

DIFFUSION OF INNOVATIONS IN SERVICE ORGANIZATIONS: SYSTEMATIC REVIEW AND RECOMMENDATIONS

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- How can we spread and sustain innovations in health service delivery and organization?

This article discusses:

- (1) an evidence-based model for considering the diffusion of innovations in health service organizations,
- (2) clear knowledge gaps where further research should be focused, and
- (3) a robust and transferable methodology for systematically reviewing health service policy and management. Both the model and the method should be tested more widely in a range of contexts.

Innovation in service delivery and organization



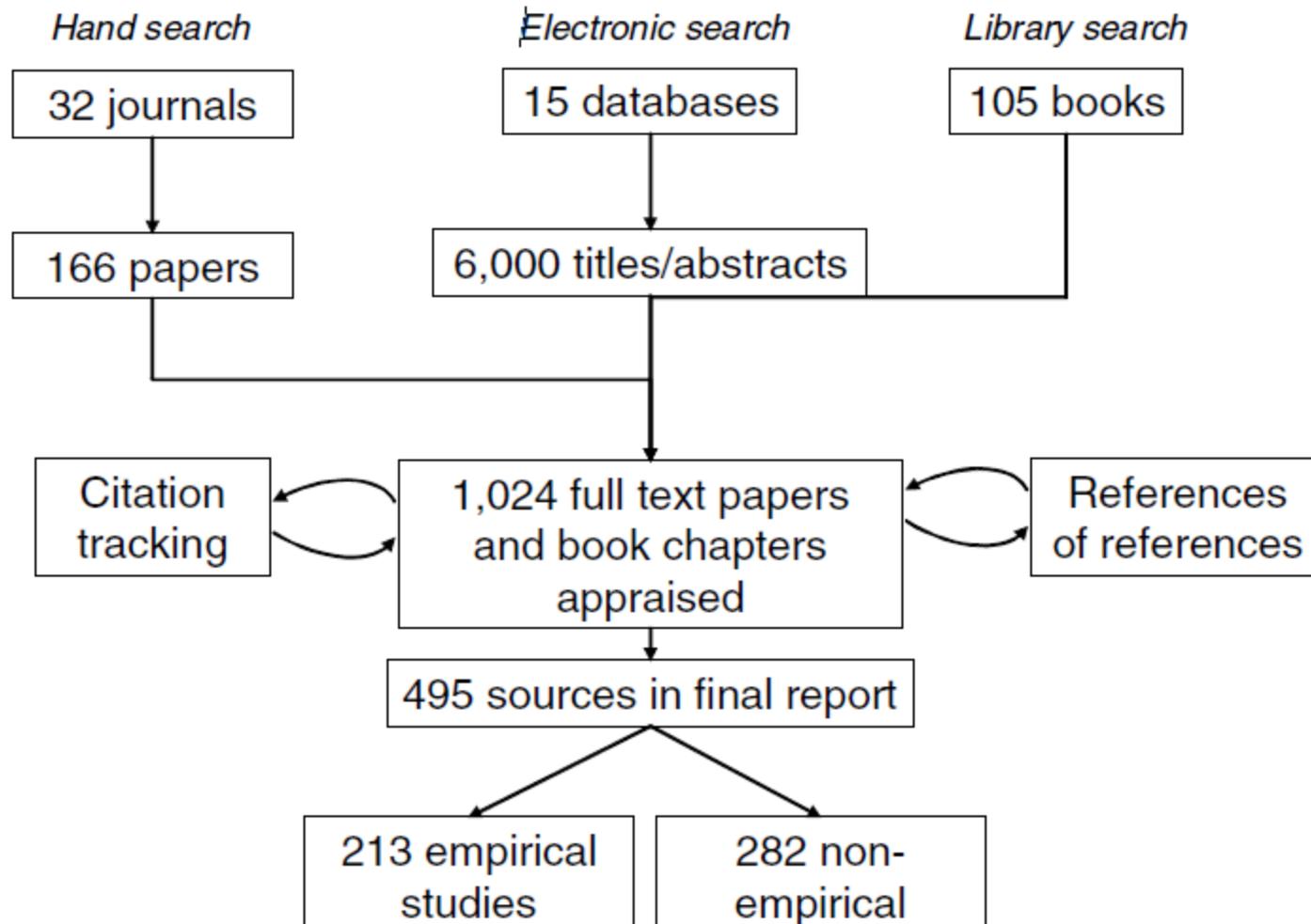
a novel set of behaviors, routines, and ways of working that are directed at improving health outcomes, administrative efficiency, cost effectiveness, or users' experience and that are implemented by planned and coordinated actions.

- *Diffusion: passive spread,*
- *Dissemination: active and planned efforts to persuade target groups to adopt an innovation,*
- *Implementation: active and planned efforts to mainstream an innovation within an organization,*
- *Sustainability: making an innovation routine until it reaches obsolescence.*

an ambiguity in the notion of sustainability

(i.e., the longer an innovation is sustained, the less likely the organization will be open to additional innovations).

Summary of Sources Contributing to the Systematic Review



Phases in Meta-Narrative Review

1. Planning Phase

- a. Assemble a multidisciplinary research team whose background encompasses the relevant research traditions (an initial scoping phase may be needed before the definitive research team is appointed).
- b. Outline the initial research question in a broad, open-ended format.
- c. Define outputs in collaboration with funder or client.
- d. Set up a series of regular, face-to-face review meetings, including planned input from external peers drawn from the intended audience for the review.

2. Search Phase

- a. Lead the initial search by intuition, informal networking, and “browsing” in order to map the diversity of perspectives and approaches.
- b. Search for seminal conceptual papers in each research tradition by tracking references of references. Evaluate these by the generic criteria of scholarship, comprehensiveness, and contribution to subsequent work within the tradition.
- c. Search for empirical papers by electronically searching key databases, hand-searching key journals, and “snowballing” (references of references or electronic citation tracking).

3. Mapping Phase

Identify (separately for each research tradition):

- a. The key elements of the research paradigm (conceptual, theoretical, methodological, and instrumental).
- b. The key actors and events in the unfolding of the tradition (including the main findings and how they were discovered).
- c. The prevailing language and imagery used by scientists to “tell the story” of their work.



4. Appraisal Phase

Using appropriate critical appraisal techniques:

- a. Evaluate each primary study for its validity and relevance to the review question.
- b. Extract and collate the key results, grouping together comparable studies.



5. Synthesis Phase

- a. Identify all the key dimensions of the problem that have been researched.
- b. For each dimension, give a narrative account of the contribution (if any) by each separate research tradition.
- c. Treat conflicting findings as higher-order data, and explain them in terms of contestation among the different paradigms from which the data were generated.



6. Recommendations Phase

Through reflection, multidisciplinary dialogue, and consultation with the intended users of the review:

- a. Summarize the overall messages from the research literature along with other relevant evidence (budget, policymaking priorities, competing or aligning initiatives).
- b. Distill and discuss recommendations for practice, policy, and further research.

World Health Organization Health Evidence Network (WHO-HEN) criteria (Øvretveit 2003)

Strong direct evidence: consistent findings in two or more empirical studies of appropriate design and high scientific quality undertaken in health service organizations.

- *Strong indirect evidence: consistent findings in two or more empirical studies of appropriate design and high scientific quality, but not from a health service organization.*
- *Moderate direct evidence: consistent findings in two or more empirical studies of less appropriate design and/or of acceptable scientific quality undertaken in health service organizations.*
- *Moderate indirect evidence: consistent findings in two or more empirical studies of less appropriate design and/or of acceptable scientific quality, but not from health service organizations.*
- *Limited evidence: only one study of appropriate design and acceptable quality available, or inconsistent findings in several studies.*
- *No evidence: no relevant study of acceptable scientific quality available.*

TABLE 1
Research Traditions Relevant to Diffusion of Innovations in Health Service Organizations

Research Tradition	Academic Discipline	Definition and Scope	"Diffusion of Innovations" Conceptualized as
1. Rural sociology	Sociology	Study of rural society and the relationships among its members, especially the influence of social structures and norms on behaviors and practices.	Influence of social norms and values on adoption decisions; networks of social influence.
2. Medical sociology	Sociology	As above for medical society.	As above. Specifically, the norms, relationships, and shared values that drive clinician behavior (e.g., adoption of guidelines).
3. Communication studies	Psychology	Study of human communication, including both interpersonal and mass media.	Structure and operation of communication channels and networks. Interpersonal influence (e.g., impact of "experts" versus "peers" on decision making).
4. Marketing	Interdisciplinary (psychology and economics)	Study of the production, distribution, and consumption of goods and services.	Affordability, profitability, discretionary income, market penetration, media advertising, supply, and demand.
5. Development studies	Interdisciplinary (anthropology, sociology, economics, political science, information and communications technology)	Study of the adoption, adaptation, and use of technology, especially in development.	Barriers to the use of more advanced technologies (e.g., labor-saving machinery, computers).
6. Health promotion	Interdisciplinary (social psychology, epidemiology, marketing)	Study of strategies and practices to improve the health and well-being of populations (draws on and overlaps with communication studies).	"Reach" and "uptake" of positive lifestyle choices in populations targeted by health promotion campaigns.

TABLE 1—Continued

Research Tradition	Academic Discipline	Definition and Scope	"Diffusion of Innovations" Conceptualized as
7. Evidence-based medicine	Clinical epidemiology	Study of the spread of best (research) evidence on managing diseases and symptoms.	Filling a "knowledge gap" or "behavior gap" in targeted clinicians.
8. Structural determinants of organizational "innovativeness"	Organization and management	Study of how an organization's structure influences its function in relation to the use of new ideas and practices.	Organizational attributes influencing "innovativeness," like size, slack resources, and hierarchical versus decentralized lines of management.
9. Studies of organizational process, context, and culture	Interdisciplinary (organization and management, sociology, anthropology)	Study of the development and impact of culture (meaning systems, language, traditions, accepted ways of doing things) in organizations and professional groups.	Changes in culture, values, and identities.
10. Interorganizational studies (networks and influence)	Interdisciplinary (organization and management, sociology)	Study of interorganizational norms, fashions, and influence.	Interorganizational fads and fashions, spread through social networks.
11. Knowledge utilization	Interdisciplinary (organization and management, information and communications technology, sociology)	Study of how individuals and teams acquire, construct, synthesize, share, and apply knowledge.	Transfer of knowledge, both explicit (formal and codified, as in a guideline) and tacit (informal and embodied, as in "knowing the ropes").
12. Narrative studies	Interdisciplinary (literature, sociology, anthropology)	Study of stories (here, those told in and about organizations). Use of storytelling as a tool for dissemination and change in organizations.	The telling, retelling, and interpretation of stories. Innovators as characters (heroes, underdogs) in a story of change. Innovation as social drama.
13. Complexity studies	Interdisciplinary (ecology, social psychology, systems analysis)	Study of how individuals, groups, and organizations emerge, evolve, and adapt to their environment.	Creativity emergence, and adaptation

Early Diffusion Research

- Rural Sociology
- Medical Sociology
- Communication Studies
- Marketing

Limitations

- (1) the only relevant unit of analysis is the individual innovation and/or the individual adopter;
- (2) an innovation is necessarily better than what has gone before and adoption is more worthy of study than is nonadoption or rejection;
- (3) patterns of adoption reflect fixed personality traits; and
- (4) the findings of diffusion research are invariably transferable to new contexts and settings.

Research areas

- Development Studies

(1) that the meaning of an innovation for the agency that introduces it may be very different from that held by the intended adopters and

(2) that “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)

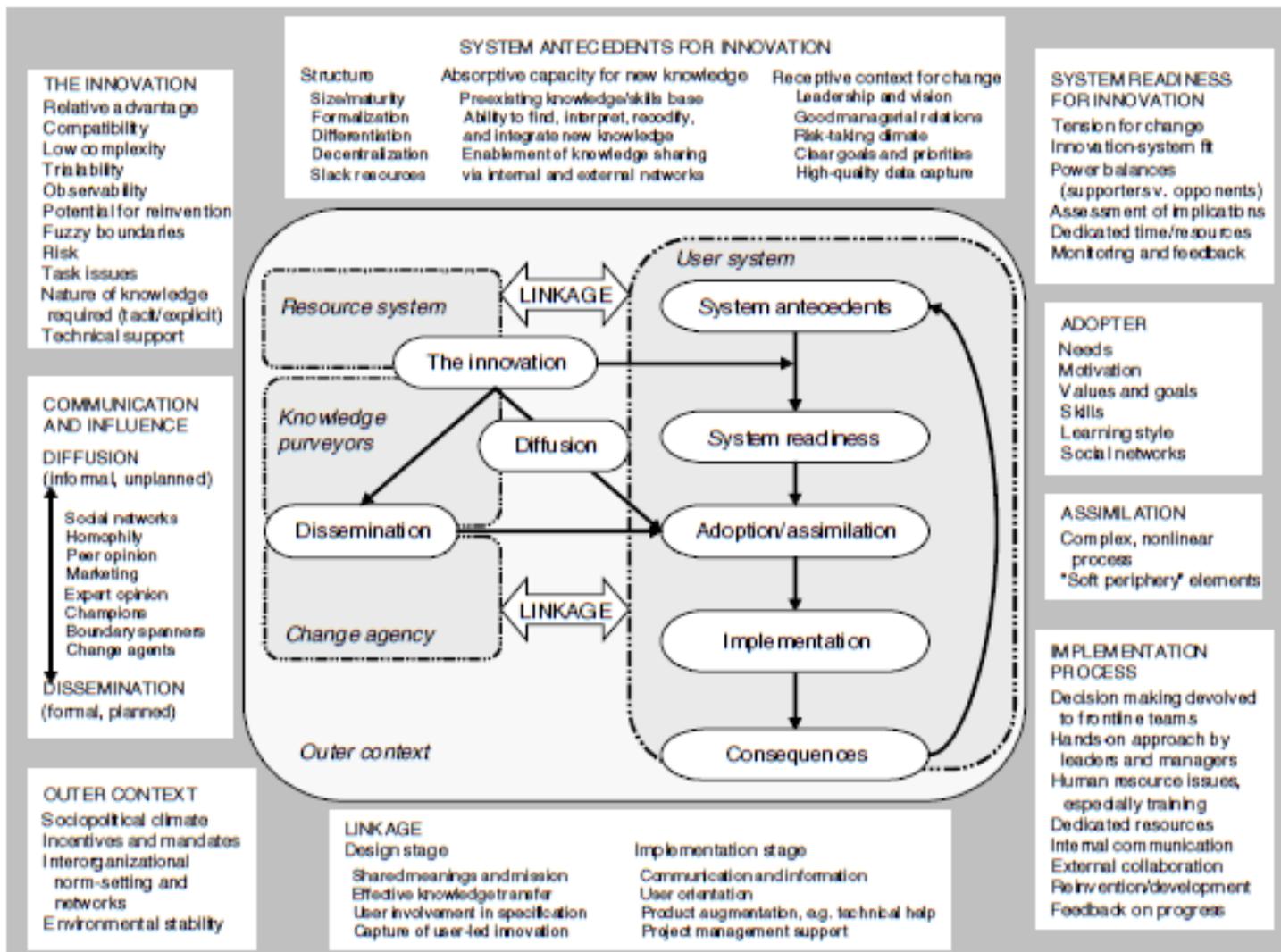
- Health Promotion

- Evidence-based Medicine

In the organization and management literature,

- *Studies of the structural determinants of organizational innovativeness*
- *Studies of organizational process, context, and culture,*
- *Interorganizational studies*
- *Knowledge-based approaches to innovation in organizations*
- *Narrative organizational studies*
- *Complexity studies*
- *Organization Psychology*

Conceptual Model for Considering the Determinants of Diffusion, Dissemination, and Implementation of Innovations in Health Service Delivery and Organization, Based on a Systematic Review of Empirical Research Studies.



The Innovation

- Relative advantage
- Compatibility
- Complexity
- Trialability
- Observability
- Reinvention



- Fuzzy Boundaries

“hard core” (the irreducible elements of the innovation itself) and a “soft periphery” (the organizational structures and systems required for the full implementation of the innovation);

- Risk

- Task Issues

- Knowledge Required to Use it

- Augmentation/ Support

Adoption by Individuals

- General Psychological Antecedents (e.g., tolerance of ambiguity, intellectual ability, motivation, values, and learning style)
- Content-specific Psychological Antecedents
- Meaning
- The Adoption Decision [contingent (dependent on a decision made by someone else in the organization), collective (the individual has a “vote” but ultimately must acquiesce to the decision of a group), or authoritative (the individual is told whether or not to adopt it)]

Stages of the adoption process in individuals

- awareness,
- persuasion,
- decision,
- implementation,
- confirmation

Concerns Based Adoption Model

- *Concerns in Preadoption Stage*
- *Concerns during Early Use*
- *Concerns in Established Users*

Assimilation by the System

Although one large, high-quality study (Meyer and Goes 1988) demonstrated an organizational parallel to the “stages” of individual adoption, comprising “knowledge-awareness,” “evaluationchoice,” and “adoption-implementation,” the remaining empirical evidence was more consistent with an organic and often rather messy model of assimilation in which the organization moved back and forth between initiation, development, and implementation, variously punctuated by shocks, setbacks, and surprises (for strong direct evidence, see Van de Ven et al. 1999).

Diffusion and Dissemination

- pure diffusion: in which the spread of innovations is unplanned, informal, decentralized, and largely horizontal or mediated by peers
- active dissemination: in which the spread of innovation is planned, formal, often centralized, and likely to occur more through vertical hierarchies; see Figure 2.

Components of the Model

- *Network Structure*
- *Homophily*
- *Opinion Leaders*
- *Harnessing the Opinion Leader's Influence
(monomorphic vs polymorphic)*
- *Champions*
- *Boundary Spanners*
- *Formal Dissemination Programs*

The different champion roles for organizational innovations

- (1) the organizational maverick, who gives the innovators autonomy from the organization's rules, procedures, and systems so they can establish creative solutions to existing problems;
- (2) the transformational leader, who harnesses support from other members of the organization;
- (3) the organizational buffer, who creates a loose monitoring system to ensure that innovators properly use the organization's resources while still allowing them to act creatively; and
- (4) the network facilitator, who develops cross-functional coalitions within the organization

Formal Dissemination Programms

- (1) take full account of potential adopters' needs and perspectives, with particular attention to the balance of costs and benefits for them;
- (2) tailor different strategies to the different demographic, structural, and cultural features of different subgroups;
- (3) use a message with appropriate style, imagery, metaphors, and so on;
- (4) identify and use appropriate communication channels; and
- (5) incorporate rigorous evaluation and monitoring of defined goals and milestones

System Antecedents for Innovation

□ *Structural Determinants of Innovativeness*

an organization will assimilate innovations more readily if it is **large, mature, functionally differentiated (i.e., divided into semiautonomous departments and units), and specialized, with foci of professional knowledge**; if it has **slack resources** to channel into new projects; and if it has **decentralized decision-making structures**. Size is almost certainly a proxy for other determinants, including slack resources and functional differentiation.

System Antecedents for Innovation

□ *Absorptive Capacity for New Knowledge*

An organization that is systematically able to identify, capture, interpret, share, reframe, and recodify 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

System Antecedents for Innovation

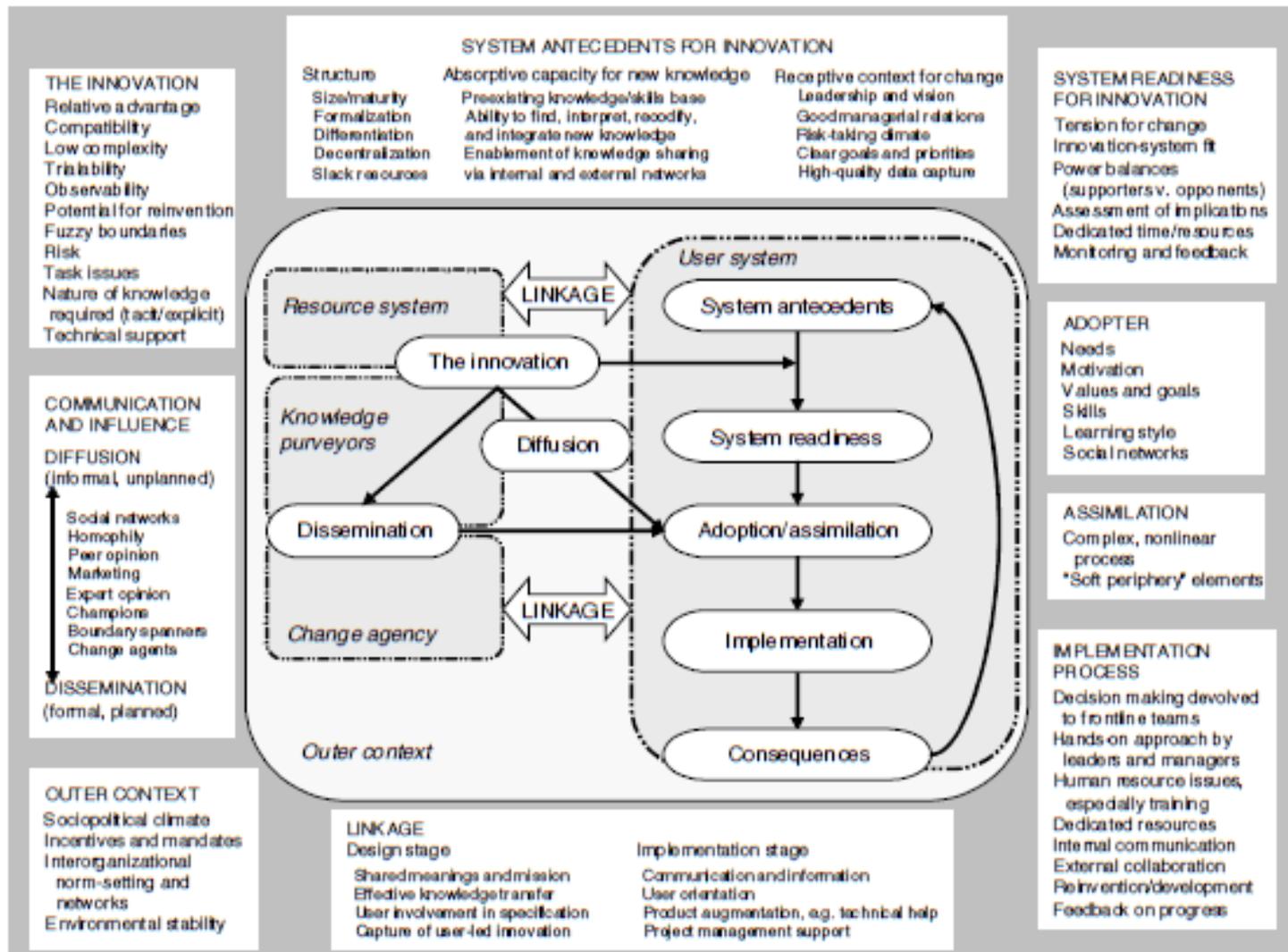
- *Receptive Context for Change*

(strong leadership, clear strategic vision, good managerial relations, visionary staff in pivotal positions, a climate conducive to experimentation and risk taking, and effective data capture systems)

System Readiness for Innovation

- *Tension for Change*
- *Innovation-System Fit*
- *Assessment of Implications*
- *Support and Advocacy*
- *Dedicated Time and Resources*
- *Capacity to Evaluate the Innovation*

Conceptual Model for Considering the Determinants of Diffusion, Dissemination, and Implementation of Innovations in Health Service Delivery and Organization, Based on a Systematic Review of Empirical Research Studies.



The Outer Context: Interorganizational Networks and Collaboration

- *Informal Interorganizational Networks*
- *Intentional Spread Strategies*
- *Wider Environment*
- *Political Directives*

The greatest success factors of health care quality improvement collaboratives

- (1) the nature of the topic chosen for improvement;
- (2) the capacity and motivation of participating teams, particularly their leadership and team dynamics;
- (3) the motivation and receptivity to change of the organizations they represent;
- (4) the quality of facilitation, particularly the provision of opportunities to learn from others in an informal space;
- (5) the quality of support provided to teams during the implementation phase

Implementation and Routinization

- Implementation: the early usage activities that often follow the adoption decision
- At the organizational level, the **move from considering an innovation to successfully routinizing it is generally a nonlinear process** characterized by multiple shocks, setbacks, and unanticipated events

Successful routinization

- Organizational Structure (adoptive, flexible)
- Leadership and Management
- Human Resource Issues
- Funding
- Intraorganizational Communication (narrative)
- Intraorganizational Network
- Feedback
- Adaptation/Reinvention

Linkage among Components of the Model

- *Linkage at the Development Stage*
- *Role of the Change Agency*
- *External Change Agents*

Recommendations (next research generation)

- Theory- driven
- Process rather than “package” oriented
- Ecological
- Addressed using common definitions, measures and tools
- Collaborative and coordinated
- Multidisciplinary and multimethod
- Meticulously detailed
- Participatory

Innovations



- Further research into the attributes of innovations that promote their adoption is probably not needed.
- Instead, research in this area should be directed at the following questions:

- **How** do innovations in health service organizations arise, and in **what circumstances**?
- **What mix of what factors** tends to produce “**adoptable**” innovations (e.g., ones that have clear advantages beyond their source organization and low implementation complexity and are readily adaptable to new contexts)?

- How can innovations in health service organizations be adapted to be **perceived as more advantageous, more compatible** with prevailing norms and values, less complex, more trialable, with more observable results, and with greater scope for local reinvention?
- Is there a role for a central agency, resource center, or officially sanctioned demonstration programs in this?

- 
- How are innovations arising as “good ideas” in local health care systems reinvented as they are transmitted through individual and organizational networks, and how can this process be supported or enhanced?
 - How can we identify “bad ideas” likely to spread so that we can intervene to prevent this?

Adopters and Adoption

- We do not recommend further descriptive studies of **patterns of adoption** by individuals.
- We believe the main unanswered questions are the following:

- **Why and how** do people (and organizations) **reject** an innovation **after adopting** it? (In the more than 200 empirical research studies covered in our review, only one explicitly and prospectively studied discontinuance;)

- What are the transferable lessons from **cognitive and social psychology** about the ability and tendency of individuals to adopt particular innovations in particular circumstances? For example, what can we learn from the mainstream literature about **how individuals process information, make decisions**, apply heuristics, and so on? A particularly fruitful area is likely to be the **psychological literature on the interaction between humans and computers** as it applies to the adoption and assimilation of information and communications technology (ICT) innovations in the service sector.

Dissemination and Social Influence

- We do not recommend further “intervention” trials of the use of opinion leaders to change the behavior of potential adopters. We already know from published research that opinion leadership is a complex and delicate process, and research that fails to capture these process elements is unlikely to add to what we already know. We recommend that research into dissemination address the following questions:

- What is the nature of interpersonal influence and opinion leadership in the range of different professional and managerial groups in the health service, especially in relation to organizational innovations? In particular, how are key players identified and influenced?

- What is the nature and extent of the **social networks of different players** in the health service (both clinical and nonclinical)? How do these networks serve as channels for social influence and the reinvention and embedding of complex service innovations?

- 
- Who are the individuals who act as **champions** for organizational innovations in health services? What is the nature of their role, and how might it be enabled and enhanced?

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- Who are the individuals who act as **boundary spanners** among health service organizations, especially in relation to complex service innovations?
 - What is the nature of their role, and how might it be enabled and enhanced?

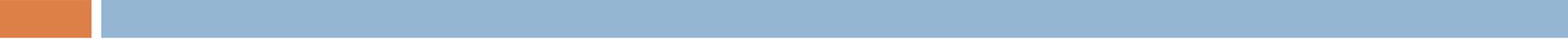
The Organizational Context

- We do not recommend further survey-based research to identify structural determinants of innovativeness in health care organizations, since the small but significant effect of structural determinants is well established.
- We suggest the following questions as possible directions for further research:

- To what extent do “restructuring” initiatives (popular in health service organizations) improve their ability to adopt, implement, and sustain innovations? In particular, will a planned move from a traditional hierarchical structure to one based on semiautonomous teams with independent decision-making power improve innovativeness?

- How can we improve the absorptive capacity of service organizations for new knowledge? In particular, what is the detailed process by which ideas are captured from outside, circulated internally, adapted, reframed, implemented, and routinized in a service organization, and how might this process be systematically enhanced?

- How can **leaders** of service organizations set about achieving a **receptive context for change**; that is, **the kind of culture and climate** that supports and enables change in general? **A systematic review centering on the mainstream change management literature** (which we explicitly excluded from this review) is probably the most appropriate first step for this question.

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- What is the process leading to long-term **routinization** (with appropriate adaptation and development) of innovations in health service delivery and organization?

System Readiness for Innovation

- There is relatively little systematic research on the development of system readiness (i.e., the steps that organizations can take to assess and anticipate the impact of an innovation). The following questions should be addressed:

□ What steps must be taken by service organizations when moving toward a state of “readiness” (i.e., with all players on board and with protected time and funding), and how can this overall process be supported and enhanced? In particular,

(1) How can **tension for change** be engendered?

(2) How can **innovation-system fit** best be assessed?

(3) How can the **implications of the innovation** be assessed and fed into the decision making process?

(4) What measures enhance the success of efforts to secure **funding** for the innovation in the resource allocation cycle?

(5) How can the **organization's capacity to evaluate the impact of the innovation** be enhanced?

- 
- What are the characteristics of organizations that successfully avoid taking up “bad ideas”? Are they just lucky, or do they have better mechanisms for evaluating the ideas and anticipating the subsequent effects?

The Outer Context

- Aside from questions in the fields of **political science and macroeconomics**, the main research questions on the environmental context are the following:

- What is the nature of **informal interorganizational networking** in different areas of activity, and how can this be enhanced through explicit knowledge management activities (such as the appointment and support of knowledge workers and boundary spanners)?

- 
- What is (or could be) the **role of professional organizations and informal interprofessional networks** in spreading innovation among health care organizations?

- 
- What is the **cost-effectiveness of structured health care quality collaboratives** and comparable models of quality improvement, and how can this be enhanced?
 - To what sort of projects in what sort of contexts should resources for such interorganizational collaboratives be allocated?

- What are the **harmful effects of an external “push”** (such as a policy directive or incentive) for a particular innovation when the system is not ready?
- What are the characteristics of more successful external pushes promoting the assimilation and implementation of innovations by health service organizations?

Implementation

- Overall, we found that empirical studies of implementing and maintaining innovations in service organizations
- (1) had been undertaken from a **pragmatic rather than an academic** perspective and been presented as “gray literature” reports (which for practical reasons we did not include in this review);
 - (2) were difficult to disentangle from the literature on **change management** in general; and
 - (3) were impoverished by lack of process information. We recommend that further research focus on the following two questions:

- By **what processes** are **particular innovations** in health service delivery and organization implemented and sustained (or not) in **particular contexts and settings**, and can these processes be enhanced?
- This question, which was probably the most serious gap in the literature we uncovered for this review, would benefit from in-depth mixed-methodology studies aimed at building up a rich picture of process and impact.

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- Are there any **additional lessons** from the mainstream change management literature (to add to the diffusion of innovations literature reviewed here) for implementing and sustaining innovations in health care organizations?