos Kleijnen
Stuart Anderson
Jerome Bruner

Foreword

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).

Summary overview

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*¹ 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.

*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.

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.² We highlighted the similarities and differences between the findings from different research traditions and considered reasons for

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 organisation. We classified four of these as ‘early diffusion research’:

1 Rural sociology, where Rogers³ first developed 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 individ-

uals 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.*⁵ 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.⁶

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.⁷

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.⁸

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

*As discussed in Section 6.1 (page 114), a social network is ‘the pattern of friendship, advice, communication and support that exists among members of a social system’.⁴

the attributes of innovations, the characteristics and behaviour of adopters, and the nature and extent of interpersonal and mass media influence on the adoption decision. However, the early tradition had a number of theoretical limitations, which are discussed in detail in Section 3.6 (page 58). Of particular note were the erroneous assumptions that (a) the only relevant unit of analysis is the individual innovation or the individual adopter; (b) an innovation is necessarily better than what has gone before and adoption is more worthy of study than non-adoption or rejection; (c) patterns of adoption reflect fixed personality traits; and (d) the findings of diffusion research are invariably transferable to new contexts and settings. Research traditions that emerged as developments – and sometimes as breakaways – from such conceptual models, include:

5 Development studies, in which a key concept was the political and ideological context of the innovation and any dissemination programme, and the different meaning and social value that particular innovations held in different societies and political contexts. Adoption of innovations was reframed as centrally to do with the appropriateness of particular technologies and ideas for particular situations at particular stages in development. Two important contributions from this tradition have been that (a) an innovation may hold a very different meaning for the agency that introduces it to that held by the intended adopters; and (b) ‘innovation–system fit’ (related to the interaction between the innovation and its potential context) is generally a more valid and useful construct than ‘innovation attributes’ (often assumed to be fixed properties of the innovation in any context).⁹

6 Health promotion, in which innovations were defined as good ideas for healthy behaviours and lifestyles, and the spread of such innovations was expressed as the reach and uptake of health promotion programmes in defined target groups. Health promotion research was traditionally framed around the principles of social marketing (developed from marketing theory – see above), but more recently, a more radical ‘developmental’ agenda has emerged in health promotion, with

parallels to development studies. In the latter, positive changes are increasingly seen in terms of the development, empowerment, and emerging self-efficacy of vulnerably communities rather than in terms of individual behaviour change in line with instructions disseminated outwards from central agencies.¹⁰

7 Evidence-based medicine (EBM) and guideline implementation, in which innovations are defined as health technologies and practices supported by good scientific evidence. Spread of innovation was initially couched in terms of behaviour change in individual clinicians in line with evidence-based guidelines. It is increasingly recognised in this research tradition that the implementation of most clinical guidelines requires changes to the organisation and the delivery of services and hence change at the organisational level as well as that of the individual clinician.¹¹ It is also increasingly recognised by some protagonists of EBM that the evidence base for particular technologies and practices is often ambiguous or contested – and must be interpreted and reframed in the light of local context and priorities.¹² Hence, the EBM research tradition now contains an inherent tension – between the traditional, highly rationalist and linear perspective in which evidence-based recommendations are seen as context-independent and depicted as flowing ‘like water through a pipe’ from their research source to the practitioner in the clinic, to a much more constructivist perspective in which the acquisition, dissemination, interpretation and application of evidence is seen as a ‘contact sport’ in which the meaning and value of evidence is negotiated at its point of use.¹³

8 Structural determinants of organisational innovativeness, in which innovation was seen as a product or process likely to make an organisation more profitable. Organisational innovativeness was seen as primarily influenced by structural determinants, especially size, functional differentiation (an internal division of labour), slack resources, and specialisation (the organisation has a clear ‘niche’ in which it offers expertise and specialist resources). In this tradition, research centred on collecting quantitative data about the formal structures of organisations, usually by

sending questionnaires to the chief executive officer (CEO). Such studies were among the few in our review that were amenable to meta-analysis.^{14–16}

9 Studies of organisational process, context and culture, in which the focus of research was the process of adoption, assimilation, and routinisation of an innovation. In this tradition, an organisation's innovativeness was explored in terms of 'softer', non-structural aspects of its make-up – especially the prevailing culture and climate, notably in relation to leadership style, power balances, social relations, and attitudes to risk-taking. This tradition used mainly qualitative (often ethnographic) methods, and centred on people and their relationships and behaviour. This stream of research has many overlaps with the mainstream change management literature, although there is also a distinct subtradition on innovation.^{17,18}

10 Interorganisational studies, in which an organisation's innovativeness was explored in relation to the influence of other organisations – in particular by interorganisational communication, collaboration, competition, and norm-setting. This tradition applied social network theory (the notion that people are 'networked' to friends and colleagues and that these networks form channels of communication and influence¹⁹) to the level of the organisation (e.g. the concept of the opinion-leading organisation was introduced and explored). Interorganisational norms ('fads and fashions') were seen as a key mechanism for the spread of ideas between organisations.^{20,21}

11 Knowledge-based approaches to innovation in organisations, in which both innovation and diffusion were radically re-couched in terms of the construction and distribution of knowledge.²² A critical new concept was the absorptive capacity of the organisation for new knowledge. Absorptive capacity is a complex construct incorporating the organisation's existing knowledge base, 'learning organisation' values and goals (i.e. those that are explicitly directed towards capturing, sharing and creating new knowledge), technological infrastructure, leadership and enablement of knowledge sharing, and effective boundary-spanning roles with other organisations.²³

12 Narrative organisational studies, in which one key dimension of organisational innovativeness – the generation of ideas – was couched in terms of the creative imagination of individuals in the organisation. An innovative organisation, according to this tradition, is one in which new stories can be told and which has the capacity to capture and circulate these stories.^{24,25} This research tradition emphasises the rule-bound, inherently conservative nature of large professional bureaucracies and celebrates stories for their inherent subversiveness. Because key constructions in stories are surprise, tension, dissent, and 'twists in the plot', and because characters can be imbued with positive virtues such as honesty, courage, or determination, stories can effectively embody 'permission to break the rules'.²⁶ In the narrative tradition, the diffusion of innovations within organisations is about constructing and bringing into action a shared story with a new ending. Hence, interventions to support innovation are directed towards supporting 'communities of practice' with a positive story to tell.

13 Complexity studies, derived from general systems theory, in which innovation is viewed as the emergent continuity and transformation of patterns of interaction, understood as ongoing, complex responsive processes of humans relating in local situations. Diffusion of innovations is seen as a highly organic and adaptive process by which the organisation adapts to the innovation and the innovation is adapted to the organisation.²⁷ This organic, adaptive process is not easily – and perhaps not at all – controllable by external change agencies.²⁸

These different research traditions vary considerably in how they conceptualise innovation and its spread. The dimension of controllability (from 'make it happen' to 'let it happen', with 'help it happen' lying somewhere in between) is one key dimension but not the only difference between these traditions. Figure 3.5 (page 82) illustrates where the 13 traditions lie on this dimension of controllability. One relevant tradition within organisation and management literature is organisational psychology, in which innovativeness is seen as critically dependent on good leadership, sound

decision-making, and effective human resource management (especially motivation, training and support of staff). We did not explore this literature in detail as it was the subject of several other projects funded by the Department of Health Service Delivery and Organisation Programme (see www.sdo.lshtm.ac.uk/changemanagement.htm).

A model of diffusion in service organisations

Figure 0.1 shows the unifying conceptual model that we derived from our synthesis of theoretical and empirical findings; the full-annotated model (which includes additional details of the key determinants of successful diffusion, dissemination and implementation) is shown in Fig. 10.1 (page 201). As noted in Chapter 11 (page 219), the model is intended mainly as an *aide memoire* for considering the different aspects of a complex situation and their many interactions. It should not be viewed as a prescriptive formula. The next section presents key empirical findings from across the different research traditions, organised broadly around the main components of the model.

Empirical findings from primary studies

On the basis of the combined evidence from all the above traditions, we addressed the seven key topic areas as set out below:

Innovations (Chapter 4, page 83)

Different innovations are adopted by individuals, and spread to other individuals, at different rates. Some are never adopted at all; others are subsequently abandoned. A very extensive evidence base from sociology (including medical sociology) supports the notion of key *attributes* of innovations (as perceived by prospective adopters), which explain a high proportion of the variance in adoption rates between innovations. Rogers³ authoritative review and the conclusions given below are based on a number of more recent empirical studies of service innovations in the health care field (see Chapter 4 for full references):

1a. Relative advantage: Innovations that have a clear, unambiguous advantage in terms of either effectiveness or cost-effectiveness will be more easily adopted and implemented (strong indirect and moderate direct evidence^{3,29-31}). If a potential user sees no relative advantage in the innovation,

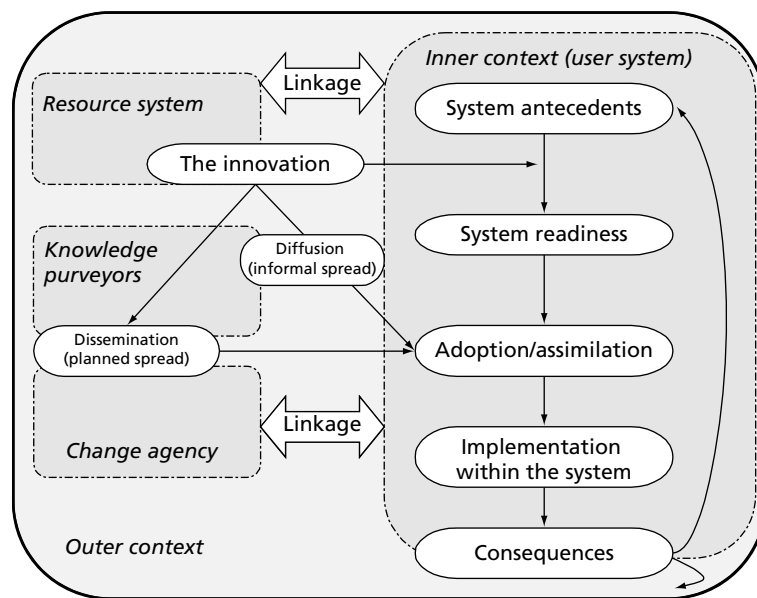


Fig. 0.1 Conceptual model for considering the determinants of diffusion of innovations in the organisation and delivery of health services.

he or she does not generally consider it further: in other words, relative advantage is a sine qua non for adoption (strong direct and moderate indirect evidence³). Nevertheless, relative advantage alone does not guarantee widespread adoption (strong direct evidence^{11,32,33}). Even so-called ‘evidence-based’ innovations go through a lengthy period of negotiation amongst potential adopters, in which their meaning is discussed, contested and reframed; such discourse can increase or decrease the perceived relative advantage of the innovation (moderate direct evidence¹²).

1b. *Compatibility*: Innovations that are compatible with the values, norms and perceived needs of intended adopters will be more readily adopted (strong direct evidence^{3,12,33–35}). Compatibility with organisational or professional norms, values and ways of working is an additional determinant of successful assimilation (strong direct evidence^{12,12,33,36}).

1c. *Complexity*: Innovations that are perceived by key players as simple to use will be more easily adopted (strong direct evidence^{3,30,31,33,37,38}). Perceived complexity can be reduced by practical experience and demonstration (moderate direct evidence²⁸). If the innovation can be broken down into more manageable parts and adopted on an incremental basis, it will be more easily adopted (strong indirect and moderate direct evidence^{3,28}). In the organisational setting, if the innovation has few response barriers that must be overcome, it will be more easily assimilated (strong indirect and moderate direct evidence³). Interventions to reduce the number and extent of such response barriers improve the chances of successful adoption (limited evidence).

1d. *Trialability*: Innovations that intended users can experiment with on a limited basis will be more easily adopted and assimilated (strong direct evidence^{3,28,37,39}). Such experimentation can be encouraged through provision of ‘trialability space’ (strong indirect and moderate direct evidence^{3,28,40}).

1e. *Observability*: If the benefits of an innovation are visible to intended adopters, it will be more easily adopted (strong direct evidence^{33,37,38,40}). Initiatives to make the benefits of an innovation

more visible (e.g. through demonstrations) increase assimilation (limited evidence).

1f. *Reinvention*: If a potential adopter can adapt, refine or otherwise modify the innovation to suit his or her own needs, it will be more easily adopted (strong direct evidence^{3,31}). Reinvention is especially critical for innovations that arise spontaneously as ‘good ideas in practice’ and spread through informal, decentralised, horizontal social networks (moderate indirect evidence³). See also point 1g.

These ‘standard’ attributes (which, apart from reinvention, are extensively cited) are necessary but not sufficient to explain the adoption and assimilation of complex innovations in organisations. Additional key attributes are listed below (note that for clarity we have conflated some attributes that were considered separately by researchers):

1g. *Fuzzy boundaries*: Complex innovations in service organisations can be conceptualised as having a ‘hard core’ (the irreducible elements of the innovation itself) and a ‘soft periphery’ (the organisational structures and systems that are required for the full implementation of the innovation); the adaptiveness of the ‘soft periphery’ is a key attribute of the innovation (moderate direct evidence³³). The concept of soft periphery links with Rogers’ concept of reinvention (point 1f) and with ‘innovation–system fit’ as a key feature of system readiness (point 6b).

1h. *Risk*: If the innovation carries a high degree of uncertainty of outcome that the individual perceives as personally risky, it will be less likely to be adopted (strong direct evidence^{31,38}). The risks and benefits of an innovation are not evenly distributed in an organisation; the more the risk–benefit balance maps to the power base of the organisation, the greater its chance of assimilation (moderate direct evidence^{12,33}). Perceived risk can be reduced through familiarity and opinion leader endorsement (strong indirect evidence⁴¹).

1i. *Task issues*: If the innovation is relevant to the performance of the intended user’s work, and if it improves task performance, it will be more easily adopted (moderate direct and strong indirect

evidence³⁹). Interventions to enhance task relevance improve the chances of successful adoption (limited evidence). If the innovation is feasible, workable and easy to use, it will be more easily adopted (strong direct evidence^{34,38,39,42}). Interventions to improve the feasibility and workability of innovations for key staff members and teams improve the chances of successful adoption (limited evidence).

1j. Nature of the knowledge required to use it: If the knowledge required for the innovation's use can be codified and separated from one context so as to be transferred to a different context, it will be more easily adopted (strong indirect and moderate direct evidence^{35,43,44}).

1k. Augmentation/support: If a technology is supplied as an 'augmented product' (e.g. with customisation, training and a helpdesk), it will be more easily assimilated (strong indirect and moderate direct evidence³⁵).

In Chapter 4, we give a number of examples of studies that failed to support the importance of even the most well established innovation attributes in certain settings. This finding illustrates the important principle that the attributes are neither stable features of the innovation nor sure determinants of their adoption or assimilation. Rather, it is the *interaction* between the innovation, the intended adopter(s) and a particular context that determines the adoption rate.

Adoption by individuals (Chapter 5, page 100)

As discussed in Chapter 5, people are not passive recipients of innovations. Rather (and to a greater or lesser extent in different individuals), they seek innovations out, experiment with them, evaluate them, find (or fail to find) meaning in them, develop feelings (positive or negative) about them, challenge them, worry about them, complain about them, 'work round' them, talk to others about them, develop know-how about them, modify them to fit particular tasks, and attempt to improve or redesign them (often through dialogue with other users).

This diverse list of actions and feelings highlights the complex nature of adoption as a process,

and contrasts markedly to the widely cited 'adopter categories' ('early adopter', 'laggard' and so on) that have been extensively misapplied as explanatory variables. The empirical work reviewed in Section 5.1 (page 100) suggests that the latter are stereotypical and value-laden; they fail to acknowledge the adopter as an actor who interacts purposively and creatively with the innovation; and they are rarely helpful in informing us of why adoption patterns are the way they are for particular innovations in particular circumstances.

On the basis of the empirical evidence set out in Chapter 5, we have included seven key aspects of adopters and the adoption process in our overall model:

2a. General psychological antecedents: We identified a large literature from cognitive psychology on individual characteristics associated with propensity to adopt innovations in general (e.g. personality traits such as tolerance of ambiguity, intellectual ability, motivation, values, learning style and so on) to try out and use innovations in general. This evidence has been largely ignored by researchers studying the diffusion of innovations, and we did not cover it in this review because of the constraints of our project. Therefore, we have not made any recommendations on general psychological antecedents, but we strongly recommend that further secondary research be undertaken to link this literature with the findings presented here.

2b. Context-specific psychological antecedents: An intended adopter who is motivated and capable (in terms of specific goals, specific skills and so on) to use a particular innovation is more likely to adopt it (strong direct evidence^{12,39,45}). If the innovation meets an *identified need* in intended adopters, they are more likely to adopt it (strong indirect evidence^{41,46}). If the adoption of the innovation accords with behaviour congruent with the individual's identity ('this is something that someone like me would do in these circumstances'), it is more likely to be adopted (moderate direct evidence⁴⁷).

2c. Meaning: The meaning that the innovation holds for the intended adopter has a powerful influence on the adoption decision (strong indirect

and moderate direct evidence^{48,49}). If the meaning attached to the innovation by individual adopters is congruent with the meaning attached by top management, service users, and other stakeholders, assimilation is more likely (moderate indirect evidence⁵⁰). The meaning attached to an innovation is generally not fixed but can be negotiated and reframed, e.g. through discourse within the organisation or across interorganisational networks (strong direct evidence¹²). The success of initiatives to support such reframing of meaning varies and is not easy to predict (limited evidence).

2d. Nature of the adoption decision: The decision by an individual within an organisation to adopt a particular innovation is rarely independent of other decisions. It may be contingent (dependent on a decision made by someone else in the organisation), collective (the individual has a 'vote' but ultimately must follow to the decision of a group) or authoritative (the individual is told whether to adopt or not).³ Authoritative decisions (e.g. making adoption by individuals compulsory) may increase the chance of initial adoption by individuals but may also reduce the chance that the innovation is successfully implemented and routinised (moderate indirect evidence³).

Adoption is a process rather than an event, with different concerns dominating at different stages. The adoption process in individuals is generally presented as having five stages: awareness, persuasion, decision, implementation and confirmation (see Box 5.4, page 104).³ However, we found that a less well-known model, the concerns-based adoption model (CBAM) developed in relation to innovation in schools (see Section 5.2, page 103), better explained the findings of empirical studies of complex service innovations in an organisational context. The CBAM suggests three key issues, which we have included in our model:

2e. Concerns in the pre-adoption stage: Important prerequisites for adoption are that intended adopters be *aware* of the innovation; have sufficient *information* about what it does and how to use it; and be clear about how the innovation would affect them *personally*, e.g. in terms of costs (strong indirect evidence⁴⁶).

2f. Concerns during early use: Successful adoption of an innovation is more likely if the intended adopter has continuing access to *information* about what the innovation does, and to sufficient training and support on *task issues*, i.e. about fitting in the innovation with daily work (strong indirect evidence⁴⁶).

2g. Concerns in established users: Successful adoption of an innovation is more likely if adequate feedback is provided to the intended adopter on the consequences of the innovation (strong indirect evidence), and if the intended adopter has sufficient opportunity, autonomy and support to adapt and refine the innovation to improve its fitness for purpose (strong indirect evidence⁴⁶).

Assimilation by organisations (Chapter 5, page 100)

Most research into the diffusion of innovations has focused on simple, product-based innovations, for which the unit of adoption is the individual and diffusion occurs by simple imitation.³ It is important not to overgeneralise from this literature to complex, process-based innovations in service organisations, for which the unit of adoption (more usually called *assimilation* at this level) is the team, department or organisation – in which various changes in structures or ways of working will be required. In such circumstances, there is almost invariably a formal decision-making process, an evaluation phase or phases, and planned and sustained efforts at implementation. In other words, empirical work in the organisation and management field has shown clearly that successful individual adoption is but one component of the assimilation of complex innovations in organisations. The evaluation of organisational (system) readiness (points 6a–6f) and the crucial implementation phase (points 8a–8h) are considered separately below, but one overarching concept should be borne in mind about the assimilation process as a whole:

3a. The nature of assimilation: Whilst one large, high-quality study³⁸ demonstrated an organisational parallel to the 'stages' of individual adoption, comprising 'knowledge-awareness', 'evaluation-choice',

and ‘adoption-implementation’, the remaining empirical evidence was more consistent with an organic and often rather messy model of assimilation in which the organisation moved back and forth between initiation, development, and implementation, punctuated variously by shocks, setbacks and surprises (strong indirect and moderate direct evidence¹⁸).

Diffusion and dissemination (Chapter 6, page 114)

As described in Section 6.1 (page 114), the various influences that promote the spread of innovation can be thought of as lying on a continuum between pure diffusion (in which the spread of innovations is unplanned, informal, decentralised and largely horizontal or peer-mediated) and active dissemination (in which the spread of innovation is planned, formal, often centralised and tends to occur more through vertical hierarchies). Whilst mass media and other impersonal channels may create awareness of an innovation, interpersonal influence through social networks (defined as ‘the pattern of friendship, advice, communication and support that exists among members of a social system’⁴) is the dominant mechanism for diffusion. On the basis of the evidence reviewed in Chapter 6, we have identified a number of key aspects of communication and influence for our overall model:

4a. Network structure: Adoption of innovations by individuals is powerfully influenced by the structure and quality of their social networks (strong indirect and moderate direct evidence^{4,36,51}). Different groups have different types of social network. Doctors, for example, tend to operate in informal, horizontal networks while nurses more often have formal, vertical networks (moderate direct evidence).⁵¹ Different social networks have different types of influence – e.g. horizontal networks are more effective for spreading peer influence and supporting the construction and reframing of meaning; vertical networks are more effective for cascading codified information and passing on authoritative decisions (moderate indirect evidence and limited direct evidence).^{3,51}

4b. Homophily: Adoption of innovations by individuals is more likely if they are homophilous – i.e. similar in terms of socio-economic, educational, professional and cultural background – with current users of the innovation (strong direct evidence^{32,36,51}).

4c. Opinion leaders: Certain individuals have particular influence on the beliefs and actions of their colleagues (strong direct evidence^{5,52}).^{*} Expert opinion leaders influence through their authority and status; peer opinion leaders influence by virtue of representativeness and credibility (moderate direct evidence^{32,53}). Opinion leaders can have either a positive or a negative influence (moderate direct evidence⁵³). If a project is insufficiently appealing (e.g. in terms of clarity of goals, organisation and resources) it will not attract the support of key opinion leaders (strong indirect and moderate direct evidence^{3,53}).

4d. Harnessing opinion leader influence: Whilst the powerful impact of social influence (such as that of opinion leaders) in naturalistic settings (see above) is well established, active attempts to engage such individuals in planned change efforts have often had disappointing results. In trials where opinion leaders have been trained to influence the behaviour of their peers (e.g. to persuade fellow clinicians to follow a new guideline), the impact is generally positive in direction but small in magnitude (strong direct evidence⁵⁴). Failure to identify the true opinion leaders, and in particular, failure to distinguish between monomorphic opinion leaders (only influential for a particular innovation) and polymorphic opinion leaders (influential across a wide range of innovations) may limit the success of such intervention strategies (strong indirect and moderate direct evidence^{3,53}).

4e. Champions: Adoption of an innovation by individuals in an organisation is more likely if key individuals within their social networks are willing to back the innovation (strong indirect

^{*}The distinction between opinion leaders and early adopters should be carefully noted: opinion leaders are usually *not* the initial enthusiasts behind an innovation, but generally lie in the ‘late majority’ of adopters.

and moderate direct evidence^{38,55–57}). The different champion roles for organisational innovations include (a) the *organisational maverick*, who provides the innovators with autonomy from the rules, procedures and systems of the organisation so they can establish creative solutions to existing problems; (b) the *transformational leader*, who harnesses support from other members of the organisation; (c) the *organisational buffer*, who creates a loose monitoring system to ensure that innovators make proper use of organisational resources, while still allowing them to act creatively; and (d) the *network facilitator*, who defends develops cross-functional coalitions within the organisation (moderate indirect evidence⁵⁸).^{*} There is very little direct empirical evidence on how to identify, and systematically harness the energy of, organisational champions.

4f. Boundary spanners: An organisation is more likely to adopt an innovation if individuals who have significant social ties both within and outside the organisation,[†] and who are able and willing to link the organisation to the outside world in relation to this particular innovation, can be identified. Such individuals play a pivotal role in capturing the ideas that will become organisational innovations (strong indirect and moderate direct evidence^{3,59}). Organisations that promote and support the development and execution of boundary-spanning roles are more likely to become aware of, and assimilate, innovations quickly (moderate direct evidence^{12,60,61}).

4g. Formal dissemination programmes: In situations where a planned dissemination program is used for the innovation (e.g. led by an external change agency), this will be more effective if program organisers (a) take full account of potential adopters' needs and perspectives, with particular attention to the balance of costs and benefits for them; (b) tailor different strategies to the different demographic, structural and cultural features of different subgroups; (c) use a message with appro-

priate style, imagery, metaphors and so on; (d) identify and utilise appropriate communication channels; and (e) incorporate rigorous evaluation and monitoring against defined goals and milestones (strong indirect evidence³).

The diverse literature on diffusion and dissemination highlighted an important area of contestation in paradigms of diffusion. The vast majority of diffusion research has addressed proactively developed innovations (e.g. technologies or products developed in formal research programmes) for which the main mechanism of spread is centrally driven and controlled (what we have defined as dissemination). But many innovations in service delivery and organisation occur as 'good ideas' at the coalface, which spread informally and in a largely uncontrolled way (diffusion). This tension, which has received remarkably little attention in the literature we reviewed, is discussed in Section 6.6 (page 131).

The inner context: organisational antecedents for innovation (Chapter 7, page 134)

Different organisations provide widely differing contexts for innovations, and a number of features of organisations (both structural and 'cultural') have been shown to influence the likelihood that an innovation will be successfully assimilated (i.e. adopted by all relevant individuals and incorporated into 'business as usual').

5a. Structural determinants of innovativeness: We identified three previous meta-analyses that included both manufacturing and service organisations^{14–16,62} (Table A13, page 269) and 15 additional empirical studies (17 papers) from the service sector^{32,38,59,63–76}). Their findings are somewhat heterogeneous, although less so than is often claimed. They suggest that an organisation will assimilate innovations more readily if it is large, mature, functionally differentiated (i.e. divided into semi-autonomous departments and units), specialised,[‡] with

^{*}See Section 6.3 (page 126) for various alternative taxonomies.

[†]As explained in Section 6.4 (page 129), wide external ties are known as 'cosmopolitanism' in social network literature.

[‡]As Section 7.1 (page 134) explains, the term 'complexity' in organisation and management literature generally refers to a composite measure of the degree of specialisation, functional differentiation and professional knowledge.

foci of professional knowledge; if it has slack resources to channel into new projects; and if it has decentralised decision-making structures (strong direct evidence). Size is almost certainly a proxy for other determinants including slack resources and functional differentiation.

These structural determinants are significantly, positively and consistently associated with organisational innovativeness, but together they only account for less than 15% of the variation between comparable organisations. Furthermore, the relationship between structural determinants and innovativeness is moderated by, or contingent on, a number of additional factors (e.g. the radicalness of the innovation, whether it is administrative or technical, and the stage of adoption). There is little empirical evidence to support the efficacy of interventions to change an organisation's structure to make it more 'innovative', except that establishing semi-autonomous project teams is independently associated with successful implementation (see point 8a, page 14).

One important weakness of the literature on structural determinants of innovativeness is the assumption that they can be treated as variables whose impact can be isolated and independently quantified. For example, the empirical studies on organisational size implicitly assume that there is a 'size effect' that is worth measuring and that is to some extent generalisable. An alternative theoretical approach,⁷⁷ supported by a number of recent in-depth qualitative studies,^{12,64} suggests that the determinants of organisational innovativeness interact in a complex, unpredictable and non-generalisable way with one another.

There is consistent empirical evidence for two other non-structural determinants of organisational innovativeness:

5b. Absorptive capacity for new knowledge: An organisation that is able to systematically identify, capture, interpret, share, reframe and re-codify new knowledge; to link it with its own existing knowledge base; and to put it to appropriate use will be better able to assimilate innovations – especially those that include technologies (strong direct evidence^{12,61}). Prerequisites for absorptive capacity include the organisation's existing know-

ledge and skills base (especially its store of tacit, uncodifiable knowledge) and pre-existing related technologies, a 'learning organisation' culture and proactive leadership directed towards enabling knowledge sharing (strong direct evidence^{12,23,61}). The knowledge that underpins the adoption, dissemination and implementation of a complex innovation within an organisation is not objective or given. Rather, it is socially constructed, frequently contested and must be continually negotiated between members of the organisation or system. Strong, diverse and organic (i.e. flexible, adaptable and locally grown) intraorganisational networks (especially opportunities for interprofessional teamwork, and the involvement of clinicians in management networks and vice versa) assist this process and facilitate the development of shared meanings and values in relation to the innovation (moderate direct evidence^{12,61}).

A critical aspect of knowledge utilisation in health care organisations is the application of research evidence on the efficacy of health technologies. Health professionals should ensure that they and their staff are aware of new developments (and new definitions of what is obsolete) in diagnostic tests, drugs, surgical procedures and so on, and modify their practice accordingly. A major overview of high-quality qualitative studies on how research evidence is identified, circulated, evaluated and used in health care organisations⁷⁵ confirms those of mainstream knowledge utilisation literature, which suggest that before knowledge can contribute to organisational change initiatives, it must be *enacted and made social*, entering into the stock of knowledge constructed and shared by other individuals. Knowledge depends for its circulation on interpersonal networks, and will only diffuse if these social features are taken into account and barriers overcome.

5c. Receptive context for change: This composite construct incorporates a number of organisational features that have been independently associated with its ability to embrace new ideas and face the prospect of change.⁷⁸ An organisation with such a receptive context will be better able to assimilate innovations. In addition to absorptive capacity for new knowledge (point 5b), the components of receptive context include strong leadership, clear

strategic vision, good managerial relations, visionary staff in key positions, a climate conducive to experimentation and risk-taking, and effective data capture systems (strong indirect and moderate direct evidence^{18,61,69–71,75,76,78}). Leadership may be especially critical in encouraging organisational members to break out of the convergent thinking and routines that are the norm in large, well-established organisations (strong indirect evidence¹⁸).

The inner context: organisational readiness for innovation (Chapter 7, page 134)

An organisation may be amenable to innovation in general but not ready or willing to assimilate a particular innovation.* As shown in Fig. 0.1 (page 6) formal consideration of the innovation allows the organisation to move (or perhaps choose not to move) to a specific state of system readiness *for that innovation*. The elements of system readiness (discussed in Chapter 7, page 134, and also in Chapter 9, page 175, in relation to implementation and sustainability) are listed below.

6a. Tension for change: If staff perceive that the present situation is intolerable, a potential innovation is more likely to be assimilated successfully (moderate direct evidence⁷⁹).

6b. Innovation–system fit: An innovation that fits with the existing values, norms, strategies, goals, skill mix, supporting technologies and ways of working of the organisation is more likely to be assimilated (strong indirect and moderate direct evidence^{3,79}). See the related concept of ‘fuzzy boundaries’ (point 1g).

6c. Assessment of implications: If the implications of the innovation (including its knock-on effects) are fully assessed, anticipated and catered for, the innovation is more likely to be assimilated (strong indirect and moderate direct evidence^{3,79}). Most of the implementation issues set out in points 8a–8h are amenable to advance assessment and planning.

6d. Support and advocacy: If supporters of the innovation outnumber, and are more strategically

placed, than opponents, it is more likely to be assimilated (strong indirect and moderate direct evidence^{3,64,79}). See also ‘champions’ (point 4e).

6e. Dedicated time and resources: If the innovation has a budget line from the outset, and if resource allocation is (a) adequate and (b) recurrent, it is more likely to be assimilated (strong indirect and moderate direct evidence^{3,79}).

6f. Capacity to evaluate the innovation: If the organisation has tight systems and appropriate skills in place to monitor and evaluate the impact of the innovation (both anticipated and unanticipated), the latter is more likely to be assimilated and sustained (strong indirect and moderate direct evidence^{3,28,79}).

The outer context: interorganisational networks and collaboration (Chapter 8, page 157)

An organisation’s decision to adopt an innovation, and its efforts to implement and sustain it, depend on a number of external influences:

7a. Informal interorganisational networks: A key influence on an organisation’s adoption decision is whether a threshold proportion of comparable (homophilous) organisations have done so or plan to do so (strong direct evidence^{36,65,80,81}). A ‘cosmopolitan’ organisation (one that is externally well networked with others) will be more amenable to this influence (strong direct evidence^{36,65,80,81}). Interorganisational networks will only promote adoption of an innovation once this is generally perceived as ‘the norm’; until that time, networks can also serve to warn organisations of innovations that have no perceived advantages (strong indirect and moderate direct evidence^{21,32,81}). Integrative organisational forms (such as the UK NHS, Health Maintenance Organisations, and professionally led networks between health care providers), which link provider organisations through common management and governance structures or explicit shared values and goals, can promote the spread of innovation between member organisations (strong indirect and moderate direct evidence³¹).

7b. Intentional spread strategies: Formal networking initiatives, such as quality improvement

*As discussed in Section 10.4 (page 206), GP fundholding in the UK was a good example of this.

collaboratives⁴⁰ or ‘Beacon’ schemes,⁷² aimed at promoting sharing of ideas and knowledge construction, are sometimes but not always effective (moderate direct evidence^{82–86}). Such initiatives are often expensive and the gains from them difficult to measure; evidence on their cost-effectiveness is limited. Key success factors from health care quality improvement collaboratives include (a) the nature of the topic chosen for improvement (comparable with attributes of the innovation discussed in points 1a–1k); (b) the capacity and motivation of participating teams – in particular their leadership and team dynamics; (c) the motivation and receptivity to change of the organisations they represent; (d) the quality of facilitation – in particular the provision of opportunities to learn from others in informal space; and (e) the quality of support provided to teams during the implementation phase (moderate direct evidence⁴⁰).

7c. Wider environment: The evidence base for the impact of environmental variables on organisational innovativeness in the service sector is sparse and heterogeneous, with each group of researchers exploring somewhat different aspects of the ‘environment’ or ‘changes in the environment’. Environmental uncertainty has either a small positive impact or no impact on innovativeness (moderate direct evidence^{38,59,63}), and there may be small positive effects from interorganisational competition and higher socio-economic status of patients/clients (limited evidence).

7d. Political directives: Whilst this review was not designed to tap centrally into the literature on policymaking and its impact, some empirical studies on innovation formally measured the effect of the policy context on the adoption of a particular innovation. A policy ‘push’ occurring at the early stage of implementation of an innovation initiative can increase its chances of success, perhaps most crucially by making a dedicated funding stream available (strong direct evidence^{32,87–89}). External mandates (political ‘must-dos’) increase the predisposition (i.e. the motivation), but not the capacity, of an organisation to adopt an innovation (moderate direct evidence⁹⁰); such mandates (or the fear of them) may divert activity away from innovations as organisations seek to second-guess what they will be required to do next

rather than focus on locally generated ideas and priorities (strong indirect and moderate direct evidence^{88,91}).

Implementation and routinisation (Chapter 9, page 175)

Implementation has been defined as ‘the early usage activities that often follow the adoption decision’.⁹¹ The evidence on implementation of innovations was particularly complex and relatively sparse; it was difficult to disentangle from that on change management and organisational development. Implementation depends on many of the factors already covered above in relation to the initial adoption decision and the early stages of assimilation. At the organisational level, the move from considering an innovation to successfully routinising it is generally a non-linear process characterised by multiple shocks, setbacks and unanticipated events,¹⁸ as discussed in point 3a. The key components of system readiness for an innovation have been discussed above (points 6a–6f) and are highly relevant to the early stages of implementation. In addition, a number of additional elements are specifically associated with successful routinisation:

8a. Organisational structure: An adaptive and flexible organisational structure, and structures and processes that support devolved decision-making in the organisation (e.g. strategic decision-making devolved to departments; operational decision-making devolved to teams on the ground), will enhance the success of implementation and the chances of routinisation (strong indirect evidence^{18,91}).

8b. Leadership and management: Top management support, advocacy of the implementation process and continued commitment to it will enhance the success of implementation and routinisation (strong indirect and moderate direct evidence^{79,91,92}). If the innovation aligns with the prior goals of both top and middle management, and if leaders are actively involved and frequently consulted, it is more likely to be routinised (moderate direct evidence⁷⁹). See also ‘champions’ (point 4e).

8c. Human resource issues: Successful routinisation of an innovation in an organisation depends

on the motivation, capacity and competence of individual practitioners (strong direct evidence⁷⁹). Early and widespread involvement of staff at all levels, perhaps through formal facilitation initiatives, enhance the success of implementation and routinisation (strong indirect and moderate direct evidence^{91,93}). Where job changes are few and clear, high-quality training materials are available and timely on-the-job training is provided, successful and sustained implementation is more likely (strong indirect and moderate direct evidence^{79,91,92,94}). Team-based training may be more effective than individual training where the learning involves implementing a complex technology (moderate direct evidence⁹⁵).

8d. Funding: If there is dedicated and ongoing funding for implementation, the innovation is more likely to be implemented and routinised (strong direct evidence^{32,79,87,92,96}).

8e. Intraorganisational communication: Effective communication across structural (e.g. departmental) boundaries within the organisation will enhance the success of implementation and the chances of routinisation (strong indirect and moderate direct evidence⁹¹). A narrative approach (i.e. the purposive construction of a shared and emergent organisational story of ‘what we are doing with this innovation’) can serve as a powerful cue to action (moderate indirect and limited direct evidence^{25,97}).

8f. Extraorganisational networks: The greater the complexity of the implementation needed for a particular innovation, the greater the significance of the interorganisational network for implementation success (moderate indirect evidence^{91,98}).

8g. Feedback: Accurate and timely information on the impact of implementation process (through efficient data collection and review systems) increases the chance of successful routinisation (strong indirect and moderate direct evidence^{11,92}).

8h. Adaptation/reinvention: If an innovation is adapted to the local context, it is more likely to be successfully implemented and routinised (strong indirect and moderate direct evidence^{3,40,79}). See also ‘reinvention’ (point 1f) and ‘fuzzy boundaries’ (point 1g).

Linkage between components of the model

As explained in Chapters 4–9, there is some empirical evidence (and also robust theoretical arguments) for building strong links between different parts of the system depicted in Fig. 0.1 (page 6). Specific success factors included in our model (which are covered in the various individual results chapters) are:

9a. Linkage at development stage: An innovation that is centrally developed (e.g. in a research centre) is more likely to be widely and successfully adopted if the developers or their agents are linked with potential users *at the development stage* in order to capture and incorporate the user perspective (strong indirect evidence³). Such linkage should aim not merely for ‘specification’ but for a shared and organic (developing, adaptive) understanding of the meaning and value of the innovation-in-use, and should also work towards shared language for describing the innovation and its impact.

9b. Role of the change agency: If a change agency is involved with a dissemination programme, the nature and quality of any linkage with intended adopter organisations will influence the likelihood of adoption and the success of implementation (strong indirect and moderate direct evidence). In particular, human relations should be positive and supportive; the two systems should share a common language, meanings and value systems; there should be sharing of resources in both directions; the change agency should enable and facilitate networking and collaboration between organisations; and there should be joint evaluation of the consequences of innovations. The change agency should possess the capacity, commitment, technical capability, communication skills and project management skills to assist with operational issues. This is particularly important in relation to technology-based innovations, which should be disseminated as augmented products with tools, resources, technical help and so on (moderate direct evidence^{3,99}).

9c. External change agents: Change agents employed by external agencies will be more effective if they are (a) selected for their homophily and

credibility with the potential users of the innovation; (b) trained and supported to develop strong interpersonal relationships with potential users and to explore and empathise with the user's perspective; (c) encouraged to communicate the user's needs and perspective to the developers of the innovation; and (d) able to empower the user to make independent evaluative decisions about the innovation (strong indirect and limited direct evidence³).

Testing the model by applying it to case studies

The case studies we selected for analysis were: integrated care pathways (ICPs), general practitioner (GP) fundholding, telemedicine, and the electronic health record (ECR) in the UK.

ICPs ('the steady success story', page 202) are an example of an innovation that has shown some – but not overwhelming – success. This innovation has high relative advantage and potentially reduces the complexity of a service; it is triable and its results are observable. It has been adopted widely but has certainly not reached niche saturation. Furthermore, many poor quality ICPs are in circulation, and organisations may 'reinvent the wheel' because they are unaware of existing models that could be adapted. All this highlights the relative absence of interprofessional collaboration on ICPs, and suggests that were such collaborations to be developed and strengthened, further spread and greater sustainability might be achieved.

GP fundholding ('the clash', page 204) is an excellent example of an innovation whose relative advantage was perceived very differently by different players, which proved incompatible with certain value systems, for which some potential adopters had a good existing knowledge and skills base (e.g. in accounting) while others did not, and whose knock-on consequences were difficult to isolate or measure. It is also a good example of a centrally driven innovation that rose and fell with the prevailing political climate. The lack of a formal pilot phase or rigorous evaluation programme

means that this historical example will always remain controversial.

Telemedicine ('the maverick initiative', page 206) tends to be introduced by individual enthusiasts rather than organisation-wide, and hence raises particular issues around sustainability. Innovators who introduce telemedicine projects (often on a research grant or short-term project funding) generally lack the skills or interest to 'mainstream' the initiative within their organisation. Costs have traditionally been high and technical ease of use low. But several factors have recently come together to swing the risk–benefit equation much more in telemedicine's favour – user-friendly technology, a fall in price–performance ratio, and better linkage between information technology (IT) companies and clients during software development and implementation. Telemedicine is thus entering an interesting phase, and it is possible that its fortunes thus far (relatively poor spread and low sustainability) may at some stage be reversed.

The ECR in the UK ('the big roll-out', page 208) has a strong external mandate for its roll-out. According to our model, this will create *predisposition* in user organisations but will not in itself increase their capacity to deliver. The very high complexity of the innovation (which requires simultaneous adoption across multiple organisations and sectors) and its low ease of use will, theoretically at least, conspire against adoption, especially since its relative advantage is not unanimously accepted. This does not, of course, mean that the innovation will fail, but it does raise challenges for the change agencies involved.

On the basis of these case studies, we believe that the model depicted above provides a helpful conceptual framework for considering the diffusion of the innovations in the first three (historical) case studies and for constructing hypotheses about the likely success of the final example – a controversial contemporary innovation that is in the early stages of dissemination and implementation. However, we emphasise that our model has yet to be tested prospectively and we make no firm claims for its predictive value at this stage.

Applying the model in a service context

As explained in Section 11.2 (page 220), because of the highly contextual and contingent nature of the diffusion process, it was not possible for us to make formulaic, universally applicable recommendations for practice and policy. Indeed, we strongly caution against any approach that seeks to produce such recommendations. Rather, we recommend a structured, two-stage framework to guide context-dependent reflection and action in the service and policymaking environment. In the first stage, the components of the model shown in Fig. 0.1 (attributes of the innovation, characteristics of intended adopters, potential agents of informal social influence, characteristics of the organisation, characteristics of the environment, nature of dissemination programme, nature of implementation programme) should be considered against the empirical evidence base presented in this book.

In the second stage, we recommend a more pragmatic approach in which the potential interaction between these variables is considered in relation to a specific local context and setting, perhaps using the realistic evaluation framework discussed in Section 11.3 (page 225). We have modified the realist framework specifically for the context-sensitive evaluation of innovations in health service delivery and organisation (see Box A.7, page 240).

Recommendations for further research

Research into diffusion of innovations in service delivery and organisation (covered in detail in Section 11.3, page 225) can be divided – somewhat arbitrarily – into research that focuses on particular components of the model and research that takes a ‘whole-systems’ approach and explores the interaction between components. We take these different approaches in turn.

Innovations. The main gap in the research literature on complex service innovations in

health care organisations is an understanding of how they arise, especially since this process is largely decentralised, informal and hidden from official scrutiny. An additional key question is how such innovations are reinvented as they diffuse within and between organisations.

Adopters and adoption. In relation to the adoption of innovations, transferable lessons might be gleaned from a secondary study of the cognitive psychology literature on the ability and tendency of individuals to adopt particular innovations in particular circumstances; and also from a study of the social psychology literature on the impact of group and organisational categorisations and identifications on the way individuals interpret and make sense of innovations.

Diffusion and dissemination. ‘Intervention trials’ of opinion leadership seem to be of limited value, and the general messages from such trials are already available. However, further in-depth qualitative research is recommended on the *nature* of social influence and of the operation of different social networks in different professional and other groups in the health services. We also recommend additional qualitative studies into the different roles of champions, boundary spanners and change agents in different organisational contexts and settings.

The inner context. At the organisational level, we recommend that research be commissioned into the challenge of how organisations might create and sustain an absorptive capacity for new knowledge and how they might achieve what are now established as the key components of a receptive context for change. An additional important research question is: What steps must be taken by organisations when moving towards a stage of ‘readiness’ (i.e. with all players on board and with protected time and funding), and how might this overall process be supported and enhanced?

The outer context. Research at the interorganisational level might fruitfully explore the process of informal interorganisational

networking and more formal interorganisational collaboration, with an emphasis on the role of the change agency (and how this might be enhanced). An explicit study of the process and effectiveness of interorganisational knowledge transfer activities through boundary spanners (such as the appointment, training and support of knowledge workers) might provide generalisable lessons for organisations seeking to develop their capacity in this area.

The implementation/sustainability process. The empirical literature on the implementation of service innovations in health care is currently extremely sparse. We recommend two areas of additional research: First, further secondary research into the extensive wider literature on change management, from which lessons about implementation and sustainability of innovations could be gleaned. Second, a wide range of in-depth qualitative or mixed-methodology studies into the process of implementation in organisations should be commissioned, perhaps ideally as responsive funding to capture innovative ideas as they emerge and spread.

Limitations of ‘component’-oriented research. A consistent theme in high-quality overviews and commentaries on the diffusion of innovations in health service organisations is that empirical research has generally been restricted to a single level of analysis (individual *or* team *or* organisation *or* interorganisational); has explicitly or implicitly assumed simple causal relationships between variables; has failed to address important interactions between different levels (e.g. how different organisational settings moderate individual behaviour and decision-making) and between both measured and unmeasured variables within these levels; and has failed to take due account of contingent and contextual issues. A growing methodological literature in both organisational studies and health promotion (two traditions that are particularly focused on implementation and sustainability) criticises previous research for being too ‘interventional’ (conceptualised in an experimental paradigm) and insufficiently cognisant of context. These critics call for more

research that is properly immersed in the practical, contextual, whole-systems world rather than the artificial and controlled world of the experimenter.

Whole-systems approaches. As depicted in Box 11.1 (page 229), a whole-systems approach to implementation research would be: (a) Theory-driven (i.e. it would explore an explicit hypothesized link between the determinants of a particular problem, the specific mechanism of the programme, and expected changes in the original situation); (b) process-rather than ‘package’-oriented (it should eschew questions of the general format ‘Does programme X work?’ in favour of those framed as ‘What features account for the success of programme X in this context and the failure of a comparable programme in a different context?’); (c) participatory (i.e. it would engage practitioners as partners in the research process); (d) collaborative and coordinated (i.e. aim to prioritise and study key research questions across multiple programmes in a variety of contexts); (e) addressed using common definitions, measures and tools to enable valid comparisons across studies; (f) multi-disciplinary and multi-method, with a primary emphasis on interpretive approaches; (g) meticulously detailed (so as to document the unique aspects of different programmes and their respective contexts to allow future research teams to interpret idiosyncratic findings and test rival hypotheses about mechanisms); and (h) ecological (i.e. it should recognise the critical reciprocal interaction between the programme and the wider setting in which it takes place).

There are many potential approaches to whole-systems research. We identified two as particularly promising for researching innovation in health service delivery and organisation, and we specifically recommend that the following methods be supported in future commissioning exercises:

Participatory action research. This approach (a) focuses on change and improvement; (b) explicitly and proactively involves participants in the research process; (c) is educational for all