Promoting a New Practice in Hospitals: A Qualitative Comparative Analysis of Alternative Designs

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INTRODUCTION

The full implementation of innovations is crucial to improve the delivery systems of professional organizations. Full implementation is achieved through a "process of gaining targeted employees' appropriate and committed use of an innovation" (Klein & Sorra, 1996, p. 1055) and basically involves two actions: (i) a correct *application* of innovations in the work context and (ii) an effective *promotion* of its committed use among the employees. In the first stage, "new ideas" translate into workable "innovations" that may be used by professionals. In the second stage, new practices progressively cease to be "innovation" and become "routines." When promotion is ineffective, however, a workable innovation falls short and its operational or economic advantages fail to materialize.

Past research shows how typical the latter scenario is, with a considerable number of innovations that were applied in the workplace, but rejected by professionals (e.g., Fiss & Zajac, 2006). Understanding how and why innovations obtain professionals' committed use has thus become a primary concern in studies of innovation implementation. The attention has focused, in particular, on the narratives and discourses deployed by innovators to promote new practices and by opponents to reject or circumvent their use (Sonenshein, 2010). Power dynamics, information asymmetry, and professional autonomy have become the typical factors under investigation; innovation rejection, reinvention, and partial implementation, instead, the most recurrent end-results.

While focusing extensively on the content of promotion, one basic question remains open: Does the *design* of promotion activities and roles also have any relevant impact on the successful implementation of innovations?

Our work moves in this direction by exposing the findings from the implementation of a telemedicine system in 12 hospitals in Northern Italy. The cases provide a peculiar opportunity to investigate the role and design of promotion. The 12 hospitals were exposed to an identical technological innovation which was always properly applied everywhere and was regarded by any user as easy to use, inexpensive, and effective for patients. Despite these premises, only few hospitals achieved full implementation, while the rest failed. This heterogeneity could be attributed only to a different engagement in promotion and, specifically, to a different design of its activities and roles.

We will investigate these cases following two steps. First, we engage in a comparative case analysis that describes the

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different promotion strategies adopted by the implementing units. Four distinct configurations eventually lead to an extended diffusion of the system. Building on this result, we then engage in qualitative comparative analysis (QCA) that allowed identifying three alternative combinations of conditions for successful promotion.

INNOVATION PROMOTION: KNOWLEDGE AND GAPS

Past research has primarily followed two research streams: (a) describing the narratives and discourses adopted by whom promotes or resists the change, (b) identifying the behaviors exhibited by "champions" of technological innovation. A third stream, concerning the organization of promotion activities has instead lingered unaddressed.

The first stream addresses the *content* of innovation promotion. Innovation creates novel situation which interrupts existing routines and requires participants to acquire new meanings, enact new patterns, and accept changes in power relations and work autonomy. Innovation promoters thus engage in processes of "sensegiving" that seek to establish the new meaning (Munir & Phillips, 2005). Sensegiving is typically a comprehensive discourse that goes beyond the simple provision of evidence on quality and efficiency, and addresses also issues of power, professional autonomy, and routines (Ferlie, Fitzgerald, Wood, & Hawkins, 2005; Labatut, Aggeri, & Girard, 2012). Its narratives are instrumental to draw employees' attention and acceptance toward the new practice and establish new boundaries for acceptable behavior in organizations (Bartel & Garud, 2009; Sonenshein, 2010). Specifically, "narratives impart legitimacy to new ideas by establishing plausibility rather than removing doubt" (Bartel & Garud, 2009, p. 112).

Notably, narratives have been typically studied in professionalized contexts such as hospitals, law firms, and universities. This is unsurprising because the divide between promoters and opponents of change reaches here distinguished heights. The reason is twofold. On one hand, professionals tend to resist more than other employees. Principles of professional autonomy, in fact, foster an "encapsulation" (Llewellyn, 2001) of workers in professional niches and stimulate a higher attention to protect the work from external interferences (Power, 1997; Thomas & Davies, 2005). On the other, professionals can resist better. Their professional autonomy also begets a favorable position whereby they can resist the innovation without losing their authority or being sanctioned. Professionals possess, in fact, expert knowledge that cannot be fully accessed nor questioned by "laypersons," that leading to the virtual impossibility to mandate nor monitor professionals' use (Dopson, 1996; Ferlie, Ashburner, Fitzgerald, & Pettigrew, 1996). Persuasive narratives become the only strategy for change that managers can adopt to advance innovation implementation (Doolin, 2002; Llewellyn, 2001; Thomas & Hewitt, 2011).

The second research stream concerns the *actors* responsible for innovation promotion. Past researches have dedicated significant attention to the features and behaviors of a specific type of organizational actors, called either "innovation champions" or "hero innovators." Kessler and Chakrabarti (1996) provided a clear-cut description: "champions are characterized as highly committed and persistent individuals who typically demonstrate a willingness to sacrifice position or prestige in order to complete the product innovation." Specific ways in which they increase the speed of innovation include their ability to overcome resistance, get resources, "sell" the project, coordinate activity and facilitate communication, and motivate key participants. Champions typically act as advocates to overcome organizational resistance or apathy (p. 1167). Several contributions report a positive influence of champions' behavior on innovation speed, new product development (Markham & Griffin, 1998), and project performance (Howell & Shea, 2001). At the same time, an overt reliance on champion behaviors has been panned. Georgiades and Phillimore (1980), in particular, denounced a "myth of hero innovators" and observed:

> the idea that you can produce, by training, a knight in shining armour who, loins girded with new technology and beliefs, will assault his organisational fortress and institute changes both in himself and others at a stroke. Such a view is ingenuous. The fact of the matter is that organisations such as schools and hospitals will, like dragons, eat hero innovators for breakfast. (p. 113)

This warning encouraged different analyses of the conditions under which champions are effective. Most notably, Howell (2005) provided a comprehensive overview of (a) features and behaviors that distinguish effective champions, e.g., framing novel ideas as opportunities rather than threats, using both formal and informal channels, extensive relational knowledge, and finally a favorable position in the network (cf. Howell & Boies, 2004, Walter, Parboteeah, Riesenhuber, & Hoegl, 2011) and (b) actions that could "breed" champions within an organization, e.g., coaching activities, recognizing innovation achievements, and raising the profile of champions, and "without [which], innovation will remain a random event" (p. 117).

The third stream of research, finally, concerns the *organization* of promotion activities and has accumulated only limited attention. Past research has not produced unambiguous knowledge on, for instance, how promotion champions could best organize their efforts to advance their discourse. We have instead multiple open questions about the role of design in the promotion of innovations. One open question stands out: What are—if any—aspects in the organization of promotion efforts that support its full implementation or explain its failure?

INTRODUCTORY INFORMATION ABOUT THE CASE

We addressed this question through a comparative case study on the implementation of tele-monitoring of chronic heart failure (CHF) in 12 cardiologic units in a Northern Italian region. This telemedicine system sought to establish a novel practice in cardiologic delivery, i.e., the remote monitoring and follow-up of patients.

The implementation of telemedicine services is a fitting context to investigate partial implementation. Despite well-established clinical and potential advantages, in fact, promises, telemedicine experiences have long—almost typically—struggled to achieve full implementation because of organizational impairments (May et al., 2003). In particular, they are often alienated by users who do not accept the significant changes resulting in their care practice (e.g., different delivery system, contacts with patients, access to data), intra-organizational relationships (e.g., new hospital roles, communication patterns among professionals) and professional autonomy (e.g., higher visibility of actions by external actors). Unsurprisingly, past research has concentrated in the specific context of telemedicine to study implementation activities (Nicolini, 2010).

Chronic care models also represent a departure from traditional forms of delivery that struggles to be introduced. Hospitals are urged to prepare to face chronic care diseases, which are becoming increasingly relevant, clinically and economically relevant. The commitment to chronic care models, however, is typically resisted because they divert some time and economic resources away from acute events, where the potential for fatalities and adverse events is higher and more visible.

Application of the Innovation

The 12 cardiologic units were all comparable in terms of size and amount of eligible patients. Differences in hospital-related factors (e.g., overall dimension, public/private nature, teaching/generalist approach) were, instead, not relevant (cf. Table 1). The different experiences could thus be pooled together and compared.

The CHF system was identical in the 12 hospitals in terms of pathway and technologies. The innovation was proposed by a common regional authority which corresponded an experimental fee under three conditions: (a) specific inclusion criteria of patients; (b) observing a pre-established care protocol; and (c) using pre-established technologies. The CHF system was designed to be as simple as possible in order to be immediately implemented in hospitals. It consists of a periodic transmission of electrocardiograms (ECGs) (from patients to hospital), followed by weekly phone calls where nurses control on a weekly basis that patients' data (e.g., weight) are under control. No unit encountered problems in following the pathway or in using the technology.

TABLE 1
Eight Different Scenarios

Case ID	*Planning of effort*	*Involvement*	*Hero innovator*	*Diffusion*
Zeta, Mi, Delta	Implicit	Individual	Absent	No
Eta, Lambda	Explicit	Individual	Absent	No
Iota, Gamma	Implicit	Team	Absent	No
HP1	Implicit	Individual	Present	No
Kappa, Epsilon	Explicit	Team	Absent	Yes
Beta	Explicit	Team	Present	Yes
Theta	Implicit	Team	Present	Yes
Alpha	Explicit	Team	Present	Yes

All 12 units were in a same, favorable, condition in terms of *application* of the innovation.

Implementation of the Innovation

We measured the degree of full implementation through two indicators. First, we accounted for the "quantitative" diffusion of system, i.e., the number of patients enrolled in the service. Informants—separately during interviews and together in a final focus group—agreed on 30 patients (per year) as the threshold between cases of effective diffusion. This indicator was not sufficient because the inclusion of many patients could have been done at the expense of rigorous activities. We then accounted for hospitals' compliance to pathway requirements. The number of weekly phone calls—one per week—represents the explicitly required indicator of compliance. In only five of 12 cases, both thresholds were surpassed (Figure 1).

This result was surprising, given the common success in the application of the service. The research then looked forward what could explain the differences. In particular:

a. What were the key variables that contributed to full implementation?
b. What were the key behaviors that contributed to full implementation?

It is beyond the scope of this paper to detail all the findings related to these two research questions. It is worth noticing,

PARTIAL IMPLEMENTATION (# Patients < 30 OR # Weekly Phone Calls < 1)	FULL IMPLEMENTATION (# Patients ≥ 30 AND # Weekly Phone Calls ≥ 1)
ZETA MI DELTA ETA LAMBDA IOTA GAMMA	KAPPA EPSILON BETA THETA ALPHA

FIGURE 1 Implementation of telemedicine pathways in the 12 cases.

TABLE 2
Conventions of Boolean Algebra

Convention	*Meaning*	*Interpretation*
Uppercase letter	It represents the (1) value for a variable or an outcome	Presence of the outcome (or variable) or a characteristic of the outcome/variable (e.g., male, high, . . .)
Lowercase letter	It represents the (0) value for a variable or an outcome	Absence of the outcome (or variable) or a characteristic of the outcome/variable (e.g., female, low, . . .)
Dash symbol (-)	"Don't care value" for a variable	It means that is a value that can be present or absent. It means also that it could be a value that we don't know
*	AND	Combination between conditions
+	OR	Combination of conditions A OR combination of conditions B
→	It expresses the (causal) link between a set of conditions and the outcome	The combinations of conditions on the left side of the arrow lead to the outcome on its right

though, that differences in implementation could not be attributed to a different attitude or acceptance among professionals of the implementing unit. Differences related instead to the possession of (a) enough resources to work with the pathway and (b) the possibility to involve patients from other hospital units. The first was a necessary condition for managing a high number of patients. When nurses could be assigned to the service only for short time, no more than 20 patients could be feasibly followed. The second was instead the corridor for a broader inclusion of patients. Not all eligible patients were treated by the implementing unit; a significant number were instead managed by other cardiologic units, as well as by different general medicine units, or A&Es. The implementing unit had to ask for permission to involve other units' patients in order to increase the diffusion.

Both conditions were not pre-existing, but had to be secured by the implementing units. Precisely, (a) the vertical promotion of the service to managers was critical to have nurses that could focus only on follow-up activities; (b) the vertical promotion of the service to colleagues of neighboring units was critical to gain access to their patients.

Promotion, thus, proved to be the critical behavior that explains the different diffusion of the service. Those units that have not promoted "effectively" the service faced partial implementation. Conversely, effective units faced full implementation. This evidence ensued the following questions: (1) *What are the "effective" forms of promotion*? (2) *What made them effective?*

STEP ONE: COMPARATIVE CASE STUDY

We adopted a multiple-case study methodology to answer these questions. The methodology better addresses the exploratory and explanatory nature of the questions, and also reflect our intention to focus on contemporary events and not require control of behavioral events (Yin, 2003). As already hinted, our unit of analysis relates to the telesurveillance project and we selected all the 12 hospitals which formally adopted the innovation.

Data collection. Efforts of innovation promotion have been rarely documented formally. Few exceptions consisted in presentations and web reports and the artifacts (e.g., leaflets) used to document the nature of the pathway to others. These documents provide a partial understanding of the phenomenon. The primary source of information had to be direct interviews to key informants. We employed a semi-structured interview consisting of three parts: (a) description of the implementing unit, including information on past or parallel experiences with telemedicine; (b) description of the efforts to promote the service, with opinions on constraining/facilitating factors; (c) reports on the "reactions" by colleagues and top managers to whom the service was promoted. We undertook multiple interviews for each hospitals, to gather multiple perspectives and reduce biases. Key informants were: physicians responsible for the project, nurses managing patients, and physicians/interns supporting nurses (cf. Table 1).

Research Team. The interviews were conducted in January–June 2011 by a research team comprising three investigators. The investigators had different roles in the process. The first investigator led the interview and personally interacted with the informants. The second investigator was present in the interview but remained more detached, for external observations, taking notes and filling in gaps in the questioning. The third investigator did not meet the informants but worked on the transcripts.

Data analysis. All interviews were tape-recorded. In the close aftermath of the interview, the tape-recording was transcribed by an investigator. In addition, both the on-field investigators actively produced a parallel document with their field notes. The documents were the basis for the third investigator to propose his view on the case.

Findings. All professionals recognized the relevance of "follow-up." The common understanding, in fact, was that "heart failures will become more and more an epidemic. We can prevent acute events, so the hospital would save a lot of money and the quality of patients would largely improve" (head physician, BETA). Yet, in no case, the choice to allocate a nurse to the pathway could be accommodated

easily. All units had to face significant constraints in terms of financial resources and personnel. The comment: "there are already few nurses as it is, let alone introducing a new pathway" (physician, MI) was basically heard in every case. In a situation of limited resources, uncontested priority was granted to the treatment of acute events, so the decision to allocate one nurse to the pathway required a rationale from implementing units. This decision could fall—and fell in several cases—in a vicious cycle: "we don't have enough [tele-monitored] patients to dedicate a nurse to it; but won't have enough patients until we dedicate a nurse" (head physician, ALPHA). Promotion was required to loosen such constraints. Because doctors could not support the decision on an evidence-based basis, the promotion of CHF systems had to stimulate the perception of the gains and losses that the unit would achieve in medium/long term.

As anticipated, two distinct behaviors were performed: (a) *vertical* promotion in which top management was persuaded to dedicate personnel and (b) *horizontal* promotion to other units to access a higher number of patients. Different approaches to promotion were introduced to meet this purpose.

Cases of Effective Promotion

Five units diffused the new practice within and outside the implementing unit, i.e., physicians in the unit enrolled their own patients as well as patients from neighboring units such General Medicine, A&E, or other cardiologic wards.

ALPHA. This hospital displayed an impressive increase of enrolled patients: "We passed from 17 to 74 [patients] in a year, and the workload increase [suddenly became] impressive" (Physician). Notably, the implementing unit managed this increase with only one physician and one nurse devoted to the pathway. The nurse could dedicate days or mornings entirely to the pathway. At the beginning, "since we had only few patients, our nurse was a factotum in the ward" (physician). The effective promotion of the new service to managers allowed physicians to dedicate a morning or a workday entirely to the new practice. Promotion was a coordinated and planned effort by the physician and nurse: "together with [head physician] and [physician], we produced a booklet to inform patients. In accordance with our physician, I personally used these brochures to inform physicians from other units who were still not aware of our service. They started sending us a lot of patients after that" (nurse). Nurse's behavior was an example of "hero innovation" as she was regularly present in other wards to promote the innovation. Nurse's effort was coupled with parallel efforts by the physicians to both "passively" receive and address questions about the pathway and "actively" engage in promotion to other physicians. Accordingly, key features of Alpha approach were: planning of activities, presence of a hero innovator, and team involvement.

THETA. Theta followed a significantly different approach. Promotion was triggered by a physician's effort that sought to be "disruptive" of the mounting skepticism toward the pathway. The diffusion was initially inhibited by a lack of support from both top management and colleagues: "we had an apical system which told us that the majority of HF must be sent to the Medicines, and the bigger one [prefers] a traditional ambulatory approach" (physician). Similarly, "No colleagues wanted to have anything to do with this 'stuff,' now everyone likes it . . ." (physician). The initial resistance was overcome through a promotion effort which—unlike Alpha—was not gradual nor diffused, but rather radical and concentrated to a single individual. Specifically, "our challenge was to convince others that their patients could be sent to us . . . but once they saw me regularly come to check patients charts, [units' physicians] came to discuss the service with me and started sending them to us" (physician). Obtaining the support from top managers also involved a "push" from the physician, which resulted in two nurses allocated to the service. This accomplishment was crucial: "when we obtained these new nurses, I could finally spend more time recruiting from units" (physician). Nurses also had an active role in promotion: "we want our colleagues of Cardiology and Medicine to get in touch with our project, explaining them what we do, how we do it, and the results we are obtaining. Our nurses are involved in this in order to let [my colleagues] understand that when a nurse [promotes instead of me], they are dealing with a competent person [. . .] Doctors must begin conceiving a doctor-nurse team, and not just a doctor who gives orders to nurses" (physician). Overall, key features of Theta were: presence of a hero innovator, team promotion, and low activity planning.

BETA. The diffusion of CHF pathway was also triggered by the emergence of a "hero innovator." However, his champion behaviors were not part of a collective effort, but linked to a high degree of planning. In fact,

> settlements with the administration were sought. At the beginning, we had a rotation of three, four nurses who had to do a bit of this, a bit of that. It did not work, and [because of the problems] some nurses were not fully persuaded of the pathway. Then, [the former head physician] told the administration: we have begun, the system is worthwhile, but we need dedicated personnel. Having [the administration] appreciated the worth in the experience that far, they allowed for two dedicated nurses. (Physician)

The involvement of colleagues was heavily planned and eventually leads to the institutionalization of a routine: "when in Medicine, someone asks for a cardiologic visit, physicians contemplate the opportunity to admit them in CHF pathway. So they call us and settle an agreement with the nurse" (physician). Overall, key features of Beta were: presence of a hero innovator, individual promotion, and activity planning.

KAPPA, EPSILON. A key feature in the diffusion of the pathway was the lack of hero innovators and the adoption of gradual, "soft" approach. Kappa and Epsilon were two different realities, with Epsilon being a specialized center for cardiologic diagnoses and treatments, with a long history of telemedicine services. Kappa was instead a generalist hospital with a recent involvement in telemedicine. This difference ensued that while Epsilon had virtually no need for promotion, the same cannot be said about Kappa. Thus, in the former case, the "soft" approach was almost an obvious strategy; in the latter, instead, it was partially surprising given the inattention that preceded the use of CHF system. In fact, "post-hospitalization was still perceived as the last thing a physician should do . . . as the outpatient should remain *out*-patient" (head physician, Kappa). Instead of "pushing" others into the use of CHF pathway, however, a team of Kappa practitioners "pulled" others by means of quasi-contractual agreements and "informative" strategies. The result was that "nurses' office was impressed by it, and were happy some nurses were dedicated to it" (head physician, Kappa). The promotion thus leveraged on a collective effort that seeks to expand "We are organizing a group comprising cardiologists, nephrologists, and others that could amplify this program . . . and as it is becoming 'official,' others' participation is getting easier" (head physician). Overall, key features of Kappa and Epsilon were: absence of a hero innovator, team promotion, and activity planning.

Cases of Ineffective Promotion

Other hospitals did not engage in promotion behaviors or their promotion efforts did not achieve the expected results. In the first case, four hospitals (Zeta, Mi, Delta, and Lambda), for different reasons, did not engage in the explicit promotion of the pathway. Some informal promotion did indeed occur—mostly informal chats—but was not part of a systematic effort to support its diffusion. The lack of promotion failed to translate a workable innovation into a diffused pathway. Key features of Zeta, Mi, Delta, and Lambda were the absence of a hero innovator, individual promotion, and low activity planning.

Similarly, Iota and Gamma manifested an almost exclusive reliance on informal actions that provided information to colleagues and managers, but were not capable to win their attention and approval. While the communication efforts in Iota and Gamma were more structured than in the previously reported cases, they did not amount to an organized promotion of the pathway. Key features of Iota and Gamma were the absence of a hero innovator, team promotion, and low activity planning.

Eta, instead, displayed an organized promotion which failed to achieve the expected results because of a "struggle to marketize the program, also because the persons responsible for it have to do many other things . . . We sometimes try to remind the colleagues of the pathway, but with no [appreciable] result" (head physician). The promotional effort in Eta was characterized by the existence of planned efforts which, however, was not leveraged by either a coordination between the parties or by the champion behaviors of "hero innovators." Key features of Eta were: absence of a hero innovator, individual promotion, and activity planning.

Overview of the Cases

A comparison of the cases shows that three variables explained the different degree of implementation: (a) the existence/lack of explicit planning in the promotional activity; (b) the involvement of a team in the promotion of the innovation, or just a series of individual efforts; (c) the presence/lack of a "hero innovator" who "pushes" the innovation with radical interventions.

Other variables (e.g., users' predisposition to new practices, past experience with telemedicine, and top-management commitment) were also crucial for the successful diffusion. However, we selected the cases in ways that explicitly controlled for such variables, so that the cases did not differ in any of these aspects. This allowed us focusing on the design of promotional efforts and eliminates concurring causes.

Accordingly, we can synthesize the existence of eight different scenarios (Table 1).

Building on these premises, we sought to generalize the findings and identify general conditions about successful promotion. Comparative case studies are not fully appropriate to produce the expect level of generalization (Rihoux, 2006). None of the statistical techniques could be employed as we are placed in a gray area of "moderate" number of case studies. These limitations can be overcome with QCA, which seeks to accommodate the goal of generalization within the boundaries of a moderate number of cases (Ragin, Shulman, Weinberg, & Gran, 2003).

STEP TWO: QCA

QCA is both an approach and a research method (Ragin, 1987, 1999; Wagemann & Schneider, 2010). QCA-as-approach understands and tests theoretical assumptions with empirical data. QCA-as-approach, being at a middle way between qualitative and quantitative method, is aimed at integrating the best features of the two approaches (Rihoux, 2003).

Theoretical Ground of QCA

A basic assumption of QCA is the concept of "causal complexity"—otherwise known as "equifinality" or "multiple conjunctural causation"—i.e., the same empirical outcome of social phenomena results from different and

non-overlapping combinations of conditions (Ragin, 1987; Rihoux, 2003). In situations in which no single causal condition is necessary or sufficient for an outcome to occur, researchers are likely to create ideal-type categories for their cases. Researchers then try identifying causal commonalities and differences within each category in order to explain the occurrence of the outcome (Ragin, 1999). Researchers, however, achieve only a "presumption" that the causal conditions are strictly linked with the outcome. QCA overcomes this limitation by assuming that different combinations of causal conditions may lead to the same outcome. QCA, thus, searches for causal conditions and assesses which combinations are sufficient to produce the outcome.

In this regard, the notions of "sufficient" and "necessary" conditions need to be explained. A cause is sufficient if it is invariably followed by the outcome (Ragin, 1999). Stated otherwise, when that condition is present, the outcome will always be present. As such, a sufficient condition is called *sub-set* of the outcome (Ragin, 2000). On the other hand, a cause is necessary if it is present in all instances of the outcome (Ragin, 1987, 1999). Stated otherwise, when the outcome is present, the condition is also present. As such, the necessary condition is called *super-set* of the outcome.

Operational Concepts of QCA

QCA adopts the logic of Boolean algebra (Rihoux, 2003; Wagemann & Schneider, 2010). Table 2 presents the conventions incorporated in QCA. The first step in every QCA analysis is the development of a truth table, which shows all the possible combination of conditions depending on the number of conditions. Table 3 presents the five possible types of configurations (Rihoux & De Meur, 2009).

Afterward, the so-called "Boolean minimization" reduces long and complex expressions into a shorter and more parsimonious one. The process can be summarized as follows: "If two Boolean expressions differ in only one causal condition yet produce the same outcome, then the causal condition that distinguishes the two expression can be considered irrelevant and can be removed to create a simpler, combined expression" (Ragin, 1987, p. 93).

TABLE 3
Possible Types of Configurations

Configuration	*Notation*	*Definition*
1	Uppercase letter	Configurations that always lead to 1 outcome
O	Lowercase letter	Configurations that always lead to 0 outcome
"Don't care"	–	Configurations with an undetermined outcome
Contradictory	C	Configurations that lead to 0 outcome value for some observed cases, but to 1 value in others
Logical reminder	L or R	Logically possible combinations of conditions that have not been observed among empirical cases

Finally, the validity of the analysis is assessed in terms of *consistency* and *coverage* of the findings. Consistency can be defined as "the proportion of cases with a given cause or combination of causes that also display the same outcome" (Ragin, 2006). It is computed as the proportion of number of cases with a (1) value on the condition AND a (1) outcome value compared with the total number of cases with a (1) outcome value. Coverage, instead, measures the proportion of empirical cases explained by a combination of conditions. It is computed as the number of cases with the same causal path AND a (1) outcome value compared with the total number of cases with a (1) outcome value.

Application to Cases

We employ QCA to answer the following question: Which are the general conditions that lead to successful promotion? The comparative case study described *planning of effort, involvement*, and *hero innovator* are the three conditions that explain the differences between the 12 cases.

Operationally, the three conditions and the outcome all have a dichotomous nature. Planning of effort has 0 value ("pleff") when no formal planning of promotional activities existed and there were only extemporaneous and informal meetings. On the other hand, it has 1 value ("PLEFF") when promotion activities were pre-planned, e.g., meetings in which the team established step by step the implementation process or the division of labor. Involvement assumes 0 value ("inv") when there is only an individual effort and 1 value ("INV") when the effort was coordinated at team level. Hero innovator with a 0 value means its absence ("hinn") and, on the contrary, a 1 value indicates its presence ("HINN"). Finally, the outcome "successful promotion" has 1 value ("SUCPROM") two conditions occur: (a) the promotional message was vertically received by the leaders that, in turn, financed the project because they were persuaded of its success; (b) the promotional message was horizontally received by colleagues of other units and they accepted the inclusion of their patients in the experimentation; 0 value otherwise ("sucprom").

Table 4 shows the specific combinations of conditions.

This is the starting point for building the truth table with all the possible 2^k configurations (k represents the number of conditions). In our research, three conditions generated eight distinct configurations of conditions. A logical reminder concerned the case of pleff-inv-HINN, i.e., an approach to promotion that relies exclusively on an individual hero innovator. This is indeed the case that contributions about "the myth of hero innovators" already discredited. These contributions inform us—with sufficient confidence—of its non-success. We thus have give 0 value to the outcome. The truth table is shown in Table 5.

TABLE 4
Case Study, Three Conditions, Outcome

Cases	*Pleff*	*Inv*	*Hinn*	*Sucprom*
Alpha	1	1	1	1
Beta	1	0	1	1
Gamma	0	1	0	0
Delta	0	0	0	0
Epsilon	1	1	0	1
Zeta	0	0	0	0
Eta	1	0	0	0
Theta	0	1	1	1
Iota	0	1	0	0
Kappa	1	1	0	1
Lambda	1	0	0	0
Mi	0	0	0	0

TABLE 5
Truth Table, Three Conditions, Outcome

Caseid	*Pleff*	*Inv*	*Hinn*	*Sucprom*
Zeta, Mi, Delta	0	0	0	0
Eta, Lambda	1	0	0	0
Iota, Gamma	0	1	0	0
Hp1	0	0	1	0
Kappa, Epsilon	1	1	0	1
Beta	1	0	1	1
Theta	0	1	1	1
Alpha	1	1	1	1

A brief assessment of the truth table quality can be conducted following the checklist presented by Rihoux and De Meur (2009): (a) there is a mix of cases with positive outcome and cases with negative outcome; (b) there are no counterintuitive rows (all 0 condition values lead to a 1 outcome or all 1 condition values lead to a 0 outcome); (c) there are no conditions that display exactly the same value across the cases.

Because of the dichotomous nature of the variables and the low number of cases, we used csQCA and Tosmana software (version 1.3. Beta) developed by Lasse Cronqvist in order to carry out the Boolean minimization process.

Analysis of Positive Outcomes

We first analyzed those situations in which successful promotion occurs. The long expression represents the combination of conditions that produce the 1 value outcome (Equation 1):

$$\text{PLEFF}^{*}\text{INV}^{*}\text{hinn} + \text{PLEFF}^{*}\text{inv}^{*}\text{HINN}^{*} + \text{pleff}^{*}\text{INV}^{*}\text{HINN} + \text{PLEFF}^{*}\text{INV}^{*}\text{HINN} \rightarrow \text{SUCCPROM} \tag{1}$$

The equation contains four terms and each term contains all the three conditions. It is thus possible to deploy the Boolean minimization for a simpler and shorter expression. The synthetic solution is (Equation 2)

$$\text{PLEFF}^{*}\text{INV} + \text{PLEFF}^{*}\text{HINN} + \text{INV}^{*}\text{HINN} \rightarrow \text{SUCCPROM} \tag{2}$$

The consistency level of this solution is 0.8, beyond the threshold of acceptability.

We can therefore affirm that: successful promotion can occur (a) when there is a combination of planned effort and a team effort OR (b) when the effort is planned and there is a hero innovator OR (c) when there is a team effort combined with a hero innovator.

Analysis of Negative Outcomes

As highlighted by Rihoux and De Meur (2009), it is important to minimize also negative outcomes (Sucprom = 0), because social phenomena are not characterized by a perfect causal asymmetry. The intermediate solution for a negative outcome is (Equation 3)

$$\text{Pleff}^{*}\text{inv}^{*}\text{hinn} + \text{PLEFF}^{*}\text{inv}^{*}\text{hinn} + \text{pleff}^{*}\text{INV}^{*}\text{hinn} + \text{pleff}^{*}\text{inv}^{*}\text{HINN} \rightarrow \text{sucprom} \tag{3}$$

The Boolean minimization process delivered the following synthetic solution is (Equation 4):

$$\text{inv}^{*}\text{hinn} + \text{pleff}^{*}\text{hinn} + \text{pleff}^{*}\text{inv} \rightarrow \text{sucprom} \tag{4}$$

The consistency level of this solution is 0.8. We can therefore affirm that: an unsuccessful promotion occurs when (a) there is a combination of individual effort and the absence of a hero innovator OR (b) informal planning of promotional activities and the absence of a hero innovator OR (c) informal planning and individual effort.

DISCUSSION

Promotion was crucial for the full implementation of the new practice in the professional context of hospitals. Promotion translated a "successfully applied" innovation into a diffused routine. Efforts to diffuse the use of the practice involved a whole-around strategy of communication that went beyond choosing "what to say" and "who promotes." The study indicates that three specific design choices—planning of promotion activities, use of hero innovation, and involvement of teams—were relevant for a successful promotion, but only under specific situations. We will review them one by one.

First: Does planning promotion activities make any difference? If so, under which conditions?

These questions may appear naive, as it is commonly understood that any activity beneficiates from earlier planning. It becomes less obvious, however, once we consider the previous literature on "innovation promotion" which emphasizes the relevance of emergent (and often spontaneous) narratives and the use of informal (and often casual) communication. This evidence may insinuate the doubt that "planning promotion efforts" are not necessary or even effective. As a matter of fact, our results also show that promotion planning is not necessary nor sufficient. On one hand, we have one case (THETA) in which it was absent, but the promotion still succeeded. The coordinated efforts of hero innovators acted as substitutes. On the other, cases such as ETA showed that an early planning of promotion fail to materialize in effective diffusion. In these cases, planning gave a "strategy," but not enough "voice" to attract others' attention. Overall, planning contributes to full implementation once it leverages on either a collective effort or the presence of at least one "hero innovator." In the first regard, in particular, the coordination of efforts between physicians and nurses was sufficient to gain legitimacy for the innovation, without any need to have hero innovators. Sensemaking from potential users was elicited by exposing multiple versions and voices about the new innovation, each from a specific perspective. The result was an organized and multifaceted representation of the innovation. Team efforts and planning balanced each other: team promotion without planning created different narratives which did not coalesce; planning without coordination is grounded on a single-voiced narrative that may not convince potential users. The latter situation was tempered when that single voice was a hero innovator, i.e., "strong" enough to push the change. In this case, users' trust in the person is a significant reinforcement—and maybe even substitution—for a lack of all-around promotion.

This consideration leads us to the second condition: Are hero innovator relevant? Under which condition is their role exploited? Contributions to the "myth of hero innovator" implied that these figures are irrelevant or even counterproductive. Our results are consistent with the notion that an individual cannot single-handedly push the change. The presence of "hero innovators" was a neither sufficient nor necessary condition for change. At the same time, hero innovation was not harmful. Hero innovators provide a positive "impetus" to change; at the same time, this impetus must be organized because the burden of promotion was too heavy to fall onto one unprepared shoulder. Hero innovation must be coupled with explicit planning and/or team-level coordination. In the former case, the individuals organized the time and effort for the promotion in ways that could be consistent with their workload; in the latter case, the weight of promotion was shared by multiple actors.

This consideration stresses the utility of team involvement. Specifically, do coordinated efforts make any difference? If so, under which conditions? Past research did not help us because innovation promotion has been investigated only as an individual effort or as a sum of individual efforts. We contend, instead, that promotion is also a property of team innovativeness. In several cases, promotion was more than a sum of individual actions, but rather a *coordinated* action. Such coordination did not necessarily involve a planning of activities, but always required a clear division of roles, the engagement in collective actions. The coordination of efforts has similar role to "hero innovation," i.e., give weight to the "push" to change. Differently from "hero innovation," though, it does not rely on an impetus to change, but rather on a polyphony. We observed that team efforts and "hero innovation" can both coexist, and act as a mutual substitute. The latter circumstances are not surprising in the context of hospitals. Past research shows that hospitals have a professional hierarchy in which doctors are at the top and nurses are playing a subordinate role (Abbott, 1988; Battilana, 2011). Communication typically flows (1) horizontally between doctors of different units, and (2) vertically from doctor to nurses within the unit. Rarely "oblique" communication—from nurses of a unit to doctors of another or from doctors of a unit to nurses of another—alters the decisions of the recipients. In our context, team effort—and, in particular, nurses' involvement—was not necessary. In neighboring units, only doctors had to be convinced because their nurses were not involved. Thus, nurses of the implementing unit may not be involved if doctors' hero innovation proved sufficient.

At the same time, team promotion is an important alternative mechanism of suasion because not every health care unit can count on doctors that can or intend to act as hero innovators. Our study, for instance, encountered several cases of overwhelming workloads and professionals renounced to promote the innovation because this time-consuming effort conflicts with care. The possibility to coordinate efforts brought the possibility to maintain "strength" in promotion. The lack of hero innovation was sublimated by the use of nurse-to-nurse and nurse-to-doctor communication. On one hand, nurses (from the implementing unit) promoted the innovation to nurses of the other units, which in turn activated bottom-up discussions of the CHF system with doctors. Alternatively, nurses coupled doctors in the promotion of the innovation to doctors of other units. A juxtaposition of multiple narratives accrued to the legitimization of the innovation—the pathway is clinically relevant (physician) and the pathway is operationally sustainable (nurse)—while reducing the "weight" of promotion from the shoulder of a single doctor.

Moving beyond the findings of our cases, we can expect the role of collective efforts to increase for multidisciplinary innovations. CHF system pertains exclusively cardiologic issues. Professionals from other disciplines (e.g., general medicine) contribute "only" by providing their eligible patients. In this case, a cardiologist's knowledge can cover the entire spectrum of information regarding the utility of innovations. Accordingly, s/he can "handle" the promotion

alone, knowledge-wise. Multidisciplinary innovations are instead too complex for a single individual or disciplinary perspective because specific knowledge domains are best communicated by others. Whether un-coordinated collective efforts are sufficient or coordinated team efforts are necessary to promote innovation is an open question that we leave to future consideration.

Practical Implications

QCA provides a triplet of strategies that professional organizations can enact to facilitate the full implementation of innovations. This is an issue of primary interest for managers and professionals because of the recurrent struggles to change established routines. A key practical implication is the need for managers and professionals to devote explicit attention on promotion. Such implication is not trivial in the context of professionalized contexts such as hospitals. Professionals are, in fact,

> largely designed to focus on, harvest, and protect existing practices rather than pay attention to developing new ideas. The more successful an organization is the more difficult it is to trigger peoples' action thresholds to pay attention to new ideas, needs, and opportunities. (Van de Ven, 1986, p. 591)

In these contexts, professionals are pressured to focus on their core and time-consuming activities—such as the provision of care. Promotion is rarely perceived as a required behavior by professionals, who instead may perceive as inappropriate an involvement in innovation-related tasks. Unsurprisingly professionals engage in no promotion or in spontaneous initiatives whose success is often limited.

The reliance on "hero-innovation" is thus an ambiguous strategy because it requires a lot of time and effort—which is what professionals lack given the nature of their work. Managers and practitioners of professional organizations are suggested here to appreciate the role of *design* in the success of promotion. Notably, each combination identified by the QCA includes at least one *design-related* element. In one case, the combination of two design-related elements allowed the implementing units not to resort to "hero-innovation"—which, it should be stressed, is not necessarily available in an organization. Specifically, the attention to *plan* promotion activities and the emergence of *teams* can allow implementing organizations or units not to rely on the emergence of hero innovators.

Our findings support indeed the notion that the identification of hero innovators is still a plausible action for the organizations, as champion behaviors do make a difference. Emergent processes, in fact, may be successful once they are ascribed on at least one design-related condition: the enclosure of hero innovators into a collective, team-level, effort and/or on the organization of champion behaviors through planning of activities.

Methodological Implications

Two implications can be drawn from QCA analysis. First, our research suggests that QCA can be a relevant addition and support to qualitative methodologies such as case studies, as they offer a generalization of their results. Researchers have longed to combine qualitative and quantitative methods, in order to provide evidence which is both insightful and generalizable. However, the possibility for traditional quantitative techniques to use the findings from case studies has been largely questioned (Ragin, 2000; Seawright, 2005). Our research shows, instead, how the results of case-studies become data for QCA and how QCA contributes to improve them. Specifically, QCA produces a synthetic and generalized understanding of the configurations in which an expected outcome is generated. As such, QCA does not replace case studies, as the latter is essential to develop QCA's truth table.

Another reflection is possible. We all know that QCA originated in the field of social sciences, with the purpose of understanding the causal complexity of social phenomena. QCA has been applied to an impressive amount of issues, such as New Deal social spending, analysis of democracy in interwar Europe, welfare state, trade union growth and decline, long-run development in Latin America (cf. Rihoux, Rezsohazy, & Bol, 2011). Notably, such applications have been limited at the level of national or cross-national policies and phenomena. Little work has been done, instead, for those social phenomena that occur at lower levels, such as organizations, teams, and individuals. Our research shows indeed that QCA can exert a positive contribution also in organizational and management research. It is, in fact, a support or test instrument that easily complement case studies, as shown by the work of Grandori and Furnari (2008) and Whitley (2008). A diffusion of QCA within organization fields is thus suggested as an important opportunity to (a) advance the evidence in these fields and (b) advance the use of QCA in multiple contexts.

Limitations and Future Research

The present research has limitations that call for future research. Our cases were selected for their relative simplicity: monodisciplinary innovation, no internal idea generation, pre-existing acceptance of the innovation, etc. These boundaries allowed a closer observation of the role of "design" in affecting promotion, without confounding explanations. These limitations should be released in future research. A first, obvious step is to reconnect the research on promotion design with that on promotion narratives, to appreciate the relations and deliver a more encompassing explanation of success in promotion. Second, we believe that observing the implementation of multidisciplinary innovations is likely to maintain the results from QCA (i.e., the three alternative strategies and the role of "design"),

but also increase the relevance of a team-level perspective to promotion. In our cases, it could be stated that individual innovativeness is sufficient to support the diffusion of the innovation—once supported with an in-depth design of activities. We expect that in a context of complex innovations that involve multidisciplinary competencies, team innovativeness may become the primary lens that explains the success of promotion. Given the lack of contributions explicitly devoted to "team promotion," we believe this venture to be a promising area of investigation. Third, in our cases the effort to develop the system ("idea generation") and the promotion of the innovation have intentionally been separated. Precedent works have indeed manifested how individuals that have participated in "idea generation" are more likely to emerge as "technology champions" (Howell & Boies, 2004; Howell, 2005). Individuals' propensity for "idea generation" and "idea promotion" is also long recognized as features of individual innovativeness (or innovative work behavior) in past contributions (e.g., de Jong & Den Hartog, 2010). This evidence suggests the opportunity to (i) appraise the link between "idea promotion" and "idea generation" at team level, and, more generally (ii) to observe the promotion effort as a part of a complex innovation journey that start from generation/adoption of the idea and terminates with the institutionalization of innovation. Thus far, promotion has been given relative importance, and it is crucial to appraise instead its role; at the same time, future research should overcome the (intentional) limitation in our research to consider promotion "as if" it is an independent stage in implementation.

Finally, the present research has addressed the notion of design with a kind of black or white perspective, i.e., basically observing the presence or absence of two design features and the outcome. As a result, the QCA brings us to virtually equate the three alternative strategies, implying that they may have the same vigor and lead to the same outcome. This is obviously a simplification that further research should try to attenuate. There are different "scales of grey" in addressing the design of promotion efforts and in assessing the "success" of promotion. Specifically, future research may further investigate the dynamics involved in the design of activities and roles, the relative merits of specific forms of design (i.e., going beyond the presence/absence dichotomy and appreciate their typology), and their interrelation.

REFERENCES

Abbott, A. (1988). *The system of professions: An essay on the division of expert labor*. Chicago, IL: University of Chicago Press.

Bartel, C. A. & Garud, R. (2009). The role of narratives in sustaining organizational innovation. *Organization Science*, *20*(1), 107–117.

Battilana, J. (2011). The enabling role of social position in diverging from the institutional status quo: Evidence from the UK National Health Service. *Organization Science*, *22*, 817–834.

de Jong, J., & den Hartog, D. N. (2010). Innovative work behavior: Measurement and validation. *Creativity and Innovation Management*, *19*, 23–36.

Doolin, B. (2002). Enterprise discourse, professional identity and the organizational control of hospital clinicians. *Organization Studies*, *23*(3), 369–390.

Dopson, S. (1996). Doctors in management: A challenge to established debates. In Leopold, L., Glover, I., & Hughes, M. (Eds.), *Beyond reason: The national health service and the limits of management*. Aldershot, UK: Avebury.

Ferlie, E., Ashburner, L., Fitzgerald, L., & Pettigrew, A. (1996). *The new public management in action*. Oxford, UK: Oxford University Press.

Ferlie, E., Fitzgerald, L., Wood, M., & Hawkins, C. (2005). The non-spread of innovations: The mediating role of professionals. *Academy of Management Journal*, *48*(1), 117–134.

Fiss, P. C., & Zajac, E. J. (2006). The symbolic management of strategic change: Sensegiving via framing and decoupling. *Academy of Management Journal*, *49*, 1173–1193.

Grandori, A., & Furnari, S. (2008). A chemistry of organization: Combinatory analysis and design. *Organization Studies*, *29*, 459–485.

Georgiades, N. L., & Phillimore, L. (1980). The myth of the hero innovator. In C. C. Kiernan & F. P. Woodford (Eds.), *Behaviour modification with the severely retarded*. London, UK: Associated Scientific.

Howell, J. M. (2005). The right stuff: Identifying and developing effective champions of innovations. *Academy of Management Executive*, *19*(2), 109–119.

Howell, J. M., & Boies, K. (2004). Champions of technological innovation: The influence of contextual knowledge, role orientation, idea generation, and idea promotion on champion emergence. *The Leadership Quarterly*, *15*, 123–143.

Howell, J. M., & Shea, C. M. (2001). Individual differences, environmental scanning, innovation framing, and champion behavior: Key predictors of project performance.. *Journal of Product Innovation Management*, *18*, 15–27.

Kessler, E. H., & Chakrabarti, A. K. (1996). Innovation speed: A conceptual model of context, antecedents, and outcomes. *Academy of Management Review*, *21*(4), 1143–1991.

Klein, K. J., & Sorra, J. S. (1996). The challenge of innovation implementation. *Academy of Management Review*, *21*, 1055–1080.

Labatut, J., Aggeri, F., & Girard, N. (2012). Discipline and change: How technologies and organizational routines interact in new practice creation. *Organization Studies*, *33*, 39–69.

Llewellyn, S. (2001). 'Two-way Windows': Clinicians as medical managers. *Organization Studies*, *22*, 593–623.

Markham, S. K., & Griffin, A. (1998). The breakfast of champions: Associations between champions and product development environments, practices and performance. *Journal of Product and Innovation Management*, *15*, 436–454.

May, C. R., Harrison, R., Finch, T., MacFarlane, A., Mair, F., Wallace, P., & Telemedicine Adoption Study Group. (2003). Understanding the normalization of telemedicine services through qualitative evaluation. *JAMA*, *10*, 596–604.

Munir, K. A., & Phillips, N. (2005). The birth of the 'Kodak Moment': Institutional entrepreneurship and the adoption of new technologies. *Organization Studies*, *26*, 1665–1687.

Nicolini, D. (2010). Medical innovation as a process of translation: A case from the field of telemedicine. *British Journal of Management*, *21*, 1011–1026.

Power, M. (1997). *The audit society: Rituals of verification*. Oxford, UK: Oxford University Press.

Ragin, C. C. (1987). *The comparative method: Moving beyond qualitative and quantitative strategies*. Berkeley, CA: University of California Press.

Ragin, C. C. (1999). Using qualitative comparative analysis to study causal complexity. *Health Services Research*, *34*, 1225–1239.

Ragin, C. C. (2000). *Fuzzy-set social science*. Chicago, IL: University of Chicago Press.

Ragin, C. C. (2006). Set relations in social research: Evaluating their consistency and coverage. *Political Analysis*, *14*, 291–310.

Ragin, C. C., Shulman, D., Weinberg, A., & Gran, B. (2003). Complexity, generality, and qualitative comparative analysis. *Field Methods*, *15*, 323–340.

Rihoux, B. (2003). Bridging the gap between the qualitative and quantitative worlds? A retrospective and prospective view on qualitative comparative analysis. *Field Methods*, *15*(4), 351–365.

Rihoux, B. (2006). Qualitative Comparative Analysis (QCA) and related systematic comparative methods: Recent advances and remaining challenges for social science research. *International Sociology*, *21*, 679–706.

Rihoux, B., & De Meur, G. (2009). Crisp-set qualitative comparative analysis (csQCA). In B. Rihoux & C. C. Ragin (Eds.), *Configurational comparative methods. Qualitative comparative analysis and related techniques*. Thousand Oaks, CA: Sage.

Rihoux, B., Rezsohazy, I., & Bol, D. (2011). Qualitative comparative analysis in public policy analysis: An extensive review. *German Policy Studies*, *7*(3), 9–82.

Seawright, J. (2005). Qualitative comparative analysis vis-a-vis regression. *Studies in Comparative International Development*, *40*, 3–26.

Sonenshein, S. (2010). We're changing—or are we? Untangling the role of progressive, regressive, and stability narratives during strategic change implementation. *Academy of Management Journal*, *53*(3), 477–512.

Thomas, R., & Davies, A. (2005). Theorizing the micro-politics of resistance: New public management and managerial identities in the UK public services. *Organization Studies*, *26*, 683–706.

Thomas, P., & Hewitt, J. (2011). Managerial organization and professional autonomy: A Discourse-based conceptualization. *Organization Studies*, *32*, 1373–1393.

Van de Ven, A. (1986). Central problems in the management of innovation. *Management Science*, *32*, 590–607.

Walter, A., Parboteeah, K. P., Riesenhuber, F., & Hoegl, M. (2011). Championship behaviors and innovations success: An empirical investigation of university spin-offs. *Journal of Product & Innovation Management*, *28*, 586–598.

Wagemann, C., & Schneider C. Q. (2010). Standards of good practice in qualitative comparative analysis (QCA) and fuzzy-sets. *Comparative Sociology*, *9*, 397–418.

Whitley, R. (2008). Varieties of knowledge and their use in business and management studies: Conditions and institutions. *Organization Studies*, *29*, 581–609.

Yin, R. K. (2003). *Case study research: Design and methods*. Thousand Oaks, CA: Sage.