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Abstract

According to scholars, a successful policy deployment is crucial to sustain continuous improvement in public hospitals, but the long-term perspective is still under investigation: most of the current literature reports single initiatives and their success. The study aims at filling this gap by testing a theoretical framework adapted from literature to understand how kaizen could be adopted by public hospitals and what features should be considered as successful key drivers. A policy deployment perspective is applied to investigate the linkage between governance and kaizen at its early stage of implementation. The study presents findings from an action research focused on the launch and implementation of a kaizen policy deployment. Such organizational change is investigated in an Italian healthcare system of 7 public hospitals, experiencing kaizen for the first time. The study provides: a Kaizen Initiative Program to be adopted for policy deployment at hospital and system level; key features for its successful launch (what); their logical sequence for a successful implementation (when); procedures (how) to align kaizen to strategy. Results provide a structured framework for practitioners interested in successfully launching a KIP in its initial phase. It could help to link strategy with kaizen at operational level, avoiding bottom-up/pop-corn initiatives.

Keywords: Healthcare; Kaizen Initiatives; Kaizen Initiative Program; Policy deployment.

1. Introduction

In recent years, the healthcare service demand has deeply changed: the ageing population continuously needs therapies and treatments to face multi-pathological and chronic diseases. Moreover, citizens are being much more aware of their rights and the expectations on care therapies are higher than before. Thus, public healthcare organizations are required to provide more services and more quality by managing financial resources in a constant reduction and respecting the governmental recommendations pushing to do more with less. The current challenge of the public healthcare system is to provide care quality and appropriateness through the efficient and effective use of resources, and the observance of financial restrictions defined

by governments. Since 1980's, different management methods have been applied in healthcare for facing these arduous requirements, as Quality Control and Assurance (Laffel & Blumenthal, 1989; Donabedian, 1992), Total Quality Management (Shortell et al., 1995) and Business Process Reengineering (Bertolini et al., 2011). These approaches were influenced by concurrent and contextual factors as the organizational culture, the environment requirements, the available resources and the personnel capabilities. Despite the managerial efforts recognized in the past decades, this critical issue has not been completely solved (Nicholas, 2012). For this reason, the lean approach has been introduced as an organizational approach for increasing the patient value by focusing on value-added activities and waste reduction. The achievement of this target needs the active and positive participation of the personnel. In 2001, it was introduced at the Virginia Mason Medical Center (Seattle) that was one of the healthcare pioneers learning from the manufacturing successful experiences (e.g. Womack & Jones, 1990). According to Shah & Ward (2007), we can define the lean production as an integrated and structured socio-technical mechanism aiming at eliminating waste by synchronously reducing both the internal and external variability (supply and costumers' processes). For transferring the concept of lean production in healthcare it is needed to deeply understand that this sector is highly political and complex, as defined by Radnor et al. (2012). It is also influenced by governmental normative and characterized by the work of powerful professionals.

1.1 Kaizen approach in healthcare

The existing body of knowledge (e.g. De Souza, 2009; Papadopoulos et al., 2011) confirms that key aspects of lean management, suitable to the healthcare system, relate to the empowerment of staff and to the kaizen approach for incremental continuous improvement, firstly without any additional financial investment. In fact, kaizen consists in increasing the value for the patient by using a structured problem-solving mechanism and involving human resources for identifying, reducing and removing non-value adding activities. As Radnor et al. (2012) affirm, non-value adding activities in hospitals refer to process duplication and redundant procedures (e.g. patient details recording in different departments or workplaces, length of stay, waiting time for patients). According to Bortolotti et al. (2018), kaizen consists in conducting a structured continuous improvement project by a heterogeneous team. The aim is to achieve an improvement in a circumscribed process perimeter in a certain time range. Kaizen mechanism respects the three main aspects of lean management, as defined by Radnor et al. (2012): planning, improvement and performance monitoring.

1.2 Current healthcare literature and research purpose

The implementation of lean management in healthcare is a discussed topic among scholars, considering both the Managerial and the Medical Sciences (Costa & Filho, 2016; De Souza, 2009; Radnor et al., 2012). Focusing on kaizen application in hospitals, most of the current literature investigates the success of specific kaizen initiatives by comparing performances (quality, time, cost) before and after the change intervention (e.g. Al Owad et al., 2013; Bahensky et al., 2005; Barnas, 2011; Ghosh and Sobek II, 2015; Laganga, 2011; Leeuwen and Does, 2011). It seems that scholars still pay more attention to investigate how continuous improvement in healthcare could achieve technical outcomes (e.g. quality and productivity) and improve process performances. This could be a scientific trend because lean healthcare is a quite recent topic in literature compared to lean manufacturing. On the other hand, a scientific investigation on how to manage a corporate organization based on continuous improvement is not evident in the healthcare literature. It could be asserted that the discussion on policy deployment in hospitals focusing on kaizen is neglected by scholars. Moreover, the link between strategic management and operational management is overlooked by the healthcare body of knowledge. According to Bessant & Francis (1999), policy deployment is defined as a level of organizational development characterized by 1) a clear communication of the strategic goals; 2) the achievement of strategic goals through improvement activities and 3)

kaizen actions monitoring and measuring. Thus, the purpose of this research is to test a theoretical framework for understanding how the kaizen approach could be adopted and adapted in public hospitals and what features should be considered. A structured linkage between management strategy and kaizen initiatives undertaking is investigated (policy deployment). Action research is the methodology chosen for exploring and testing, through the application of the process consultation model. The subject of the study is the organizational change occurred in seven Italian public hospitals belonging to the same regional healthcare system through the kaizen policy deployment. At the end, this study provides a tested framework with its features, practices and modalities for successfully selecting kaizen initiatives linked to the strategic objectives of healthcare organizations.

2. Literature review

Lean Healthcare Management is defined as an organizational approach developing a hospital culture characterized by increased (patient and employee) satisfaction through continuous improvements, in which all employees actively participate in identifying and reducing non-value adding activities (Dahlgaard et al., 2011). Thus, the Continuous Improvement (CI) approach is defined as an organization-wide evolutionary learning process or an improvement evolution across the organization, from local to organization wide and from operational to strategic (Bessant & Francis, 1999). The CI approach in healthcare has been increasingly applied by practitioners and investigated by scholars. Both are still interested in practicing kaizen initiatives and studying their local impact in hospital settings. Such impact is mostly measured as a set of technical system outcomes (e.g. lead time, work in process inventory, productivity). Kaizen initiatives are defined as structured projects performed by a multi-disciplinary team aiming to improve a focused work area or process in a given timeframe (Bortolotti et al., 2018). Technical outcomes could be defined as quantifiable metrics (key performance indicators) which reflect the performance of an organization in achieving its goals and objectives (Bauer, 2004).

Most of the current literature describes only the success of specific kaizen initiatives and reports their technical outcomes (e.g. Al Owad et al., 2013; Bahensky et al., 2005; Ghosh and Sobek II, 2015; Laganga, 2011). Aspects related to kaizen approach deployment across healthcare organizations are still neglected by scholars. We can define a kaizen program as a policy deployment strategy enabling continuous improvement when kaizen events are systematically used to introduce rapid change in targeted work areas, often relying on lean work system principles (Van Aken et al., 2010). Policy deployment is meant as linkage among local and project level activities to broader strategic goals; includes a clear strategic focus for CI activities. In other words, a level of development in which strategic goals are communicated and deployed and where improvement activities are guided by a process of monitoring and measurement against these strategic objectives (Bessant & Francis, 1999).

2.1 Literature review methodology

The overall concept leading the conduction of this study is the application of continuous improvement in healthcare. The implementation of the kaizen methodology in public hospitals is the guiding principle of this study. The starting point of the research was a literature review for identifying the relevance of the topic chosen, the existing knowledge and its limitations. An extensive search in two main databases (PubMed, Scopus) was conducted for guaranteeing a proper selection of scientific papers facing continuous improvement in healthcare. Management sciences and Medical sciences have been considered as correct areas of competence, whereas the topic involves both perspectives. Search terms applied: “continuous improvement”, “lean healthcare”, “healthcare”, “hospital”, “kaizen *” (* for including all the terminologies starting with kaizen, e.g. initiative; kaizen event). English writing and peer-reviewed journals were considered. The grey literature (books, book chapters, conference proceedings and work-in-progress articles) was excluded because it is not index-linked and not

peer-reviewed. Papers have been selected due to the "Article Title, Abstract, Key words" search modality. We decided to consider a timeframe of 13 years from 2005 to 2018 included. As kaizen application in healthcare is a quite recent topic of research, this is an appropriate range for understanding its trend. Secondly, papers were included in the literature analysis after abstracts reading: papers facing lean management in healthcare through the kaizen or continuous improvement methodology were considered. Papers focusing only on lean management in healthcare with any mention of kaizen have been excluded. Thirdly, 35 papers (Table 1) were selected and analyzed also considering the mention or absence of these additional concepts in the full-text: kaizen event or synonymous, kaizen program, policy deployment, technical outcomes, social outcomes.

Table 1. Literature Review: papers selected

N°	Authors	Year	Journal	Area of competence	Descriptive/ Empirical
1	Al Owad et al.	2013	Advanced Materials Research	Managerial Sciences	Empirical (action research)
2	Atkinson and Mukaetova-Ladinska	2011	Journal of Psychosomatic Research	Medical Sciences	Descriptive
3	Bahensky et al.	2005	Journal of Healthcare Information Management	Medical Sciences	Descriptive
4	Barnas	2011	The Joint Commission Journal on Quality and Patient Safety	Medical Sciences	Descriptive
5	Bortolotti et al.	2018	International Journal of Operations & Production Management	Managerial Sciences	Empirical (case study)
6	Carter et al.	2012	Official Journal of the Society for Academic Emergency Medicine	Medical Sciences	Descriptive
7	Casey et al.	2009	Nature Clinical Practice	Medical Sciences	Descriptive
8	Dickson et al.	2009	Health Policy and Clinical Practice/Original Research	Medical Sciences	Descriptive
9	Dickson et al.	2009	The Journal of Emergency Medicine	Medical Sciences	Descriptive
10	Ghosh and Sobek II	2015	Journal of Health Organization and Management	Medical Sciences	Empirical (case study)
11	Iannettoni et al.	2011	The Annals of Thoracic Surgeons	Medical Sciences	Descriptive
12	Jacobson et al.	2009	Official Journal of the Society for Academic Emergency Medicine	Medical Sciences	Descriptive
13	Jimmerson et al.	2005	The Joint Commission Journal on Quality and Patient Safety	Medical Sciences	Descriptive
14	Johnson et al.	2012	Nursing Administration Quarterly	Medical Sciences	Descriptive
15	Kimsey	2010	AORN (Association of periOperative Registered Nurses) Journal	Medical Sciences	Descriptive
16	Laganga	2011	Journal of Operations Management	Managerial Sciences	Empirical (action research)
17	Leeuwen and Does	2011	Quality Engineering	Managerial Sciences	Descriptive
18	Martin et al.	2009	Journal of Nursing Care Quality	Medical Sciences	Descriptive
18	Mazzocato et al.	2016	BMJ Open	Medical Sciences	Empirical (qualitative analysis)
20	Melanson et al.	2009	American Journal for Clinical Pathology	Medical Sciences	Descriptive
21	Naik et al.	2011	Journal for Healthcare Quality	Medical Sciences	Descriptive
22	Natale et al.	2014	International Journal of Collaborative Enterprise	Managerial Sciences	Empirical (case study)
23	Ng et al.	2010	Canadian Journal of Emergency Medicine	Medical Sciences	Descriptive
24	Nicholas	2012	Hospital Topics: Research and Perspectives on Healthcare	Medical Sciences	Descriptive
25	Papadopoulos	2011	Leadership in Health Services	Managerial Sciences	Empirical (case study)
26	Papadopoulos et al.	2011	International Journal of Operations & Production Management	Managerial Sciences	Empirical (case study)
27	Rico and Jagwani	2013	European Journal of Hospital Pharmacy	Medical Sciences	Descriptive
28	Simon and Canacari	2012	AORN Journal	Medical Sciences	Descriptive
29	Smith et al.	2012	Journal of Public Management Practice	Medical Sciences	Descriptive
30	Stelson et al.	2017	International Journal of Health Care Quality Assurance	Managerial Sciences	Empirical (survey)
31	Stonemetz et al.	2011	Anesthesiology Clinics	Medical Sciences	Descriptive
32	Tetteh	2012	AORN Journal	Medical Sciences	Descriptive
33	Waldhausen et al.	2010	Journal of Pediatric Surgery	Medical Sciences	Descriptive
34	Wennecke	2008	Medical Laboratory Observer	Medical Sciences	Descriptive
35	Yusof et al.	2012	BMC Medical Informatics and Decision Making	Managerial Sciences	Empirical (case study)

2.1 Relevant gaps and research questions

The preliminary insights obtained by the literature analysis represent the basis for discussing different aspects of continuous improvement in the hospital setting, classified into three main categories:

1) Descriptive studies vs Empirical studies;

The reviewed papers were classified into two first categories: descriptive and empirical. A paper was defined as a descriptive study if any methodology was clearly explained. A paper

was defined as an empirical study if a methodology (case study, qualitative or quantitative analysis, action research, survey, etc.) was specified for the research. Among 35 selected papers, 25 were descriptive studies (71%). 10 out of 35 studies (29%) faced empirically continuous improvement in the hospital setting, through case studies (Bortolotti et. Al., 2018; Papadopoulos, 2011; Papadopoulos et al., 2011; Yusof et al., 2012; Natale et al., 2014; Ghosh et al., 2015); qualitative analysis (Mazzocato et al., 2016; Stelson et al., 2017) and action research (Laganga et al., 2011; Alowad et al., 2014;). Descriptive studies paid attention to the sequence of activities for the kaizen approach implementation and focus on technical outcomes (quality, patient satisfaction, costs, time, reduction of waste).

2) Studies addressed to technical outcomes vs studies addressed to social outcomes.
Technical outcomes include time, cost and quality performances. They can be defined as quantifiable metrics used for measuring the performances of an organization to reach its own objectives (Bauer, 2004). On the other hand, social outcomes are explained as problem solving capabilities and attitude to team work of professionals involved in a kaizen project (Farris et al., 2009; Bortolotti et al., 2018).
Referring to these main concepts, it is emerged that reviewed papers are addressed mainly to investigate technical outcomes as result from the kaizen action:

- 25 papers (71%) reported technical outcomes reached by specific kaizen initiatives. 20 of them (80%) were descriptive studies. The residual 5 papers (20%) were empirical studies.
- 6 articles (17%) focused mainly on technical outcomes but paying a little attention to social outcomes. 5 of them were descriptive studies.
- 2 papers were specifically addressed to social outcomes, by using a qualitative analysis from a survey;

Exclusively 2 out of 35 papers investigated other topics of research such as actor networks in continuous improvement implementation (Papadopoulos, 2011) and complexity issues of continuous improvement in healthcare settings (Papadopoulos et al., 2011).

3) Studies on short-term kaizen experiences vs studies on long-term kaizen experiences.
Despite the organizational complexity to sustain this managerial approach is a well-known critical issue, healthcare studies are more focused on specific kaizen initiatives for proving their specific performances.
We associate the meaning *short-term perspective* (short-term) to the timeframe and the performances of a specific kaizen initiative. Whereas the meaning *long-term perspective* (long-term) is associated to a kaizen initiative design at organizational level lasting at least one year (policy deployment) and its relative performances. Thus, we classified papers facing specific kaizen initiatives as "focusing on a short-term perspective"; papers introducing or facing a kaizen program as "papers focusing on a long-term perspective"; papers on a short-term perspective but introducing a little attention to the long-term as "papers focusing on a short-term perspective, with a starting discussion on long-term".

A relevant issue emerging from the literature review is that only 10 out of 35 papers (29%) start to contemplate the long-term perspective for continuous improvement in addition to the success of kaizen initiatives (short-term). These studies introduce a particular attention to the long-term vision for continuous improvement design in healthcare at strategy level, to be linked (policy deployment) with the operative level (kaizen implementation): Dickson et al., (2009), Jacobson et al. (2009); Ng et al. (2010), Waldhausen et al. (2010), Laganga et al. (2011), Leeuwen et al. (2011), Naik et al. (2011), Papadopoulos et al. (2011), De Souza et al. (2011), Yusof et al. (2012). These scholars aim at discussing what a long-term continuous improvement program should be in healthcare, but there is no universal solution for defining features guaranteeing a long-term kaizen. Moreover, it is not clear how this long-term perspective should be planned and deployed in public hospitals. Only 1 paper out of 39 is primarily

addressed to long-term kaizen initiatives (Mazzocato et al., 2016): the authors face the issue on how the entire kaizen process relates to the overall organizational goals from the workers' perspective. Even if the setting of this study is a hospital, the investigation faces a situation in which the kaizen methodology is already part of the organizational culture.

As it emerged, we did not find a reliable and structured contribute on designing a Kaizen Program in a healthcare setting. Thus, we tried to enlarge the literature analysis considering sectors different from the health area. It emerged that some publications have given a contribution on the long-term kaizen, proposing frameworks (Van Aken et al., 2010; Glover et al, 2013) in the field of manufacturing and service industries.
The common issue in this little literature is how to guarantee the incremental improvement in any organization and what managerial tool could be designed and applied (a logical framework for kaizen program). Moreover, Bessant & Francis (1999) contribute to understand different and sequential levels for continuous improvement evolution in any organization, from random problem-solving (Level 0) to the learning organization (Level 5).
Details on these papers are listed in Table 2.

Table 2 Empirical papers on kaizen program in sectors different from healthcare

Authors	Year	Journal	Area of competence	Descriptive /Empirical	Unit of Study	Setting
Van Aken et al.	2010	International Journal of Productivity and Performance Management	Managerial Sciences	Empirical (case study)	Kaizen Event Program	Defence industry organisation
Glover et al.	2013	International Journal of Operations & Production Management	Managerial Sciences	Empirical (qualitative study)	Kaizen Event Program	Manufacturing, Service and Government organisations
Bessant and Francis	1999	International Journal of Operations & Production Management	Managerial Sciences	Empirical (case study)	Policy deployment	Japan and Western enterprises

Despite the relevance of policy deployment for systematic improvement of kaizen initiatives, it seems that there is a lack of systemic and empirical-based guidance on how to address policy deployment for continuous improvement. Such gap is particularly emphasized in healthcare literature. Thus, the purpose of this research is to investigate the following research questions:

RQ1: *What are the key features of a successful policy deployment in its initial implementation phase in public hospitals?*
RQ2: *How to deploy a kaizen initiative program for launching and guaranteeing a structured continuous improvement in public hospitals?*

We used an action research approach (exploratory study) to investigate a group of seven public hospitals, experiencing their first design and introduction of kaizen approach. They belong to an Italian regional healthcare system. The implementation was led by the local regional authority with a strong attention to the alignment between top management goals and daily operation targets. Firstly, success was meant to face the launching of a long-term kaizen perspective and overcome cultural barriers at the first beginning of the implementation. Secondly, to sustain policy deployment of continuous improvement, starting from the first deployed initiatives linked to the hospital governance. The focus was to test a theoretical framework for policy deployment and explore the organizational change dynamics.

3. Research Design

A research in action was conducted as defined by Coughlan & Coghlan (2002) to observe the organizational change dynamics in a healthcare site. The community investigated is part of a regional healthcare system composed by seven public hospitals. Almost 400 professionals participated actively to the whole project. We accurately analyzed the organizational change at both strategic and operational level. The organizational change consisted in introducing and

applying a managerial approach different from the traditional applied, focusing on increasing the efficiency and the efficacy of the healthcare public processes by involving actively the operative professionals: the Lean healthcare management. Kaizen was the methodology chosen. The A3-tool was the technique used for implementing the kaizen methodology. The original feature of the research is that hospitals experienced their first kaizen initiatives, aligned to the organizational strategy, by deploying a structured logical framework (Kaizen Program). We worked actively in close contact with healthcare professionals at any level.

The practitioners' issue was defined: to undertake a project for implementing the same management approach at systemic level (across the seven public hospitals): Lean management, and its continuous improvement methodology (Kaizen). The challenge was to introduce and stabilize a common long-term framework leading the kaizen practice (*Kaizen Event Program)* in each organization as a parallel system to ordinary operations.
The academics' issues were identified: a) to provide an example on what a continuous improvement program in public hospitals could be from the first kaizen experience; b) to offer a clear contribution on how to deploy a Kaizen Program and guarantee a structured continuous improvement practice in public hospitals from the beginning, linking strategy to single improvements; c) to rationalize the lessons learned from the action; d) to supply a functional framework from the field for designing continuous improvement at strategy level, e) guaranteeing a linkage with kaizen initiatives (operative level) through a policy deployment; f) to prepare guidelines to hospitals managers for deploying a Kaizen Program.
We were formally recognized by the key actors involved. Our role as facilitators was conducted by using the process consultation model (Coughlan & Coghlan, 2002). Practically, we: were directly and actively involved in the action; provided our contribution to the work of professionals in inquiring in their issues, creating and implementing suitable solutions; analyzed the kaizen implementation. The project was an emergent process, (Coghlan & Coghlan, 2002) as characterized by a general plan of actions not estimated in detail beforehand. Actions were rearranged several times by following the intermediate results from practice as the research was concurrent with action (simultaneously feature).
The study reliability was ensured at considering the selection criteria used by Farris et al. (2009) and Bortolotti et al. (2018) for classifying the hospitals involved, as listed in Table 3.

Table 3 Characteristics of the hospitals investigated

	Description	H1	H2	H3	H4	H5	H6	H7
Organisation Characteristics	Private/public	Public	Public	Public	Public	Public	Public	Public
	No employees	**4.300**	**3.252**	**2.214**	**5.205**	**3.796**	**700**	**628**
	No. beds*:	**755**	**703**	**341**	**1185**	**657**	**161**	**130**
	Ordinary	*676*	*646*	*311*	*1066*	*602*	*136*	*98*
	Day Hospital	*79*	*57*	*30*	*119*	*55*	*25*	*32*
Kaizen experience	First kaizen experience: Yes/No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	First Kaizen Program Experience: Yes/No	Yes	Yes	Yes	Yes	Yes	Yes	Yes

We worked within Italian public hospitals belonging to the same regional healthcare service; coordinated by the regional authority; experiencing both the kaizen approach and the kaizen program implementation for the first time; following the same logical framework; using the same kaizen method for acting (the A3-tool and its sub-techniques).

The action research was performed in 4 main cycles as illustrated in Figure 1: Design; Training; Kaizen; Evaluation. Each research cycle consisted in six main sub-steps: to gather data; to feedback, to analyze data; to plan; to implement; to evaluate actions. Before starting, the context and the practitioners' purpose were analyzed (pre-step) and all the activities were

monitored during the project implementation (meta-step). The research project lasted 12 months, from June 2017 to July 2018.

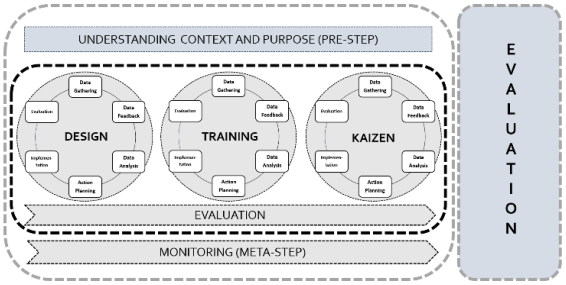

Figure 1 Action Research Design

3.1 Theoretical framework

Starting from the literature review, the terminologies *Kaizen Initiative* and *Kaizen Initiative Program* were identified as guidance for testing the theoretical framework.

Kaizen Initiative instead of *Kaizen event*: in healthcare the improvement project with a dedicated team could last from few weeks to few or several months. This is a peculiarity of the sector because professionals are in continuous and direct contact with patients. As a service, the care or therapy provided includes the user's participation during its delivery. Moreover, this service refers to the human health. For this motivation, *Kaizen Initiative* (KI) from Bortolotti et al. (2018) was used: a structured project performed by a heterogeneous team for improving a specific process in a defined time schedule.

With reference to the site of the study, the definition of *Kaizen Event Program* (Van Aken et al., 2010) as a systematic use of kaizen to introduce rapid change in targeted working areas based on lean principles was adapted. Thus, a *Kaizen Initiative Program* (KIP) was defined as a structured policy framework applied for systematically implement kaizen initiatives and thus to introduce a permanent change in selected processes, complying with lean principles and aligning operation goals with the organizational policy. Its characteristics were identified: a) a strict adherence to lean principles; b) a structured mechanism for continuous improvement to be activated and maintained; c) a strategic management with a clear focus on continuous improvement mechanisms; d) a precise alignment of kaizen initiatives with the organizational strategy (policy deployment); e) targets to be identified and clearly communicated; f) a reliable monitoring system to be performed; g) a participative approach to be spread.

The theoretical framework provides a solution to imprint a structured kaizen mechanism from the preliminary endeavors by paying attention to the problem-solving mindset and establishing a linkage between strategic and operational management. Thus, this study aims at investigating if the learning process proposed by Bessant & Francis' scale (1999) could start directly from Level 2 by skipping the previous levels due to the fulfilment of the theoretical framework to be applied in the action research (Figure 2).

Figure 2 The learning process from Bessant and Francis (1999)

Therefore, the framework respects the performances and the practices defined for a structured and systemic CI by Bessant & Francis (1999), as illustrated in Table 4.

Table 4 Performance and practice adapted from Bessant & Francis (1999)

Theoretical Framework	
Performance	**Practice**
Local level effects due to the kaizen initiatives realized (social outcomes)	Formal endeavour to incept and maintain CI

Measurable CI actions: - *No. participants* *No processes selected for improvement* Measurable performance effects limited to the KIs boundaries: *technical outcomes and social outcomes* Little or no bottom line impacts, *as profit, social and environmental objectives (Osland and Zhou, 2013)* Inception of policy deployment	Use of a declared and official problem-solving process Participative approach Participation enhancement Structured training in basic CI tools: Structured management system Recognition system Parallel system to processes Cross-functional work for ad hoc kaizen action

According to Witcher & Butterworth (2001), the KIP is designed to activate a policy deployment mechanism, to be managed as a process. The theoretical framework architecture is illustrated in Table 5.

Table 5 Kaizen Initiative Program Architecture

PROCESS	***Sub-processes and Activities***
1 – Design and Support	*Planning* Establishment of the Umbrella Steering Committee (USC) Overall objective identification Strategic definition of the main features of the Kaizen Initiatives Identification of the method to be used. Scheduling
	Coordination Project and objectives dissemination Recognition of the established kaizen teams Kaizen Initiatives Selection and Coordination Monitoring and Evaluation Exchange of experience among teams
	Dissemination of results Sharing of results and lessons learnt
2 - Education	*Communication of the long-term strategy* (one-year kaizen)
	Orienting to kaizen methodology
	Selection of potential team leaders
3.- Training	*Methodology and Tools Training* Focusing on transferring basic lean tools
	Transferring Knowledge Training Focused on transferring knowledge to tutors for training their collaborators
4 – Kaizen Implementation	*Preparation* Identification of the specific work team Identification of the initiative boundaries Communication of implementation rules
	Execution Kick off Meeting Training Team A3 tool methodology Application Check of improvements Measuring and adjusting Standardizing new working behaviours

The first action cycle *Design* included the *Process 1- Design and Support* of the theoretical framework; the second action cycle *Training* coincided with *the Process 2 - Education* and the *Process 3 - Training* of the theoretical framework. The third cycle *Kaizen* corresponded with the *Process 4 – Kaizen Implementation*.

Different roles and positions across the hospitals were involved:

- **top management**: general directors, medical directors; medical directorate and health professions office; financial office.
- **middle management**: department head offices; human resources office; administrative office.
- **operative level**: physicians, nurses, clinical engineers, IT engineers, healthcare assistants.

3.2 Data collection

To target the research purpose, information was collected qualitatively in real time by two

members of our research team. This to guarantee a rationale data gathering and a reliable data processing during the exploratory action. Both researchers followed individually this procedure: a) a diary was kept taking notes of events, dynamics and observations occurred in real time; b) notes were translated in a report, highlighting the concurrent method of inquiry and the learning history; c) action outcomes were detailed; d) a self-reflection was made by each researcher on his/her own. Secondly, they compared their individual elaborations for finding reliable results. Specifically, they worked together for making a common reflection on the project story, highlighting the occurred modifications respect to the expected plan; extrapolating usable knowledge. This second step allowed to produce a balanced debate and to avoid misrepresentations. Data collected (hospitals and regional authority sites) involved semi-structured recorded interviews, observations, project meetings and related reports (strategic teams and kaizen teams), discussions and confidential information exchange.
We used different methods of inquiry. The modalities were different in accordance with the unfolding action steps, as detailed in Table 4 and Table 5.

Table 6 Methods of inquiry (Process 1 and Process 2)

	PROCESS 1		PROCESS 2	
Cuncurrent circustance	USC Meetings (Members: Regional Authority, General Directors, action researchers)		Education edition to top managers	
Data gathering provider	Both action researchers and hospital managers		Action researchers	
Method of inquiry	Pure inquiry:	Confronting inquiry:	no specific inquiry occurred. Only neutral behaviour observation and listening	
Question type	Narrative questions: "Please, describe what happened?" "What is happening?" "What is going on"?	Sharing ideas: "What do you think if…?" "Have you considered if…?"	Not applicable	Not applicable
Process consultation modality	Firstly, reporting data gathered and acknowledgement of data gathered by key actors Secondly, facilitating feedback elaboration, enhancing problem solving, prompting to propose solutions.		Reporting data gathered from the silent observation and listening	

Table 7 Methods of inquiry (Process 3 and Process 4)

	PROCESS 3		PROCESS 4	
Cuncurrent circustance	Training editions to selected leaders and potential team members. Informal talking after training editions		Kaizen team meetings Informal meetings	
Data gathering provider	Action researchers		Both action researchers and team members	
Method of inquiry	Confronting inquiry	Exploratory Diagnostic Inquiry:	Confronting inquiry:	Exploratory Diagnostic Inquiry:
Question type (e.g.)	Narrative questions: "Please, describe what happened" "What is happening?" "What is going on"?	"Why do you think it is happened?" "What did you do?" What ae you going to do?"	Sharing ideas: "What do you think if…?" "Have you considered if…?"	"Why do you think it is happened?" "What did you do?" What ae you going to do?"
Process consultation modality	Firstly, reporting data gathered and acknowledgement of data gathered by key actors Secondly, facilitating feedback elaboration, enhancing problem solving, prompting to propose solutions		Firstly, neutral observation and learning Secondly, stimulating talking and reflecting beyond a joint problem-solving orientation.	

4. Findings

Findings are classified into two main categories:

1) architectural results, concerning the KIP features and their sequence;
2) procedural results, regarding the KIP dynamics and modalities.

4.1 Architectural results

To successfully launch and implement the continuous improvement approach, a policy deployment in healthcare needs to be supported by a sequence (when) of processes (what).
Processes have been confirmed through the action research as the key drivers for a kaizen successful implementation: *Design and Support*, *Education*, *Training* and *Kaizen implementation*. It is emerged that *Design and Support* was transversal because it covered the whole project and was continuously connected to the other processes. It was dynamic because represented the stakeholders' decision-making process (the regional system and its hospitals). Moreover, this process represented the strategic hand of the kaizen implementation for planning, coordination dissemination and evaluation. *Education*, *Training* and *Kaizen Implementation* were the operative processes meant to undertake the strategic decisions and to

enact kaizen. These three processes respected a logical sequence: firstly education, secondly training and finally kaizen. *Education* to the top and the middle management firstly, because they represented the hierarchical level meant to legitimize kaizen initiatives and to recognize kaizen teams. Thus, it was necessary to make them aware of the opportunity to 1) change for the better daily work and consequently 2) to improve the quality of the care service provided. *Training* secondly, because it was necessary to transfer the basic competences and tools to the selected leaders before acting kaizen. Finally, *Kaizen* to practice the continuous improvement. If these processes have been confirmed as main features of the KIP architecture, some of their sub-processes and tasks have been revised following the professionals needs and requests.
Firstly, the sub-process 3.2 - *Transferring Knowledge Training* - was modified, considering the professionals' feedbacks: the expected peer-education among professionals was replaced with an advanced level of training and a further support during the kaizen implementation by our team. It emerged that professionals did not feel confident in transferring tools after a first training. The training program was completely changed, and the duration of *Training* and *Kaizen* were enlarged. After this modification, hospitals had more time to activate kaizen initiatives because the training process finished a month before. Moreover, kaizen teams received more support during the practical experience. This itinerary modification was successful: we provided more details on kaizen during the training and supported kaizen teams in practicing the methodology, and in reflecting on the emerging situations.

Considering the architectural outcomes, the following insights are provided:

1) policy deployment for continuous improvement in public hospitals could be successful if launched through a Kaizen Initiative Program;
2) a successful Kaizen Initiative Program should consider the following processes as key drivers (*what*): *Design and Support*, *Education*, *Training* and *Kaizen*. *Design and Support* as the transversal process to plan, coordinate, monitor and evaluate the kaizen implementation. *Education* for involving the top and the middle management. *Training* for transferring the basic concepts tools. *Kaizen* as the implementation of continuous improvement;
3) a successful Kaizen Initiative Program should respect a time sequence for acting the key drivers (*when*): 1) *Design and Support*; 2) *Education*; 3) *Training*; 4) *Kaizen*;
4) Training should be addressed directly to professionals assigned for kaizen teams, included leaders and facilitators.

4.2 Procedural results

During the action project, it emerged that the policy deployment was a full-fledged process. Its management was crucial to trigger and coordinate the kaizen implementation within the hospitals. The establishment of a regional Steering Committee (the Umbrella Steering Committee) facilitated the joint planning and coordination among the main stakeholders: the representatives of the regional authority and general directors from each hospital. The USC intervention was crucial to face the transition from a process to another, especially when some adjustments were requested by the professionals involved. The USC met formally 6 times during the annual project. Kaizen teams were invited to participate at two meetings for presenting the progress status of their work. The USC provided a managerial support to hospitals and teams for kaizen implementation. Such managerial support consisted in:

- firstly, transferring clearly guidelines and rules;
- secondly, recognizing the kaizen teams;
- thirdly, considering doubts and difficulties expressed by professionals.

Guidelines for selecting processes consisted in: alignment with the organizational strategy at hospital level; characteristics of the selected processes; number of processes to be activated;

time to be invested. Rules concerned the kaizen initiative setting: lean method to be respected (PDCA Cycle); lean tools to be used (A3-Report: Value Stream Map; Ishikawa Diagram; 5whys; 5S; Spaghetti chart); team heterogeneity; focus and measurable objectives.

Kaizen teams were autonomous and formally recognized by both the USC and the hospitals' managers. Moreover, top or middle managers were active members or supported teams if requested. Doubts and difficulties expressed by professionals were immediately discussed, solved and communicated to general directors.

Considering the procedural outcomes, the following insights for success emerged:

- Policy deployment should be considered as a process to be managed;
- In public healthcare, the very first policy deployment for continuous improvement could have more chance of success if launched by the healthcare authority to which the hospitals belong;
- Consequently, the establishment of a Kaizen Committee (as the USC in the project) could be established for coordinating the policy deployment. It could guarantee the success of kaizen implementation. Such Kaizen Committee should be composed by the representatives of the healthcare authority and the general directors of each hospital involved.
- Managers should consider first to align kaizen initiatives to the hospital strategy and secondly to define the number of kaizen initiatives to be activated.
- Kaizen teams should be recognized by managers to facilitate and safeguard their efforts against other professionals;
- It is successful to provide implementation rules to kaizen teams (e.g. the methodology and the tools to be used, modalities for membership selection)
- The active participation of department directors or coordinators could encourage teams to persist.

5. Discussion and Conclusions

This research contributes to the body of knowledge providing a tested framework to successfully launch and implement a policy deployment for continuous improvement in public hospitals. The tested framework is named Kaizen Initiative Program (KIP) and it allows to select kaizen initiatives linked to the organizational strategy. It was tested in a territorial healthcare system to which belonged seven public hospitals. Thus, the framework is a versatile tool that could be applied in different healthcare contexts. Specifically, the aim of the research is dual:

1) to build knowledge on policy deployment through kaizen program in healthcare (contributions to theory).
2) to guarantee the efficacy of the action at strategic and operative level by adopting a scientific method (contributions to practice);

5.1 Contributions to theory

Our study provides contributions to the organizational design to launch the policy deployment for continuous improvement as a process in healthcare (long-term strategy perspective).
To address the first research question, a theoretical framework adapted from the manufacturing literature (Van Aken et al., 2010) was tested. Such theoretical framework was firstly meant to be a Kaizen Initiative Program (KIP): a structured policy framework applied for systematically implement kaizen initiatives and thus to introduce a permanent change in selected processes, complying with lean principles and aligning operation goals with the organizational policy.
Thus, the meaning of successful policy deployment is twofold: firstly, refers to the launch of a

long-term kaizen perspective by overcoming the cultural resistance; secondly, to sustain kaizen policy deployment.
Object of the action research was a group of seven Italian public hospitals, belonging to a regional healthcare system. For them it was the first experience for both approaching the kaizen methodology and a Kaizen Initiative Program. The KIP launch and implementation were led by the regional authority with a strong attention to the alignment between hospitals strategy and daily operation targets.
We investigated the organizational change and were actively involved in each phase of the project. This research confirms that a Kaizen Initiative Program is needed to launch successfully a structured policy deployment for continuous improvement in public healthcare. We suggest specific and testable propositions based on architectural findings, concerning features (*what*) and temporal sequences (*when*).

PROPOSITION 1A: a successful policy deployment for continuous improvement in public hospitals could be launched through a Kaizen Initiative Program.

Our study confirms that a structured guidance for applying a long-term kaizen perspective as a first endeavor encourages: the activation of kaizen initiatives selected in accordance with the hospital strategy, and the linkage between strategic level decisions and continuous improvement actions at operative level.

PROPOSITION 1B: A successful Kaizen Initiative Program should consider the following processes as key drivers (what): Design and Support, Education, Training and Kaizen, as illustrated in Figure 3.

Process	***Sub-processes***	***Tasks of sub-processes***
1 Design and Support	*Planning*	Establishment of the Umbrella Steering Committee (USC) Overall objective identification Strategic definition of the main features of the Kaizen Initiatives Identification of the method to be used. Scheduling
	Coordination	Project and objectives dissemination Recognition of the established kaizen teams Kaizen Initiatives Selection and Coordination Monitoring and Evaluation Exchange of experience among teams
	Dissemination of results	
2 Education	*Communication of the long-term strategy* (one-year kaizen)	
	Orienting to kaizen methodology	
	Selection of potential team leaders	
3 Training	*Methodology and Tools Training*	Transferring basic lean tools
	Transferring Knowledge Training	Training for practicing
4 Kaizen	*Preparation*	Identification of the specific work team Identification of the initiative boundaries Communication of implementation rules
	Execution	Kick off Meeting Training Team A3 tool methodology Application Check of improvements Measuring and adjusting Standardizing new working behaviours and monitoring

Figure 3 Kaizen Initiative Program Architecture (tested)

The action study revealed that:

- *Design and Support* is meant as a process running along the policy deployment. It is conceived to plan, coordinate, monitor and evaluate the kaizen implementation at strategy level. This process is necessary to give a robust and clear track to kaizen.
- *Education* is needed to involve the top and the middle management as powerful professionals.
- *Training* for firstly transferring the basic kaizen concepts and tools and then for practicing with simulation practices. Moreover, training should be addressed directly to

professionals assigned for kaizen teams, included leaders and facilitators. The proposed peer-education among professionals were not appreciated, as it was the first approach to kaizen.

- *Kaizen* as the implementation of selected kaizen initiatives, linked to the hospital strategic goals.

PROPOSITION 1C: the successful launch of a Kaizen Initiative Program should respect a time sequence for acting the key drivers (when): 1) *Design and Support*; 2) *Education*; 3) *Training*; 4).

Design and Support could be defined as the umbrella process for the KIP launch and support. On the other side, *Education*, *Training* and *Kaizen* are the operative processes to deploy the kaizen policy.

The proper sequence of processes (*when*) investigated is represented in Figure 4. Such sequence should be respected to launch successfully the policy deployment for continuous improvement.

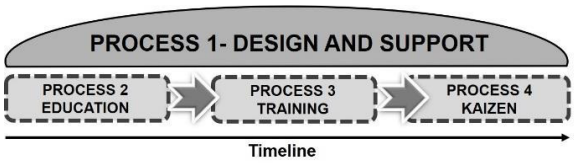

Figure 4 Sequence of KIP processes

5.2 Contributions to practice

A *Kaizen Initiative Program* adapted from the manufacturing literature (Van Aken et al., 2010) was applied and investigated in its procedural mechanisms (*how*) to align kaizen to strategy (policy deployment). The study provides contributions to practice. Such contributions encourage public hospital managers to implement performances and practices to activate kaizen in a long-term perspective, by involving collaborators at any organizational level from the early beginning.

We suggest specific and testable propositions based on procedural findings, also concerning performances and practices (*how*) to be applied for launching a kaizen policy deployment in hospitals.

PROPOSITION 2: Policy deployment should be considered as a process to be managed to successfully launch and sustain continuous improvement.

This study states the need of a process-driven mindset for undertaking a long-term kaizen approach in public hospitals and confirms the contribution from Witcher & Butterworth (2001). Such authors affirm that the policy deployment mechanism should be designed and managed as a process.

This study partially confirms that it is also needed to activate a monitoring system to make the policy deployment reliable (Witcher & Butterworth, 2001; Naik et al., 2011 and Ng et al., 2010) because the action project lasted only a year, and it was not possible to have insights beyond the project.

The following propositions provide a contribution to the body of knowledge on how to deploy a Kaizen Program in its launching phase.

PROPOSITION 3A: In public healthcare, the very first policy deployment for continuous improvement has chance of success if launched by the authority to which the hospitals belong.

PROPOSITION 3B: Consequently, the establishment of a Territorial Kaizen Committee could sustain the policy deployment and guarantee the success of kaizen implementation.
The study revealed that the engagement of both the territorial authority and the hospitals general directors was crucial to launch successfully a policy deployment for continuous improvement in public hospitals. It is needed their powerful to move professionals towards the organizational change. Such Kaizen Committee could be established to guarantee the KIP deployment through the engagement of top managers. This Committee guides the policy deployment due to a structured management system. Such system consists in three levels: the systemic management; the organizational management; the operative management.
The systemic management represents the linkage between the regional authority and its hospitals. Its board could be defined as a Kaizen Committee. It oversees and supports the policy deployment at systemic level. It convenes meetings to monitor the progress status of the policy deployment at systemic and hospital level. The organizational management represents the alignment between each hospital strategy and its kaizen initiatives. It is expected that top managers supervise and support the selected kaizen teams and these teams reports their progress status to the strategy level. The operative management concerns the execution of the kaizen initiatives at local level. Team leaders guide teams to achieve the expected improvement through the established modus operandi (PDCA).

PROPOSITION 3C: A successful launch of a kaizen policy deployment applies a participative approach.

The participative approach consists in actively involving together healthcare professionals and managers to identify the issues to be faced in their organizations together and to execute the kaizen initiatives.

PROPOSITION 4: The Kaizen Initiative Program represents the structured and systemic level of continuous improvement in a public healthcare system.

The exploratory study demonstrates that the KIP performed as a structured and systematic CI of the learning process scale provided by Bessant & Francis (1999). Thus, level 0 and Level 1 could be skipped due to this framework. In Table 8, confirmed performances are illustrated. In Table 9 confirmed practices are illustrated.

Table 8 Confirmed KIP Performances, adapted from Bessant & Francis (1999)

KAIZEN INITATIVE PROGRAM	
PERFORMANCE	**CONFIRMED FROM THE FIELD**
Local level effects due to the kaizen initiatives realized	**Social outcomes:** • strong commitment of teams to solve problems in their processes; • problem-solving attitude enhanced; • morale increased and generated willingness to go further; • team working attitude encouraged and improved.
Measurable CI actions: - *No. participants* *No processes selected for improvement*	No participants (education): 195 No participants (training): 127 No participants (kaizen): 102 No selected processes for kaizen: 8
Measurable performance effects limited to the KIs boundaries: *technical outcomes*	Technical outcomes as: • technical benefits as waiting time reduction, patient steps reduction; saturation medical exams booking to respond to patients' demand (completed kaizen initiatives) • data analysis benefits: awareness on how complex processes are working due to numbers and data analysis.
Little or no bottom line impacts, *as profit, social and environmental objectives (Osland and Zhou,2013)*	No bottom line effects at this level of implementation. It is the first launch of policy deployment.
Inception of policy deployment	• Engagement of top managers during the project; • Engagement of top managers after the project by pursuing the continuous improvement by new measures applied (launching the same Kaizen Program framework at single hospital level; engaging a research fellow to guarantee and support the approach application; assignment of the training programme to an external expert) • Empowerment of professionals • Alignment between strategy and selected kaizen initiatives • Formal protocol to execute improvement

Table 9 Confirmed KIP Practices, adapted from Bessant & Francis (1999)

KAIZEN INITATIVE PROGRAM	
PRACTICE	**CONFIRMED FROM THE FIELD**
Formal endeavour to incept and maintain CI	• Formal project of policy deployment for continuous improvement in the healthcare system; • Establishment of a Steering Committee as a board office; • Design and Support to hospitals; • Education to top managers • Training to operative healthcare professionals
Use of a declared and official problem-solving process	• Adherence to lean principles; • Formal problem-solving process transferred and used: PDCA Cycle
Participative approach Participation enhancement	Active involvement of professionals in the: • Decision-making process for selecting topic areas and kaizen initiatives • Kaizen implementation (team autonomy)
Structured training in basic CI tools:	Training followed a formal educational programme consisting in transferring the following basic tools for improvement: A3*; VSM; Root causes analysis; Ishikawa Diagram; 5S; Spaghetti chart.*
Structured management system	• Structured management system with sequential processes to launch and supervise the policy deployment for continuous improvement in the territorial healthcare system including its hospitals: (Design and support, Education, Training and Kaizen.
Recognition system	Leader and kaizen teams recognised officially by: • The board office; • Their general directors and the top managers. Leaders identified due to selection criteria
Parallel system to processes	• Kaizen initiatives worked parallelly with the daily operations
Cross-functional work for ad hoc kaizen action	• Team membership was heterogeneous: professionals involved represented the functions covered by the process object of the analysis

Summarizing, to guarantee the KIP success, our study suggests that:

- Managers should first align kaizen initiatives with the hospital strategy and secondly activate them;
- Kaizen teams should be legitimated through a recognition system within the hospitals. Such recognition facilitates and safeguard kaizen teams' efforts against potential cultural barriers;
- The role of department directors or coordinators as leaders could encourage teams to persist during the first experience of kaizen. In seven out of eight teams, directors and coordinators as powerful leaders stimulated and pushed professionals to persist and go further;
- Providing a kaizen protocol for guiding teams to the PDCA cycle support effectively the first approach to problem-solving. (All professionals appreciated this modality). A kaizen protocol should define: the time-schedule (e.g. the starting date, the expected time range of implementation); steps following the PDCA cycle;

KIP modalities explored confirm the theoretical characteristics, starting from the literature: a strict adherence to lean principles; a structured mechanism for continuous improvement activated and maintained; strategic management with a clear focus on continuous improvement mechanisms; a precise alignment of kaizen initiatives with the organizational strategy; targets identified and clearly communicated; a participative approach spread. A reliable monitoring system is not confirmed because only the progress status and the adherence to the policy deployment project were monitored. It was too early to apply a monitoring system to measure the evolution of key performance indicators.

This study aimed at focusing theoretically and practically on the long-term perspective for continuous improvement in public hospitals by applying a policy deployment strategy starting from the first launch of the initiative. Thus, our research partially response to the second part of the research about guaranteeing a structured continuous improvement in healthcare because provides procedural contribution for the first year of implementation but overtime.

6. Limitations and further research opportunities

Limitations of this study should be recognized. Firstly, although our purpose was to explore the policy deployment through a Kaizen Initiative Program in an Italian healthcare context experiencing the kaizen methodology, the framework is tested only to launch and implement

the continuous improvement. In fact, we are unable to affirm that the tested framework is useful to successfully sustain continuous improvement over time. It is needed to continue the study for at least another year. Secondly, we encourage researchers to apply our insights in other public healthcare settings and to compare this research with such existing kaizen experiences that are deploying continuous improvement systematically, without declaring a policy framework. Thirdly, kaizen initiatives are worthy to be compared to deeply investigate social outcomes and their determinants, according to Bortolotti et al. (2018). This study gathered data only from de-structured or semi-structured interviews addressed to investigate the organizational change. We encourage researchers and practitioners to further analyze professionals' perspectives, problem solving attitude and motivation. Fourthly, our study did not consider the commitment to organizational change at system, hospital and kaizen initiative level, according to Herscovitch & Meyer (2002). Such authors define the commitment to organizational change as a mindset that binds and individual to a course of action deemed necessary for the successful implementation of a change initiative. This mindset can reflect: (a) a desire to provide support for the change based on a belief in its inherent benefits (affective commitment to change); (b) a recognition that there are costs associated with failure to provide support for the change (continuance commitment to change) and (c) a sense of obligation to provide support for the change (normative commitment to change). We encourage researchers to deepen this unit of analysis.

Despite these limitations, we think that the insights developed in this action research could help hospital managers to formulate an effective policy deployment mechanism starting from the first kaizen experience, aligning strategy with the operational targets and encourage researchers to continue pursuing the long-term perspective inquiry in public healthcare for enlarging the body of knowledge.

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