Innovation as emergence in healthcare: Unpacking change from within

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ABSTRACT

The contemporary healthcare literature suffers from a disproportionate focus on 'given' externally created innovations, and belief in ordered, planned and well-funded implementation processes. As an alternative, the present paper highlights the potential of emergent change processes, using the continuous invention and re-invention of the Rheumatology Quality Registry in Sweden as an example. This 19 year long process, which is still ongoing, does not exhibit the sequential steps that are allegedly determinants of success in the innovation and implementation literature. Yet, it has produced system-wide improvements. We draw on more than 100 informal and formal meetings with practitioners involved in the process studied, observations, documentation analysis and quantitative registry-data. A total of 67 interviews with registry-users and external stakeholders were also performed. The dissipative structures model (complexity theory) was used to analyze the data. The studied process illustrates an ongoing, practice-driven improvement process, which was sparked by abstract and indirect energies that interacted with more concrete innovations such as new drugs. For example, participants tapped new information technologies, changing perspectives and governmental priorities to challenge current ways of working and introduce new ideas. Ideas were realized and spread through various self-organized processes that involved the re-arrangement of existing resources rather than acquisition of new resources. Taken together, these processes brought Swedish rheumatology to new levels of functioning 1992–2011.

An important implication of our work is that incremental and practice-driven change processes can significantly transform care systems in the long run. Policy makers need to acknowledge and foster such ongoing innovation processes at micro-level, rather than focusing exclusively on innovations as externally created 'things' that await 'implementation'.

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Introduction

A major concern of today's policy makers is that a majority of improvement efforts in the health care sector fail to result in sustained impact (see e.g. Länsisalmi, Kivimäki, Aalto, & Ruoranen, 2006). Numerous articles in the health care innovation literature address this situation, suggesting ordered and sequential models for "optimal implementation processes" that underline the need to define the innovation, secure managerial support, and funding. The typical lack of fidelity to such ordered models in practice may, from this perspective, explain the difficulty to achieve long-term improvement (Becker, Dumas, Houser, & Seay, 2000; Castle, 2001; Cohen et al., 2004, see also review by Greenhalgh, Robert, Macfarlane, Bate, & Kyriakidou, 2004; Länsisalmi et al., 2006).

Is it not possible, then, to achieve large-scale changes without managerial support? Without a clear strategy from the outset? With an innovation that has *not* been subject to randomized controlled trials? Is it possible to achieve change through messy and diverse rather than ordered processes?

Readers informed by the nascent healthcare literature inspired by complexity theory would probably answer yes to this question. This literature emphasizes that health care systems consist of a large number of interconnected agents that can self-organize in highly unpredictable ways (McDaniel & Driebe, 2005; Plsek & Greenhalgh, 2001). There is however still a lack of studies applying complexity theory to empirical cases in ways that highlight the potential of and flesh out the mechanisms involved in self-organized innovation.

The present paper seeks to begin to fill this gap by analyzing the nationwide spread of and continuous re-invention of an IT-based 'quality registry' and associated re-invention of rheumatologist

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practice in Sweden. The process started with an idea about measuring results in a new way among a few practitioners in 1992, an idea, which has not only been materialized in the form of an IT-system implemented in all 64 rheumatology clinics in Sweden. It has also evolved into a multi-professional and cross-sectorial model for health care innovation and improvement. The 19 year long process, which is still ongoing, does not exhibit the sequential steps that are allegedly determinants of success in mainstream innovation or implementation studies. Yet, its results are remarkable in terms of the reach and range of changes achieved.

We use the dissipative structures model (DSM) (Chiles, Meyer, & Hench, 2004; Plowman et al., 2007; Prigogine & Stengers, 1984), a branch of complexity theory, to conceptually unpack this incremental and *ongoing* process of innovation and change. At more practical level, our empirical material shows how significant health care improvement can be achieved by practitioners that do not wait for policy changes or directives, but rather find ways of making do with resources at hand. This suggests that 1) organic change, which starts out small, can escalate into system-wide changes within the healthcare structures that prevail today. This is important as the repeated mantra that 'policy changes' are needed creates a passive mentality. However, 2) much can be done at structural level to facilitate and boost such practice-driven innovation, rather than, as is too often the case today, impede it.

Limitations in the health care innovation and implementation literatures

Innovation can be defined as "ideas, processes, products or procedures, new to the relevant unit of adoption, designed to significantly benefit the individual, the group, or wider society" (West, 1990: 309). A large share of the contemporary health care literature focuses on the *implementation* of readymade innovations, trying to provide a "prescription" for achieving sustainable implementation and adoption of innovations. The theory developed by Rogers (1983) has had a pervasive influence in this context, suggesting five "innovation attributes" effect adoption: relative advantage, compatibility, complexity, trialability and observability. While these are important aspects, the mere application of Rogers' (1983) theory tends to generate rather obvious conclusions rather than arguments that bring implementation science forward. For example, Scott, Plotnikoff, Karunamuni, Bize, and Rodgers (2008) conclude: "…if a potential user sees no advantage in using the innovation it will not be adopted." (pp. 6). In general, many recent studies repeat the need to conform to previously listed success models. For example, Glaser (2009) emphasizes the need for having clear strategies, objectives and plans, managerial support, efficient IT governance in place; and measures of performance of the implementation process. Further, van Achterberg, Schoonhove, and Grol (2008) apply a stepwise approach and model for "effective implementation", which include a series of rational and deliberate steps in order to accomplish practice improvement.

This focus on orderly implementation processes has been questioned. For example, authors have suggested that successful implementation involves the unpredictable interaction between various forces at multiple-level, and that local champions are as important as the manager. Scholars further underline that the innovation-system fit is a more useful construct than Rogers' (1983) "innovation attributes" (Greenhalgh et al., 2004; Ovretveit, 2002).

The mainstream literature has also been criticized for its short-term and single-level focus (Greenhalgh et al., 2004; Länsisalmi et al., 2006), which is associated with the focus on the implementations of specific programmes (e.g. Dixon-Woods, Bosk, Aveling, Goeschel, & Pronovost, 2011) as opposed to longer-term studies of how programmes are renewed and replaced over time.

Finally, an important critique against the literature is the predominant view of innovations as proactively developed in external, formal research programs. However, as argued by Greenhalgh et al. (2004: 604), "many innovations in service delivery and organization occur as "good ideas" in local services". The innovations produced through such embedded processes of adapting practice differ from innovations as envisioned in the evidence based medicine framework in that they are not finished "products". Rather they can be viewed as improvable ideas. The question is: How do you implement an improvable idea — a possibility that others can use and further develop?

The present paper seeks to begin to answer this question. We do not separate *the generation* of innovations from their implementation. In the process studied, these dimensions were inextricably interlinked to each other.

A framework for studying change from within

Indeed, what was salient in the process studied was the need to focus on innovation as an *ongoing activity embedded in everyday practice*, rather than a thing awaiting implementation. Previous work on complexity theory in health care helped us approach this case. Works by McDaniel and Driebe (2005) and Plsek and Greenhalgh (2001) suggest that health care systems should be viewed as complex adaptive systems (CASs), characterized by diverse agents who can learn, self-organize, and co-evolve with their environment in non-linear ways. Order and progress can emerge naturally from the interactions within a CAS, they do not need to be imposed centrally or from outside.

What dynamics may be involved in such self-organized processes? The extant literature on health care as CAS does not provide empirical elaborations on this issue. Hence, the present paper draws on the dissipative structures model (DSM) (Prigogine & Stengers, 1984), which posits four interacting dynamics of emergence that have been confirmed inductively in several empirical studies of social settings (Chiles et al., 2004; Plowman et al., 2007). Building on this framework our proposition is that change processes can be triggered by *fluctuations*, the injection of energy in terms of a new idea, technology, product, policy or other event that interrupt the existing order — "way of doing things" — create disequilibrium, and catalyze the emergence of a new order. *Amplifying Feedback Dynamics* fortify the initial fluctuations, helping the emerging new order to take hold and gain momentum. There is no central agent controlling how the energy is repeatedly channeled through these self-organizing feedback-loops. Deviation is amplified until a threshold is reached, where the system has reached the limits of its capacity. At this threshold, the system can collapse or reorganize through *recombination dynamics* in which the system's existing elements are reused, rearranged, reconstructed, re-leveraged, and re-created. Finally, *stabilizing dynamics* constitute a "quasi-permanent, invisible substructure" that, unlike many observable structures, remains intact during major transformations, takes the form of basic social rules that comprise fundamental organizing principles. Stabilizing dynamics dampen the non-linear process and institutionalize the change. This process repeats itself, generating a continuous evolution of new orders that replace previous orders. That is, emergent processes can disrupt existing orders or norms, in a self-organized or *from within* manner.

Drawing on the DSM, it is possible to situate acts of innovation and implementation in a process of emergent change that involves the continuous interaction between the enabling and constraining mechanisms at micro- and macro-level, producing results that may drift from the original intention of the inventors, implementers and users. Hence, in contrast to conventional views that describe attempts to deliberately spread a "finished" innovation in order to