How to Spread Good Ideas A systematic review of the literature on diffusion, dissemination and sustainability of innovations in health service delivery and organisation

Executive summary for the National Co-ordinating Centre for NHS Service Delivery and Organisation R&D (NCCSDO)

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Introduction and methods

This report describes a systematic review of the literature on the spread and sustainability of innovations in health service delivery and organisation. It was commissioned by the Department of Health via the NHS Service Delivery and Organisation programme and undertaken between October 2002 and July 2003. The brief for the project was to inform the modernisation agenda set out in *The NHS Plan* and other policy documents and led by the NHS Modernisation Agency.

Scope

The review covers a very wide range of literature. It has 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 our own time limitations, we did not attempt an encyclopaedic coverage of all possibly relevant literature, and we have indicated areas where we believe additional work should be commissioned or undertaken.

Definitions

We defined a systematic review as a review of the literature undertaken according to an explicit, rigorous and reproducible methodology. We defined innovation in service delivery and organisation as a novel set of behaviours, routines and ways of working, which are directed at improving health outcomes, administrative efficiency, cost-effectiveness, or the user experience, and which are implemented by means of planned and co-ordinated action. We distinguished 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). We noted 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.

Search strategy

We used a broad search strategy (described in detail in Section 2.3), covering 11 separate electronic databases as well as hand searching 30 journals in the health

care, health services research, organisation and management, and sociological 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.

Inclusion criteria

Our ideal was to include studies that:

- · had been undertaken in the health service sector
- had addressed innovation in service delivery and organisation
- had looked specifically at the spread or sustainability of these innovations

• had met stringent criteria for methodological quality, as set out in Appendix 2. In practice, as explained under 'Scope' 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 'hierarc hy of evidence'. Rather, we used an iterative and pluralist approach to defining and evaluating evidence, as set out in the paragraphs that follow.

Making sense of the literature

Our search strategy led us to scan over 6000 abstracts and identified around 1200 full-text papers and over 100 books and book chapters that were possibly relevant, of which some 450 are included in this report. 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 mapping', described in detail in Chapter 2 (see in particular Box 2.1). 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. (As explained in Section 2.7, 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.) 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. We then used these papers to identify, classify and evaluate other sources within that tradition.

Data extraction and analysis

We developed a standard 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).

Data synthesis

We grouped the findings of primary studies under six broad themes:

- 1 the innovation itself
- 2 the adoption process

3 communication and influence (including social networks, opinion leadership, and change agents)

- 4 the inner (organisational) context
- 5 the outer (inter-organisational) context
- 6 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 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 organisation. 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 further after the summary of results which follows (see 'Developing and testing a conceptual model').

Outline of research traditions

We identified 11 major research traditions that had, largely independently of one another, addressed (or provided evidence relevant to) the issue of diffusion and/or dissemination and/or sustainability of innovations in health service delivery and organisation. We classified four of these as 'early diffusion research':

1 **rural sociology**, where Everett Rogers 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 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 specifically to the clinical behaviour of adopters.

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 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. These include pro-innovation bias (the notion that anything new is better than what has gone before and that adoption is more worthy of study than nonadoption or rejection), individual blame bias (the stereotypical and value laden terminology for describing adopters, such as 'early adopter', 'laggard'), a tendency to assign causality when such a link was not justified, and the implication that the findings of diffusion research were independent of context and setting. Research traditions that built on, and to a greater or lesser extent challenged, the work of the early sociologists, social psychologists, and economists, and in particular that have gone beyond the widely cited Rogers model, included:

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 which 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. An important notion that arose in this tradition was that of 'innovation–system fit'.

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 vulnerable communities rather than in terms of individual behaviour change in line with instructions passed down from central agencies.

7 evidence-based medicine and guideline implementation, in which innovations are defined as health technologies and practices supported by good scientific evidence. Spread of innovation was initially couched of 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 delivery of services and hence organisational as well as individual change. It is also increasingly recognised 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. Hence, this research tradition has recently shifted from a highly rationalist and linear perspective in which evidence-based recommendations are thought of 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' around the negotiation of meaning.

8 **organisational studies**, in which innovation was seen as a product or process likely to make an organisation more profitable. Organisational innovativeness was seen as influenced by structural determinants (size, functional differentiation, slack resources, and so on); by elements of good leadership and management; and by inter-firm competition, collaboration and norm setting. This stream of research has many overlaps with the mainstream organisational development and change management literature, though there is also a distinct sub-tradition on innovation.

9 **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. A critical new concept was introduced: 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 (that is, 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.

10 **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. This research tradition emphasises the rule-bound 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'). 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.

11 **complexity and general systems theory**, which views innovation as the emergent continuity and transformation of patterns of interaction, understood as ongoing, complex, responsive processes of human relating in local situations. Thus, 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. The key contribution of complexity theory to the diffusion of innovations is (arguably) the notion that this organic, adaptive process is not easily – and perhaps not at all – controllable by external agencies.

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 illustrates where the 11 traditions lie on this dimension of controllability.

Results

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

- 1 Innovations
- 2 Adopters and adoption
- 3 Communication and influence
- 4 The inner context
- 5 The outer context
- 6 Implementation and sustainability
- 7 Linkage between components of the model.

Innovations (Chapter 4)

Different innovations are adopted by individuals, and spread to other individuals, at different rates. Some are never adopted at all; others are rapidly abandoned. A very extensive empirical literature from sociology (including medical sociology) has established a number of attributes of innovations as perceived by prospective

adopters that explain a high proportion of the variance in adoption rates of innovations. The evidence on attributes of innovations relevant to health service delivery and organisation is described in detail in Sections 4.1 and 4.2 and summarised below.

Note: The grading system for strength of evidence is a modified version of the WHO Health Evidence Network (HEN) system for public health evidence and is explained in more detail in Chapter 2, Box 2.4. 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).

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 direct evidence). This advantage must be recognised and acknowledged by all key players (strong direct evidence). If a potential user sees no relative advantage in the innovation, he or she does not generally consider it further: in other words, relative advantage is a *sine qua non* for adoption (strong direct evidence). Relative advantage is a socially constructed phenomenon: in other words, even so-called 'evidence-based' innovations go through a lengthy period of negotiation among potential adopters, in which their meaning is discussed, contested and reframed; such discourse can either increase or decrease the perceived relative advantage of the innovation (moderate direct evidence).

Compatibility

Innovations that are compatible with the values, norms and perceived needs of intended adopters will be more easily adopted and implemented (strong direct evidence).

Complexity

Innovations that are perceived by key players as simple to use will be more easily adopted and implemented (strong direct evidence). The perceived complexity of an innovation can be reduced by practical experience and demonstration (moderate indirect evidence).

Trialability

Innovations that can be experimented with by intended users on a limited basis will be more easily adopted and implemented (strong direct evidence). Such experimentation can be supported and encouraged through provision of 'trialability space' (moderate indirect evidence).

Observability

If the benefits of an innovation are visible to intended adopters, it will be more easily adopted and implemented (strong direct evidence). Initiatives to make the benefits of an innovation more visible (for example, through demonstrations) increase the chances of successful adoption (limited evidence).

Re-invention

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 and implemented (strong direct evidence). Re-invention is a particularly critical attribute for innovations that arise spontaneously as 'good ideas in practice' and which spread primarily through informal, decentralised, horizontal social networks (moderate indirect evidence; see also 'Structural determinants of innovativeness' under 'The inner context', below. The above 'standard' attributes are necessary but not sufficient to explain the adoptability of complex service innovations; additional operational attributes (that is, attributes of the innovation-in-use in a particular organisational and task context) include the relevance of the innovation to a particular task, and the complexity of its implementation in the organisational context. These are discussed in more detail in Section 4.3. They include:

Task relevance

If the innovation is relevant to the performance of the intended user's work, it will be more easily adopted and implemented (strong indirect evidence). Interventions to enhance task relevance improve the chances of successful adoption of the innovation (limited evidence).

Task usefulness

If the innovation improves task performance, it will be more easily adopted and implemented (strong indirect evidence). Interventions to enhance task usefulness improve the chances of successful adoption of the innovation (limited evidence).

• Feasibility

If the innovation is feasible and workable in this particular setting, it will be more easily adopted and implemented (strong indirect evidence). Interventions to improve the feasibility and workability of the intervention improve the chances of successful adoption of the innovation (limited evidence).

Implementation complexity

If the innovation has few response barriers that must be overcome, it will be more easily adopted and implemented (strong indirect and moderate direct evidence). Interventions to reduce the number and extent of such response barriers improve the chances of successful adoption of the innovation (limited evidence).

Divisibility

If the innovation can be broken down into more manageable parts and adopted on an incremental basis, it will be more easily adopted and implemented (strong indirect evidence).

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 and implemented (strong indirect and moderate direct evidence).

Adopters and adoption (Chapter 5)

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 with the widely cited 'adopter categories' ('early adopter', 'laggard' and so on) which have been extensively misapplied as explanatory variables. The empirical work reviewed in Section 5.1 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.

General psychological antecedents

We identified a large literature from cognitive psychology on individual characteristics associated with propensity to adopt innovations in general (for example, 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 own project. We have not therefore made any recommendations on general psychological antecedents, but we strongly recommend that a secondary research project be undertaken to link it with the findings presented here.

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). If the innovation meets an identified need in the intended adopter, they are more likely to adopt it (strong indirect evidence).

• Meaning

The meaning that the innovation holds for the intended adopter(s) has a powerful influence on the adoption decision (strong indirect and moderate direct evidence). The examples in Section 5.3 illustrate that it is often particularly instructive to explore the meaning of an innovation among *non*-adopters. If the meaning attached to the innovation by individual adopters is congruent with the meaning attached by top management, service users, and other stakeholders, successful implementation is more likely (moderate indirect evidence). The meaning attached to an innovation is generally not fixed but can be negotiated and reframed – for example, through discourse within the organisation or across interorganisational networks (strong direct evidence). The success of initiatives to support such reframing of meaning has been variable, and is not easy to predict (limited evidence).

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 the decision of a group); or authoritative (the individual is told whether to adopt or not). Authoritative decisions (for example, making adoption by individuals compulsory) increase the chance of adoption (moderate indirect evidence).

Adoption is a process rather than an event, with different concerns being dominant at different stages. The adoption process in individuals is generally presented as having five stages: awareness, persuasion, decision, implementation, and confirmation (see Chapter 5, Box 5.4). The Concerns based Adoption Model (Section 5.2) suggests three key issues, which we have included in our model:

Concerns in pre-adoption stage

Important prerequisites for adoption are that the intended adopter is aware of the innovation; has sufficient information about what it does and how to use it; and is clear how the innovation would affect them personally, for example, in terms of costs (strong indirect evidence).

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, that is, about fitting the innovation in with daily work (strong indirect evidence).

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 evidence).

The notion of 'attributes' is a somewhat simplistic and misleading concept for complex service innovations, which in reality will not have clear boundaries within the system. The theoretical literature is divided on the detail but clear on one thing: adoption in organisations is a complex and often drawn-out process that should not be thought of as a single event.

• Fuzzy boundaries

Adoption (or, more accurately, assimilation – see Glossary for discussion of this distinction) of complex innovations in organisations often requires major changes in existing structures, systems and ways of working (strong direct evidence). Complex innovations in service delivery and organisation 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 – see Figure 5.4).

The process of adoption in organisations

While one large, high-quality study demonstrated an organisational parallel to the 'stages' of individual adoption, comprising knowledge–awareness, evaluation– choice, and adoption–implementation (see Box 5.6), the empirical evidence was generally 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 evidence).

Communication and influence (Chapter 6)

As described in Section 6.1, while mass media and other impersonal channels may create awareness of an innovation, interpersonal influence through social networks (these are described in Section 6.1 as 'the pattern of friendship, advice, communication and support which exists among members of a social system') is the dominant mechanism for promoting adoption of innovations. Most types of communication and influence 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, centralised and occurs through vertical hierarchies). 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.

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). Different groups have different types of social networks (doctors, for example, tend to operate in informal, horizontal networks while nurses more often have formal, vertical networks; moderate direct evidence). Different social networks have different utilities for different types of influence (for example, 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).

Homophily

Adoption of innovations by individuals is more likely if they are homophilous – that is, similar in terms of socioeconomic, educational, professional and cultural background – with current users of the innovation (strong direct evidence).

Opinion leaders

Certain individuals have particular influence on the beliefs and actions of their colleagues (strong direct evidence). (Here, 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.) Expert opinion leaders influence through their authority and status; peer opinion leaders influence by virtue of representativeness and credibility (moderate direct evidence). Opinion leaders can have either positive (in the eyes of those trying to achieve change) or negative influence; 'negative' opinion leaders sometimes need do little more than show indifference to inhibit spread of the innovation among their peers (moderate indirect and limited direct evidence).

Interventions aimed at harnessing the social influence of peer opinion leaders are more effective when such individuals are homophilous with intended adopters (strong indirect and moderate direct evidence). In relation to the behaviour of doctors, such interventions have generally had an impact that was positive in direction but small in magnitude (moderate direct evidence). If a project is insufficiently appealing (for example, 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).

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 intervention strategies (strong indirect evidence).

Champions

Adoption of an innovation by individuals in an organisation is more likely if there exist key individuals who have good personal relationships within their social networks and are willing to back the innovation (strong indirect and moderate direct evidence). Key champion roles for organisational innovations include:

– 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 – the transformational leader, who harnesses support from other members of the organisation 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 – the network facilitator, who defends and develops cross-functional coalitions within the organisation (moderate indirect evidence).

See Section 6.3 for various alternative taxonomies.

There is remarkably little direct empirical evidence on how to identify, and systematically harness the energy of, organisational champions.

• Boundary spanners

An organisation is more likely to adopt an innovation if individuals can be identified 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. As will be explained in Section 6.4, wide external ties are known as 'cosmopolitanism' in the social network literature. Such individuals play a pivotal role in capturing the ideas that will become organisational innovations (strong indirect and moderate direct evidence). 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 indirect evidence).

Formal dissemination programmes

In situations where a planned dissemination programme is used for the innovation, this will be more effective if programme organisers:

- take full account of potential adopters' needs and perspectives (with particular attention to the balance of costs and benefits for them)

 tailor different strategies to the different demographic, structural and cultural features of different subgroups

- use a message with appropriate style, imagery, metaphors and so on
- identify and utilise appropriate communication channels
- incorporate rigorous evaluation and monitoring against defined goals and milestones

(strong direct evidence).

The inner context (Chapter 7)

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.

Structural determinants of innovativeness

An organisation will assimilate innovations more readily if:

 it is large (organisational size is almost certainly a proxy for other determinants including slack resources and functional differentiation)

it is mature

it is functionally differentiated (that is, divided into semi-autonomous departments and units)

- it is specialised (as Section 7.1 explains, some of the organisation and management literature uses the term 'complexity', which generally refers to a composite measure of the degree of specialisation, functional differentiation and professional knowledge)

- it has slack resources available to be channelled into new projects

-it has decentralised decision-making structures

(strong indirect and moderate direct evidence).

In general, these determinants are significantly, positively and consistently associated with organisational innovativeness, but together they account for only a small proportion of the variation between comparable organisations. There is little empirical evidence to support the efficacy of interventions to change organisational structure towards these preferred characteristics, except that establishing semi-autonomous multi-disciplinary project teams is independently associated with successful implementation of an innovation (moderate indirect evidence).

The construction, interpretation, distribution and utilisation of knowledge within the organisation is also a crucial determinant of innovativeness. The ability to absorb new knowledge depends critically on what knowledge the organisation already has – and how this is used and exchanged among its members.

Absorptive capacity for new knowledge

An organisation that is able systematically to identify, capture, interpret, share, re-frame, 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 indirect and moderate direct evidence). Prerequisites for absorptive capacity include the organisation's existing knowledge and skills base (especially its store of tacit, uncodifiable knowledge) and preexisting related technologies; a 'learning organisation' culture (explicit values and goals that support the capturing and sharing of knowledge); and proactive leadership directed towards enabling the sharing of knowledge both internally within the organisation and externally via networking and collaboration (strong indirect and moderate direct evidence).

The knowledge that underpins the adoption, dissemination and implementation of an innovation (such as a complex technology) 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' (that is, 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). Similarly, strong links to external networks by both clinicians and senior management enhance the overall innovativeness of the organisation (moderate direct evidence).

Receptive context for change

An organisation that has the general features associated with receptivity to change will be better able to assimilate innovations. These features include strong leadership, clear strategic vision, good managerial relations, visionary staff in key positions, a climate conducive to experimentation and risk-taking, and effective monitoring and feedback systems that are able to capture and process highquality data (strong indirect and moderate direct evidence). The term 'receptive context for change' also includes some elements of absorptive capacity, the learning organisation culture, and environmental pressures (see Section 7.7), but we have presented these in the previous paragraph and below for clarity.

An organisation may be amenable to innovation in general but not ready or willing to assimilate a particular innovation. (GP fundholding in the UK was a good example of this – see Section 10.4.) As shown in Figure 10.1, 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, and also in Chapter 9 in relation to implementation and sustainability) are listed below.

Tension for change

If staff in the organisation perceive that the present situation is intolerable, a potential innovation is more likely to be implemented successfully (strong direct evidence).

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 and implemented successfully (strong indirect and moderate direct evidence).

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. In particular, job changes should be few and clear, appropriate training and support should be given, and relevant documentation and augmentation (such as a helpdesk) provided for technologies (strong indirect and moderate direct evidence).

Support and advocacy

If supporters of the innovation outnumber, and are more strategically placed, than opponents, it is more likely to be assimilated and successfully implemented (strong indirect and moderate direct evidence) – see also 'Champions', under 'Communication and influence', above.

Dedicated time and resources

If the innovation has a 'budget line' and if resource allocation is both adequate and recurrent, it is more likely to be assimilated (strong indirect and moderate direct evidence).

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, that innovation is more likely to be assimilated and sustained (strong indirect and moderate direct evidence). In particular, measures must be in place to capture and respond to the different consequences of the innovation:

- those that are intended and predicted
- those that are unintended and predicted
- those that are unintended and unpredicted ('knock-on').

Rapid, tight feedback enhances the organisation's ability to respond to the impact of these consequences (strong direct evidence).

The outer context (Chapter 8)

The decision by an organisation to adopt an innovation, and the success of its efforts to implement and sustain it, depend on ideas and information gleaned from outside – on what other organisations are perceived to be doing ('bandwagons' affect organisations in the same way that fashions affect individuals), and on the mutual sense-making that occurs between organisations in relation to the innovation.

Informal inter-organisational network

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). A 'cosmopolitan' organisation (one that is externally well networked with others) will be more amenable to this influence (strong indirect and moderate direct evidence). Interorganisational networks will only promote adoption of a new innovation once this is generally perceived as 'the norm'; until that time, networks can also serve to 'warn organisations off' innovations that have no perceived advantages (strong indirect evidence).

Intentional spread strategies

Initiatives to promote the sharing of ideas and the construction of knowledge through formal networking initiatives (such as quality improvement collaboratives) are sometimes but not always effective (moderate direct evidence). Such initiatives are often expensive and the gains from them difficult to measure; current evidence on their costeffectiveness is limited. Key success factors from health care quality improvement collaboratives include:

- the nature of the topic chosen for improvement (comparable to attributes of the innovation discussed in the points listed under 'Innovation', above)

– the capacity and motivation of participating teams, in particular their leadership and team dynamics

- the motivation and receptivity to change of the organisations they represent

 the quality of facilitation – in particular the provision of opportunities to learn from others in informal space

- the quality of support provided to teams during the implementation phase

(moderate direct evidence).

The adoption decision, and the success of attempts at implementation, are widely perceived to depend on a host of external political, economic and ideological factors.

Wider environment

The evidence base for the impact of environmental variables on organisational innovativeness in the health care sector is sparse and heterogeneous, with each group of researchers exploring somewhat different aspects of the 'environment' or 'changes in the environment'. The overall impact of environmental uncertainty appears to be positive in direction but small in magnitude (moderate direct evidence), and there may be small positive effects from inter-organisational competition and higher socioeconomic status of patients/clients (limited evidence). The timing of the arrival of new ideas in relation to policymaking cycles is critical. Policies (potential solutions to problems) can be thought of as floating in a 'primeval soup' of potential initiatives, waiting to be selected and implemented.

Political directives

External mandates (political 'must-dos') increase the predisposition (that is, the motivation), but not the capacity, of an organisation to adopt an innovation (moderate direct evidence).

Policymaking streams

An innovation that is presented as the solution to a policymaking problem must be both technically feasible and congruent with prevailing values (moderate indirect and limited direct evidence). It must arrive at the right stage in the local and/or national policymaking cycle (strong direct evidence).

Implementation and sustainability (Chapter 9)

The evidence on implementation and sustainability was particularly complex and difficult to disentangle from that on change management and organisational development in general. Success in imp lementing and sustaining an innovation in service delivery and organisation depends on many of the factors already covered above in relation to the initial adoption decision and the early stages of assimilation. The notion of specific 'system readiness' for the innovation, a prerequisite for implementation, has been addressed under 'The inner context' above (the last six points). In addition to readiness before the innovation is adopted, additional elements are specifically associated with its successful implementation and routinisation (the defining feature of sustainability).

Staff involvement and commitment

Early and widespread involvement of staff at all levels and, in particular, top management support and advocacy of the implementation process enhance the success of implementation (strong indirect and moderate direct evidence). See also 'Champions', under 'Communication and influence', above, for a description of the different types of organisational champions.

Human resources

Successful implementation of an innovation in an organisation depends on the motivation, capacity and competence of individual practitioners (strong direct evidence). Appropriate training enhances the chance of effective implementation and of sustainability (moderate indirect and limited direct evidence).

Organisational structure

Structures and processes that support devolved decision making in the organisation (for example, 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 sustainability (moderate indirect evidence).

Intra-organisational networks

Effective communication across internal structural (for example, departmental) boundaries within the organisation enhances the success of implementation and the chances of sustainability (moderate direct evidence). An explicitly narrative approach to intra-organisational networking – that is, the purposive construction of a shared and emergent organisational story – can serve as a powerful cue to action (limited direct evidence).

Extra-organisational networks

The greater the complexity of the implementation needed for a particular innovation, the greater the significance of the inter-organisational network to implementation success (moderate indirect evidence).

Linkage between components of the model

As explained in the main results chapters, there is some empirical evidence (and there are also robust theoretical arguments) for building strong links between different parts of the system depicted in Figure 10.1. Specific success factors included in our model (which are addressed in Chapter 9) are as follows.

Linkage at development stage

If the innovation is formally developed (for example, in a research centre), it 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 (moderate indirect evidence). 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.

Role of the change agency

If a formal change agency is involved with the dissemination and implementation of an innovation, the nature and quality of any linkage relationship between it and the intended adopter organisations will influence the likelihood of adoption and the success of implementation. 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 tools and resources in both directions; the change agency should enable and facilitate external networking and collaboration between organisations; and there should be joint evaluation of the consequences of innovations (strong indirect and limited direct evidence).

To this end, the change agency should possess the necessary capacity, commitment, technical capability, communication skills and project management skills to help organisations with operational aspects of assimilation (strong indirect and moderate direct evidence). This is particularly important in relation to innovations with a major technical element (such as new computer hardware/software), in which the innovation should routinely be disseminated as an augmented product with tools and resources, technical help, and so on (moderate direct evidence).

External change agents

Change agents employed by external agencies will be more effective if they are:

- selected for their homophily and credibility with the potential users of the innovation

- trained and supported to develop strong interpersonal relationships with potential users and to explore and empathise with the user's perspective

 encouraged to communicate the user's needs and perspective to the developers of the innovation

 able to empower the user to make independent evaluative decisions about the innovation (strong indirect and moderate direct evidence)

Developing and testing a unifying conceptual model

A simplified version of the conceptual model derived from the evidence summarised above is shown in Figure ES.1 below; the full annotated model (which includes additional detail of the key determinants of successful diffusion, dissemination, and sustainability) is shown in Chapter 10, Figure 10.1.to be noted

Figure ES.1 Conceptual model for considering the determinants of diffusion, dissemination and sustainability of innovations in health service delivery and organisation, based on research studies evaluated in this systematic review





The case studies we selected for analysis were:

- 1 integrated care pathways
- 2 GP fundholding
- 3 telemedicine
- 4 the electronic health record in the UK.

Integrated care pathways (ICPs) ('the steady success story', Section 10.2) 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 trialable 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 're-invent 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', Section 10.3) 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 skill base(for example, 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', Section 10.4) 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 his or her 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 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 electronic health record in the UK ('the big roll-out', Section 10.5) has a strong external mandate for its roll-out in the UK. 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 conspire against adoption, especially since its relative advantage is not unanimously accepted.

On the basis of these case studies, we believe that the model provides a helpful conceptual framework for considering the spread and sustainability 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 will be explained in Section 11.2, because of the highly contextual and contingent nature of the process of spread and sustainability, 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 Figure ES.1 above (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 the report.

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 that will be discussed in Section 11.3. We have modified the realist framework specifically for the context -sensitive evaluation of innovations in health service delivery and organisation (see Appendix 2, Box A2.7).

Recommendations for further research

Future research into spread and sustainability of innovations (which will be addressed in detail in Section 11.3) can be divided into research that focuses on the separate components of the model and research that takes a 'wholesystems' approach and focuses on the interaction between components. The main gap in the research literature on innovations 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.

In relation to the adoption process, 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. While 'intervention trials' of opinion leadership seem to be of limited value, we believe that further in-depth qualitative research into the nature of social influence and of the operation of different social networks in different professional and other groups in the health services would be useful. We also recommend additional qualitative studies into the different roles of champions, boundary spanners and change agents in different contexts.

At the organisational level, we recommend additional research 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' (that is, with all players on board and with protected time and funding), and how might this overall process be supported and enhanced? Research at the inter-organisational level might fruitfully explore the process of informal inter-organisational networking and more formal inter-organisational 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 inter-organisational 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.

A consistent theme in high-quality overviews and commentaries on the spread and sustainability of innovations is that empirical research has generally been restricted to a single level of analysis (individual or team or organisational or interorganisational); has implicitly or explicitly assumed simple causal relationships between variables; has failed to address important interactions between different levels (for example, 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.

As depicted in Box 11.1, a whole-systems approach to implementation research would be:

• **theory-driven** – it should explore an explicit hypothecated link between the determinants of a particular problem, the specific mechanism of the programme, and expected changes in the original situation)

• 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?'

• **participatory** – it would engage practitioners as partners in the research process

• **collaborative and co-ordinated** – it should aim to prioritise and study key research questions across multiple programmes in a variety of contexts

 addressed using common definitions, measures and tools to enable valid comparisons across studies

• multidisciplinary and multi-method with a primary emphasis on interpretive approaches

• **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

• **ecological** – 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.

The first is participatory action research, which: focuses on change and improvement; explicitly and proactively involves participants in the research process; is educational for all involved; looks at questions that arise from practice; involves a cyclical process of collecting, feeding back, and reflecting on data; and is a process that generates knowledge. We specifically recommend further research that uses this approach. The second approach which we specifically recommend is the realistic evaluation (and the linked realist synthesis) approach developed by Pawson and others, which will be discussed further in Section 11.3. Briefly, the realist approach addresses the innovationcontext interaction and asks 'what works, for whom, and under what circumstances?'. When evaluating any particular programme, a list of open-ended questions (known as the 'Would it work here?' framework, which we have adapted and reproduced in Box A2.7 in Appendix 2) are asked about the innovation, the organisation, the people, the resources, and so on, in order to tease out and illuminate the mechanisms of success and/or failure. When comparing two or more comparable programmes, each dimension of the programme is compared in relation to contextual factors using a general question format: 'What is the desirability and/or feasibility of changing practice, procedures and context of system B (in which the programme was successful) to match those of system A (in which it was less successful)?'.

In order to produce meaningful comparisons from a realist perspective, future research studies must follow the criteria for whole-systems research set out in the list above. In particular, these studies must aim for a detailed, multidimensional picture of the experience of implementing the programme, and (therefore) must prospectively set out to capture high-quality data on a range of standardised process measures. We believe that a first step towards addressing the remaining unanswered questions in spread and sustainability is to develop, adapt and disseminate the 'Would it work here?' framework and encourage research teams to align with its recommendations.

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