

Does Van Linge's model provide a basis for the improvement of the early implementation phase of a quality management system in a physical therapy practice?

Masterthesis

Physiotherapy Science

Program in Clinical Health Sciences

Utrecht University

Name student:	R. de Vetten (Reinier)
Student number:	3845834
Date:	25-06-2016
Internship supervisor(s):	Dr. J. van der Net
Internship institute:	UMC Utrecht
Lecturer/supervisor Utrecht University:	Dr. M.F. Pisters

"ONDERGETEKENDE

Reinier de Vetten

bevestigt hierbij dat de onderhavige verhandeling mag worden geraadpleegd en vrij mag worden gefotokopieerd. Bij het citeren moet steeds de titel en de auteur van de verhandeling worden vermeld."

Examiner

Dr. M.F. Pisters

Assessors:

Dr. J. van der Net

Prof. dr. P.J.M. Helders

Words:

3773

Abbreviations:

QI	-	Quality Improvement
QMS	-	Quality Management System
IC model	-	Innovation Contingency Model
RO configuration	-	Regulation-Oriented configuration
GO configuration	-	Goal-Oriented configuration
TO configuration	-	Team-Oriented configuration
DO configuration	-	Development-Orientated configuration

Masterthesis, Physical Therapy Sciences, Program in Clinical Health Sciences, Utrecht University, Utrecht, 2016

SAMENVATTING

Achtergrond

Fysiotherapeuten hebben steeds meer aandacht voor verbetering van de kwaliteit en effectiviteit van zorg. Dit kan worden bereikt door de implementatie van een kwaliteitsmanagementsysteem.

Doelstelling

Het doel van deze studie is het verkennen van de vroege implementatie fase van een kwaliteitsmanagementsysteem, ter verbetering van de kwaliteit in een fysiotherapiepraktijk. Voor deze verkenning is het innovatiecontingentiemodel van Van Linge geselecteerd.

Methode

De participanten van de deelnemende praktijken vulden elk vragenlijsten in over de karakteristieken van de organisatie en innovatie. Aanvullend werden zij geïnterviewd over de voor hun bevorderende en belemmerende ervaringen in relatie tot de verschillende systemen die invloed hebben op de implementatie.

Resultaten

De resultaten laten een misfit zien tussen de systemen 'innovatie' en 'organisatie' van het innovatiecontingentiemodel van Van Linge in de vroege fase van implementatie van een kwaliteitsmanagementsysteem in een fysiotherapiepraktijk. Dit resultaat wordt ondersteund door interviews waarin organisatorische karakteristieken als belemmerend werden genoemd, karakteristieken van de innovatie als bevorderend ervaren en de contextuele karakteristieken van de praktijken zowel bevorderend als belemmerend werden ervaren.

Conclusie

Er is sprake van een misfit tussen twee systemen van het model van Van Linge in de vroege implementatiefase. Het model van Van Linge is bruikbaar in de vroege fase van implementatie ter verkenning van de fit of misfit. De interviews dragen bij aan de verheldering en verdieping van de gevonden misfit. Echter, de gevonden resultaten hebben enkel betrekking op de deelnemende praktijk. Verder onderzoek zou zich moeten richten op generaliseerbaarheid.

Klinische relevantie

Fysiotherapiepraktijken die zich in de vroege fase van implementatie bevinden kunnen het innovatiecontingentiemodel van Van Linge gebruiken bij het vinden van de misfit. Praktijken kunnen vervolgens een toegesneden implementatiestrategie opzetten ter eliminatie van de misfit om zo een perfecte fit voor implementatie te creëren. Uit ander onderzoek blijkt dat een goede fit de kans op een succesvolle implementatie vergroot.

ABSTRACT

Background

Physical therapists are increasingly more focused on improving the quality and effectiveness of care. Quality improvement can be facilitated by the implementation of a quality management system.

Aim

This study aims to explore the early implementation phase of a quality management system in order to improve quality in a physical therapy practice. For this exploration, Van Linge's innovation contingency model is selected.

Methods

Each of the participants from the physical therapy practice completed an organization and innovation characteristics questionnaire. Subsequently, they were interviewed about their implementation experiences, focusing on facilitators and barriers.

Results

Results indicate a misfit between the systems 'innovation' and 'organization' in the innovation contingency model of Van Linge. This was shown in the early implementation phase of the quality management system in a physical therapy practice. This result is supported by the qualitative results from the interviews, in which organizational characteristics were reported as barriers, characteristics of the innovation were reported as facilitators and contextual characteristics were reported as both facilitators and barriers.

Conclusion

There is a misfit between two systems of Van Linge's model in the early implementation phase. This model is compatible to explore the fit or misfit in the early phase of implementation. The content of the interviews contributes to the exploration and explanation of the discovered misfit. Nevertheless, these results relate only to the participating practice and cannot be generalized. Further research should focus on generalizability.

Clinical Relevance

Physical therapy practices that are in the early phase of implementation can use the innovation contingency model of Van Linge to detect the misfit. Subsequently, practices can set up a tailored implementation strategy in order to eliminate the misfit and to create a perfect fit for implementation. Previous research shows that good fit increases the chances of successful implementation.

Keywords: (mis)fit, implementation, quality management system, barriers

INTRODUCTION

Health care professionals, such as physical therapists, are increasingly more focused on improving the quality and effectiveness of care (1). Health care organizations feel social pressure to offer more transparency in the quality of care because of a declining trust in their performance (2,3). As a result, quality improvement (QI) becomes more important for health care organizations (1).

Quality improvement is a well-known management principle that emphasizes the development of a structured, organization-wide approach in order to improve and understand fundamental work procedures (4). Within a health care organization, QI can be facilitated by the implementation of a quality management system (QMS) (4,5).

The implementation of a QMS brings several advantages to the health care organization. For instance, it may improve the image of the organization (6), contribute to the standardization of procedures, and improve the capacity of managers, employees and patients to be critical of and improve the quality of care (7). In order to achieve a successful QI, the literature strongly emphasizes that the standard procedures within the organization should become part of the QMS (8,9).

The implementation of such a QMS has a number of essential features. These include a written preparation, training on the accreditation process, and planned quality-evaluations based on established plans and objectives, in order to enable improvements (6). An accurate implementation process is indispensable in order to achieve success. However, in the early phase of implementation, a misfit is often observed between the QMS and the organization in which it is implemented (8). Such a misfit has shown to diminish the chances of successful implementation (10,11).

Previous research indicates a variety of strategies for the implementation of QI innovations. None of these have proven to be the most adequate (12-14). Some studies found that a dynamical system approach that includes a coherent set of characteristics (team, organization, leadership and context) appears to be required in the implementation of a QMS (12,15,16). Others found promising results for implementation that is tailored on identified barriers (17). These barriers are defined as factors that impede the implementation of change in a professional practice (18). Tailoring makes it possible to anticipate on barriers, which results in an implementation process that suits the characteristics of the innovation, organization, persons and context (12,15). As a result, identifying barriers appears to be an important first step in various implementation models, in order to set up a tailored implementation strategy (12).

Notwithstanding the research described above, several gaps within the current knowledge remain. More specifically, the influence of facilitators and barriers in the fit or misfit between the characteristics of a system is not entirely understood (19). Additionally, the methods that were adopted in previous studies were not optimal: most research on barriers for the implementation of QMS was quantitative, while only a few implementation studies of QMS have used multimethod (quantitative and qualitative) approaches (20). Considering that

health care organizations are complex and dynamic systems, a multimethod approach would offer insights into these systems (21,22). Furthermore, most implementation studies mainly focus on one specific group of users of QI innovation users or on individual facilitators and barriers. A heterogeneous group should be included in order to test the effects of different systems on the implementation of QMS (19). Finally, previous research has not included the multiple factors and levels of the organization, or its context as a key characteristic that influence implementation (23). For these reasons, further research is needed.

It is recommended to adopt an explicit theory in order to understand barriers and design tailored interventions in implementation research (24). A strong theoretical construct that is based on a theory would greatly enhance research within this field. For this exploratory study of the early implementation phase of a QMS in order to improve QI in a physical therapy practice, the innovation contingency (IC) model of Van Linge (figure 1) is selected. A contingency model was chosen because the contingency theory underlying the model was developed for the analysis of organizations (25) and because it is frequently used for the development of organizations (26). Thus far, the model has been successfully adopted in hospitals during the implementation of nursing innovations (10,11). This study is the first to test the model in a physical therapy practice.

The IC model of Van Linge is based on three theoretical constructs. The first is the configuration approach. A configuration is a coherent set of characteristics of a system, such as the innovation (e.g. the QMS), persons, context and organization (27). The second construct is shaped by theories regarding the layers within the systems. An innovation process has operational characteristics (operational layer), explicit values (explicit layer) and basal views (depth layer). When these layers fit, the innovation is considered to be a configuration (28). The third construct is formed by the strategy contingency approach in relation to change and innovation within organizations: there is no optimal way by which to innovate. Effective implementation strategies for innovation are based on the specific circumstances (fit or misfit) (11).

The IC model assumes that implementation can only be successful when the innovation strategy is tailored to the fit or misfit between systems (10,11). By providing tools for the identification of potential barriers toward successful implementation the model offers insights into how the intervention should be tailored in order to eliminate the misfit (10,11). As a result, the success of the implementation increases.

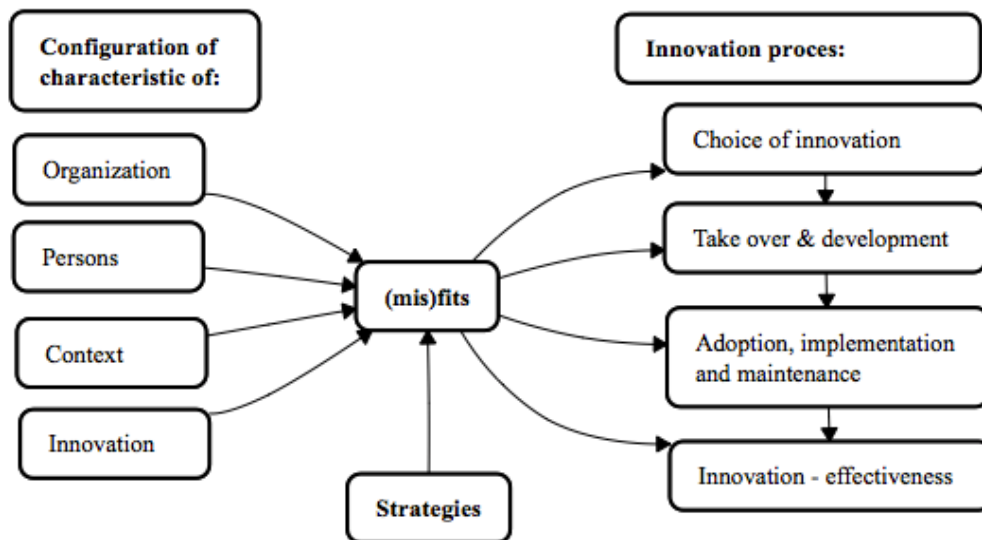


Figure 1. The innovation contingency model of Van Linge.

The innovation in this study, i.e. the used QMS, is a commonly used Dutch health care management system: the Harmonisation Quality Assessment within the health care sector (Harmonisatie Kwaliteitsbeoordeling in de Zorgsector (HKZ)). Thus far, 538 out of 4700 (29) primary physical therapy practices in The Netherlands have implemented HKZ (30).

It is hypothesized here that (1) specific factors and levels of the organization and its context have an impact on the fit (or misfit) between the QMS and the organization, (2) that facilitators and barriers offer insights into the fit (or misfit), and (3) that the inclusion of a heterogeneous group offers insights into different factors that lead toward a fit (or misfit).

METHODS

Setting

One primary physical therapy practice was selected, in which the early implementation phase of the QMS could be observed. This practice met all of the following inclusion criteria: (1) being a primary care practice, (2) being in the early implementation phase of the QMS, and (3) consisting of at least 12 directly involved participating employees. The latter was considered important as previous research shows that between 6 and 12 participants are needed in order to reach saturation (31).

Participants

In the selected practice, 13 employees were willing to participate. All of the employees worked in the same primary physical therapy practice. Three of the participants also worked

in other physical therapy practices. In order to be eligible to participate in this study, a participant had to meet the following inclusion criteria: being directly or indirectly involved with the implementation and/or the use of the QMS and not intending to leave the practice within the study procedure or within the implementation phase. The final inclusion of participants was based on saturation: inclusion ended when saturation was reached. Saturation was considered to be reached when (1) no new relevant data was found for a certain category, (2) the category was fully worked out in all its dimensions and variations, and (3) the relation between different categories was clear (32).

Procedures

All of the participants signed an informed consent. They were instructed to carefully read background information about the QMS, and to complete the questionnaires and return them personally. After returning the questionnaires, appointments were made to conduct the interviews.

Design

A mixed methods design was used in order to acquire information on all systems of Van Linge's IC model. For the systems 'innovation' and 'organization', quantitative measures were available. For the other systems, qualitative measures were used to acquire the required information. Thereby, previous research is mainly quantitative (20) a mixed method approach is recommended in order to gain insights into the different systems (21,22).

Quantitative Measures

The 12-item Perceived Innovation Characteristics Questionnaire (Vragenlijst Waargenomen Innovatie Kenmerken (WIK)) and the 12-item Organization Characteristics Questionnaire (Vragenlijst Waargenomen Afdelingskenmerken (unit) Kenmerken (WAK)) were used for the collection of data about the innovation and the organization characteristics, respectively. The questionnaires were designed to measure innovation and organization characteristics and distinguish four configurations: (1) the Regulation-Oriented (RO) (α 0.87), (2) the Goal-Oriented (GO) (α 0.76), (3) the Team-Oriented (TO) (α 0.91), and (4) the Development-Oriented (DO) (α 0.89) configuration. Each configuration is scored on three layers: the operational, the explicit and the depth layer. Participants were instructed to rate the strength of their agreement to the characteristics on a scale from one (fully disagree) to five (fully agree).

Leadership was obtained by means of the Multifactor Leadership Questionnaire (MLQ). The MLQ measures leadership on two scales: transformational- (α 0.95), and transactional (α 0.60) leadership. Each scale consists of six-items. Participants were instructed to rate the strength of their agreement to the theses, on a scale from one (not at all) to five (very often).

Qualitative Measures

A structured diagnostic interview was used, to collect data about the innovation, the organization, the persons involved in the implementation and the context. The interview consisted of 13 questions. In preparation of this study, two test interviews were conducted in order to formulate the questions in such a way that they would be understood as they were meant (for (the development of) the interview, see appendix 1).

Data interpretation

The WIK and WAK were analyzed on individual scores. The analysis was conducted according to the WIK and WAK interpretation rules (appendix 2).

For the MLQ descriptive statistics were used in order to determine the mean score on both scales (transformational and transactional). The analysis of the questionnaire was performed using SPSS for Macintosh (version 20.0, SPSS Inc, Chicago, Ill). No norm scores are available. The interpretation of the data focuses on one of the types of leadership.

The interviews were thematically analyzed in three steps. Analyses of the interviews were performed using NVIVO for Macintosh (version 10.1.2, QRS International). (1) The procedure began with a line by line coding of the audio-taped interviews into typed statements. (2) Subsequently, the first author organized the statements into analytical themes based on the IC model of Van Linge. (3) The statements were reviewed and organized by all of the authors during the analysis of the results. Disagreements were discussed and, if necessary, statements were replaced.

RESULTS

Participants and saturation in the data

The final sample consisted of eight participants before saturation was reached (see diagram 1). Participant five added five unique statements, participant six added one unique statement, participant seven added none unique statements and participant eight added one unique statement. Based on this pattern it is not expected that the inclusion of more participants will lead to a different composition of statements or data pattern(s). The characteristics of the study population are shown in table 1. Given the number of participants and the setting, only minimal characteristics are given, in order to maintain anonymity.

Diagram 1

Participants and saturation in the data.

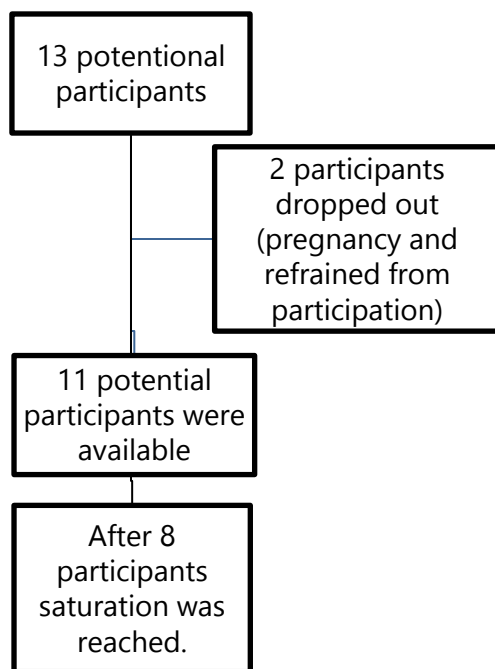


Table 1

Characteristics of the study population.

Characteristics		Participants
Age in years	Mean (SD)	43.5 (16,31)
Gender		
• Male	N (%)	5 (63%)
• Female	N (%)	3 (37%)
Function in practice		
• General therapists	N (%)	4 (50%)
• Psychosomatic therapist	N (%)	1 (12,5%)
• Geriatric therapist	N (%)	1 (12,5%)
• Practice owner	N (%)	1 (12,5%)
• Quality management assistant	N (%)	1 (12,5%)

Leadership

The practice owner and two participants who worked on a stand-alone basis did not complete the questionnaire. Despite their stand-alone basis, they complied with the policy of the practice.

Among the participants, there was no consensus on the leadership characteristics of the practice owner (table 2). Participant one, two, and four considered their manager to be more transformational than transactional, while participant three considered his/her manager

to be more transactional. Participant five identified transformational as well as transactional characteristics in the manager.

Innovation and organization characteristics

Do the participants attribute certain characteristics to the innovation and to what extent do they agree on these characteristics?

The results on the WIK (table 2) show that three or more participants could not attribute certain characteristics to a layer of a configuration. On the operational layer of the DO configuration, four participants scored 'neither agree, nor disagree'. On the explicit layer of the TO configuration and the depth layer of the GO configuration, three participants scored 'neither agree, nor disagree'. One of the participant's scored 'neither agree, nor disagree' on 7 out of 12 layers. The latter indicates that this participant may have had limited knowledge about the innovation. The other seven participants attributed certain characteristics to the innovation, which indicates that they had sufficient knowledge of the innovation.

The participants showed comparable results on the GO configuration (17 positive, 3 negative) and the TO configuration (16 positive, 3 negative). On the RO configuration and the DO configuration, the scores among participants were less consistent (respectively 15 positive, 6 negative and 10 positive, 7 negative).

Does the innovation have an internal fit (single or multiple)?

The results from table 2 show that the innovation mainly has a single internal fit on the GO configuration (four participants). One participant scored negatively on all three layers of the GO configuration, while three participants could not attribute characteristics to all layers. This indicates that the innovation mainly fits together on the GO configuration. The results did not show a multiple internal fit.

Does the organization have an internal fit (single or multiple)?

According to the participants, the organization firmly fits together (single internal fit) on the GO configuration (six participants) and the TO configuration (seven participants). Six participants scored a single internal fit on the GO configuration and the TO configuration. This entails that the organization scores a multiple internal fit on the GO configuration and the TO configuration (table 2).

Is there a fit between innovation and organization (external fit, single or multiple)?

None of the configurations showed a clear fit between innovation and organization. The GO and TO configurations showed a cautious multiple external fit, meaning that the innovation and the organization have characteristics of the GO and TO configurations. However, the majority of the participants showed a misfit between innovation and organization (table 2).

Configuration profile of the organization and the innovation based on the WIK and WAK scores.

According to the participants, the innovation is mainly GO (table 2, in green). They consider their organization to be GO as well as TO (table 2, in orange). There is a cautious fit between innovation and organization on the GO and TO configurations (table 2, in blue). However, the majority of the participants show a misfit between innovation and organization (table 2, in red).

Table 2

Leadership (MLQ), innovation (WIK) and organization (WAK) characteristics.

	Participants							
Data Source	1	2	3	4	5	6	7	8
MLQ TRF	4	4.8	2	3.8	2.3	-	-	-
MLQ TRA	3.3	3.1	3.3	3.2	2.2	-	-	-
WIK RO	O:5 - E:4 - D:4	O:4 - E:4 - D:4	O:3 - E:4 - D:2	O:3 - E:4 - D:3	O:4 - E:4 - D:2	O:2 - E:5 - D:1	O:5 - E:2 - D:2	O:5 - E:5 - D:5
INT FIT	YES	YES	NO	NO	NO	NO	NO	YES
WAK RO	O:5 - E:3 - D:4	O:4 - E:4 - D:5	O:5 - E:4 - D:4	O:4 - E:5 - D:3	O:2 - E:4 - D:5	O:4 - E:3 - D:4	O:5 - E:4 - D:4	O:5 - E:5 - D:5
INT FIT	NO	YES	YES	NO	NO	NO	YES	YES
EXT FIT	NO	YES	NO	NO	NO	NO	NO	YES
WIK GO	O:5 - E:4 - D:5	O:4 - E:4 - D:3	O:4 - E:5 - D:4	O:4 - E:5 - D:3	O:4 - E:4 - D:4	O:3 - E:4 - D:3	O:1 - E:1 - D:2	O:5 - E:5 - D:5
INT FIT	YES	NO	YES	NO	YES	NO	NO	YES
WAK GO	O:5 - E:5 - D:5	O:4 - E:4 - D:5	O:4 - E:5 - D:5	O:3 - E:5 - D:4	O:2 - E:4 - D:4	O:4 - E:4 - D:5	O:4 - E:4 - D:5	O:5 - E:5 - D:5
INT FIT	YES	YES	YES	NO	NO	YES	YES	YES
EXT FIT	YES	NO	YES	NO	NO	NO	NO	YES
WIK TO	O:4 - E:4 - D:4	O:4 - E:3 - D:3	O:5 - E:5 - D:4	O:5 - E:3 - D:4	O:4 - E:3 - D:2	O:4 - E:5 - D:3	O:5 - E:1 - D:2	O:5 - E:5 - D:4
INT FIT	YES	NO	YES	NO	NO	NO	NO	YES
WAK TO	O:4 - E:5 - D:5	O:4 - E:4 - D:5	O:4 - E:5 - D:4	O:4 - E:4 - D:4	O:3 - E:2 - D:5	O:4 - E:4 - D:5	O:4 - E:4 - D:5	O:4 - E:4 - D:5
INT FIT	YES	YES	YES	YES	NO	YES	YES	YES
EXT FIT	YES	NO	YES	NO	NO	NO	NO	YES
WIK DO	O:2 - E:4 - D:2	O:2 - E:4 - D:3	O:3 - E:5 - D:5	O:3 - E:3 - D:3	O:4 - E:4 - D:2	O:3 - E:4 - D:4	O:3 - E:1 - D:2	O:1 - E:4 - D:5
INT FIT	NO	NO	NO	NO	NO	NO	NO	NO
WAK DO	O:5 - E:5 - D:5	O:4 - E:4 - D:5	O:4 - E:4 - D:5	O:4 - E:4 - D:3	O:4 - E:4 - D:4	O:3 - E:3 - D:5	O:4 - E:4 - D:3	O:4 - E:4 - D:5
INT FIT	YES	YES	YES	NO	YES	NO	NO	YES
EXT FIT	NO	NO	NO	NO	NO	NO	NO	NO

Note. MLQ = Multifactor Leadership Questionnaire, TRF = Transformational Leadership, TRA = Transactional Leadership, WIK = Innovation characteristics, WAK = Organization characteristics, RO = Regulation-Oriented, GO = Goal-Oriented, TO = Team-Oriented, DO = Development-Oriented, INT FIT – Internal Fit, EXT FIT = External Fit, O = Operational layer, E = Explicit layer, D = Depth layer, In Green = FIT innovation, In Orange = FIT organization, In Blue = External FIT, In Red = Misfit.

Diagnostic interview

Definition and purpose of the HKZ system according to the participants.

Table 4 (appendix 4) shows that five out of eight participants described the HKZ system as one that can be used for an internal quality check for the processes in the practice. According to five out of eight participants, the main purpose of the HKZ system is to maintain the quality of the practice on a high level.

Barriers and facilitators

Tables 5 and 6 (appendix 5) show the participants' self-experienced barriers and facilitators. One system of Van Linge's IC model emerged as a barrier in this practice: the organization. The participants described organizational barriers, such as: "lack of time to implement and use the HKZ system", "the innovation is not supported by everyone", and "the managers do not make a good example regarding the implementation and use of the HKZ system". Participants consider the characteristics of the innovation as facilitating. This emerged from statements such as: "the HKZ model ensures stability and insight about the processes in the practice" and "the HKZ model gives transparency about the processes and quality in the practice".

The participants experienced the context as a facilitator and a barrier. On one hand, they perceive a negative characteristic of the context: "due to HKZ, health insurance companies gain insight into our quality and can set high goals for improvement". On the other hand, they see a facilitating characteristic: "Having a certified HKZ gives you possibility's to differentiate yourself from other practices which are not in possession of a HKZ".

DISCUSSION

As hypothesized, the results from this study show a misfit between 'innovation and organization' of Van Linge's IC model. This result is supported by the qualitative results from the interviews, in which organizational characteristics were reported as barriers, the characteristics of the innovation were reported as facilitators and the contextual characteristics were reported as both facilitators and barriers.

The results, the misfit that was shown, form the fitness landscape. A 'fitness landscape' is a combination of the systems that are involved with the implementation (33). This study found a fitness landscape in which the innovation is mainly GO, while the organization is GO as well as TO. The differences in the fitness landscape form the basis for defining the tailored implementation strategy. Physical therapy practices that are in the early phase of implementation can use the IC model of Van Linge to detect the misfit, if present. Subsequently, according to the IC model of Van Linge, practices can set up a tailored implementation strategy in order to eliminate the misfit and to create a perfect fit for implementation. Previous research shows that good fit increases the chances of successful implementation (10,11).

The findings in this study are in agreement with previous research: both identify a misfit between innovation and organization in the early phase of implementation (8). The most frequently demonstrated barriers in previous research are the lack of time and an excessive workload in implementing QI (34). This study confirms these and shows that they are perceived as organizational barriers. Furthermore, both previous research and the current study recognize mismanagement as an organizational barrier. More specifically, one stated barrier is a management that lacks direction and does not adequately form a role model (35). Additionally, the lack of the implementation's clear outcomes for the organization is a barrier (36). There are also differences between the present study and previous research. For example, the lack of support for the innovation was not evident in previous research. Furthermore, both this study and previous ones show that health insurance companies play an important role, but that the mechanism varies. According to this study, participants are afraid that health insurance companies may gain insight into their quality and can set high goals for improvement, in order to maintain a preferred healthcare provider. Other studies, however, show that it is in particular the lack of financial support by the health insurance company that is an issue (37).

Depending on their position in the practice, health care professionals (from administrative employees to therapists and management) had competing priorities during the implementation of QI (38). Previous research shows that a physical therapist's main priority is to deliver high quality care (39). Quality improvement that focuses directly on the quality of patient care, in which the healthcare professional is involved in the implementation process, is experienced as facilitating (39). Though managers share the priority of delivering a high quality of care, they also understand the need for change by means of QI. An implementation of QI that does not directly lead toward an improvement in the quality of care is often experienced as a barrier by physical therapists (38). This is in accordance with the current study. As facilitating, the participants in the present study stated that, in addition to the quality of care, the QMS has a positive impact on the processes in the practice. In contrast to earlier research, being involved in the implementation is stated as a barrier by half (50%) of the participants. According to the participants, it leads to increased workload. As a result of the implementation of the QMS, the time spent on documentation and on updating the electronic patient files increases. These activities are experienced as unnecessary because they do not contribute to the quality of care for the patient. Consequently, these requirements reduce the focus of a physical therapist's QI effort (38).

Earlier research states that the lack of support and follow-up by the management during the early phase of implementation was considered a barrier (40). The participants in this study stated similar barriers. Health care managers that inspire the team members by identification with the values of the QI contribute to the success of the implementation (40). The results from this study support this. Participants who perceive their manager as supportive, show more fits between innovation and organization, and state more facilitators.

This study also has several limitations. Interactive implementation research is related to a specific context from a specific practice. As a result, it has a limited generalizability of its

results. However, the results from such studies provide important detailed insights during implementation, which can place the critique in perspective (41). This study thereby provides an opportunity to include a heterogeneous group of participants and investigate the implementation process in a real sense. Previous studies show that including healthcare professionals in the early phase of implementation increases their engagement (42). Nevertheless, this study suggests that future research should focus on generalizable results, which can be achieved by the inclusion of multiple practices. The second limitation refers to the comparison of results of recent research which in contrast to the current study, did not only focus on the implementation of QMS in health care. This study compares its results with results from studies that also focus on the implementation of different innovations (guidelines, practice facilitation, and so forth). The implementation of different innovations may lead to specific innovation related barriers and facilitators, and future research could investigate these differences.

The final limitations arises from the adopted method. Data collection by means of an interview relies on the technique of the interviewer and future research can use other forms of qualitative data collection. The adherence to rules and agreements within the HKZ system can be checked as a result of implementation. Furthermore, this study focuses on the early phase of implementation and the results do not give any insight into a possible fit or misfit in later phases of implementation. Recent literature shows that these later phases include different factors that influence fit or misfit (43). Future research can focus on the longitudinal effects of a tailored implementation strategy on fit or misfit.

CONCLUSION

Overall, the results of this study support the hypothesis that there is a misfit between the systems 'innovation and organization' of the IC model of Van Linge in the early implementation phase of a QMS in a physical therapy practice. In the early phase of implementation, the model of Van Linge is compatible with the exploration of the fit or misfit. The content of the interviews contributes to the exploration and explanation of the discovered misfit. Nevertheless, these results relate to the participating practice only and cannot be generalized. Further research should focus on generalizability.

REFERENCES

1. Maher CG, Sherrington C, Elkins M, Herbert RD, Moseley AM. Challenges for Evidence-Based Physical Therapy: Accessing and Interpreting High-Quality Evidence on Therapy. *Phys Therapy*. 2004;84(7):644–54.
2. Checkland K, Marshall M, Harrison S. Re-thinking accountability: trust versus confidence in medical practice. *Qual Saf Health Care*. 2004;13(2):130–5.
3. Love T, Dowell AC, Salmond C, Crampton P. Quality indicators and variation in primary care: modelling GP referral patterns. *Fam Pract*. 2004;21(2):160–5.
4. Berlowitz DR, Young GJ, Hickey EC, Saliba D, Mittman BS, Czarnowski E, et al. Quality Improvement Implementation in the Nursing Home. *Health Serv Res*. 2003;38(1p1):65–83.
5. Eckert H, Schulze U. Quality management in a combined clinic - the quality management system according to DIN EN ISO 9001 of the The German Association of Spa Accommodation Resorts e. V. (VdKB). *Rehabilitation (Stuttg)*. 2004;43(3):166–73.
6. Benoliel MJ. Step-by-step Implementation of a quality system in the laboratory. *Trends Anal Chem*. 1999;18(6):632-8.
7. Almeida JS, Pires, AC. Evaluation of the implementation of a quality system in a basic research laboratory: viability and impacts. *Bol Soc Portuguesa Química*. 2006;101:34-39.
8. Alanen SI, Johannala-Kemppainen R, Ijäs JJ, Kaila M, Klockars M, Mäkelä M, et al. Evaluation of current care effectiveness: a survey of hypertension guideline implementation in Finnish health centres. *Scand J Prim Health Care*. 2007; 25(4):232–6.
9. Boström A-M, Wallin L, Nordström G. Evidence-based practice and determinants of research use in elderly care in Sweden. *J Eval Clin Pract*. 2007;13(4):665–73.
10. Van Os-Medendorp H, Eland-de Kok P, van Linge R, Bruijnzeel-Koomen C, Grypdonck M, Ros W. The tailored implementation of the nursing programme “Coping with Itch”. *J Clin Nurs*. 2008;17(11):1460–70.
11. Timmermans O, Van Linge R, Van Petegem P, Van Rompaey B, Denekens J. A contingency perspective on team learning and innovation in nursing. *J Ad Nurs*. 2013;69:363–373.
12. GroL R, Grimshaw J. From best evidence to best practice: effective implementation of

- change in patients' care. *Lancet*. 2003; 362(9391):1225–30.
13. Grimshaw J, Eccles M, Tetroe J. Implementing clinical guidelines: current evidence and future implications. *J Contin Educ Health Prof*. 2004; 24 Suppl 1:S31–7.
 14. Grimshaw JM, Thomas RE, MacLennan G, Fraser C, Ramsay CR, Vale L, et al. Effectiveness and efficiency of guideline dissemination and implementation strategies. *Health Technol Assess*. 2004;8(6):iii – iv:1–72.
 15. Grol R, Wensing M. What drives change? Barriers to and incentives for achieving evidence-based practice. *Med J Aust*. 2004;180(6 Suppl):S57–60.
 16. McFadden KL, Stock GN, Gowen CR. Leadership, safety climate, and continuous quality improvement: Impact on process quality and patient safety. *Health Care Manage Rev*. 2014 Feb 21;00(0):1–11.
 17. Baker R, Camosso-Stefinovic J, Gillies C, et al. Tailored interventions to overcome identified barriers to change: effects on professional practice and health care outcomes. *Cochrane Database Syst Rev*. 2010;(3):CD005470.
 18. Shaw B, Cheater F, Baker R, Gillies C, Hearnshaw H, Flottorp S, et al. Tailored interventions to overcome identified barriers to change: effects on professional practice and health care outcomes. *Cochrane database Syst Rev*. 2005;(3):CD005470.
 19. Alexander JA, Hearld LR. The science of quality improvement implementation: developing capacity to make a difference. *Med Care*. 2011 Dec;49 Suppl(12):S6–20.
 20. Cochrane LJ, Olson CA, Murray S, Dupuis M, Tooman T, Hayes S: Gaps between knowing and doing: understanding and assessing the barriers to optimal health care. *J Contin Educ Health Prof* 2007, 27(2):94–102.
 21. Hroschikoski MC, Solberg LI, Sperl-Hillen JM, Harper PG, McGrail MP, Crabtree BF. Challenges of change: a qualitative study of chronic care model implementation. *Ann Fam Med*. 2015;4(4):317–26.
 22. Hung DY, Rundall TG, Tallia AF, Cohen DJ, Halpin HA, Crabtree BF, Rethinking prevention in primary care: applying the chronic care model to address health risk behaviors. *Milbank Quaterly*. 2007;85:69–91.
 23. Foy R, Penney GC, Grimshaw JM, Ramsay CR, Walker AE, MacLennan G, et al. A randomised controlled trial of a tailored multifaceted strategy to promote implementation of a clinical guideline on induced abortion care. *BJOG*.

2004;111(7):726–33.

24. Davies P, Walker AE, Grimshaw JM. A systematic review of the use of theory in the design of guideline dissemination and implementation strategies and interpretation of the results of rigorous evaluations. *Imp Sci*. 2010;5:14-19.
25. Damanpour F. Organizational complexity and innovation: developing and testing multiple contingency models. *Manage Sci*. 1996;42:693–716.
26. Gnyawali DR, Stewart AC. A contingency perspective on organizational learning: integrating environmental context, organizational learning processes and types of learning. *Manage Learn*. 2003;34:63–89.
27. Eric W, Ford W, Duncan J, Ginter PM. The Structure of State Health Agencies: A Strategic Analysis. *Med Care Res and Rev*. 2003;60:31-57.
28. Bartunek JM, Moch MK. First-Order, Second-Order, and Third-Order Change and Organization Development Interventions: A Cognitive Approach. *J App Behavior Sci*. 1987;23:483-500.
29. Rabobank Cijfers & Trends, Branche-informatie, fysiotherapeuten. 2016. From <https://www.rabobankcijfersentrends.nl/>
30. Overzicht certificaten 2016. From <https://www.hkz.nl>.
31. Guest G. How Many Interviews Are Enough?: An Experiment with Data Saturation and Variability. *Field methods*. 2006;18(1):59–82.
32. Mortelmans D. *Handboek kwalitatieve onderzoeksmethoden*. 2007. Den Haag: Acco
33. Jermais J, Gami L. Integrating business strategy, organizational configurations and management accounting systems with business effectiveness: a fitness landscape approach. *Manage account res*. 2004;15:179-200.
34. Scurlock-Evans L, et al. Evidence-Based Practice in physiotherapy: a systematic review of barriers, enablers and interventions. *Physiotherapy*. 2014;100:3:208- 219
35. Fraga HC, Fukutani FK, Celes FS, Barral AMP, Oliveira de CI. Evaluation of the implementation of a quality system in a basic research laboratory: viability and impacts. *Einstein*. 2012;10(4), 491-497
36. Stevens JGA, Beurskens AJMH. Implementation of measurement instruments in physical therapist practice: development of a tailored strategy. *Phys Ther*. 2010;90: 953–961.

37. Huijg JM, Dusseldorp E, Gebhardt WA, et al. Factors associated with physical therapists' implementation of physical activity interventions in the Netherlands. *Phys Ther.* 2015;95:539–557
38. Karlen E, McCathie B. Implementation of a quality improvement process aimed to deliver highvalue physical therapy for patients with low back pain: case report. *Phys Ther.* 2015;95:1712–1721
39. de Vos ML, van der Veer SN, Graafmans WC, de Keizer NF, Jager KJ, Westert GP, van der Voort PH: Process evaluation of a tailored multifaceted feedback program to improve the quality of intensive care by using quality indicators. *BMJ Qual Saf.* 2013; 22(3):233–241.
40. Rycroft-Malone J: The PARIHS framework—a framework for guiding the implementation of evidence-based practice. *J Nurs Care Qual.* 2004;19(4):297–304.
41. Nielsen AK, & Svensson L. Action and interactive research: beyond practice and theory. 2006. Maastricht: Shaker Publishing.
42. Ireland S, Kirkpatrick H, Boblin S, Robertson K: The real world journey of implementing fall prevention best practices in three acute care hospitals: a case study. *Worldviews Evid Based Nurs* 2013, 10(2):95–103.
43. Fitzgerald L, Ferlie E, Wood M, Hawkins C. Interlocking Interactions, the Diffusion of Innovations in Health Care. *Hum Relations.* 2002;55(12):1429–49.

Appendix 1

1. Key subjects and questions of the structured diagnostic interview:

Knowledge of the quality management system HKZ.

- What can you tell me about the HKZ system?
- What is the main purpose of the HKZ system?

Facilitators and barriers in relation to the adoption of the quality management system HKZ within the current organization characteristics.

- When you look at the current organization characteristics, what do you think are the main barriers in implementing the HKZ system?
- When you look at the current organization characteristics, what do you think are the main facilitators in implementing the HKZ system?
- When you look at the management's leadership style, which behavior is facilitating and which do you experience as a barrier?

The attitude towards implementation and use of the quality management model HKZ.

- What is your feeling with respect to your role in the implementation of the HKZ system?
- What is your feeling with respect to the use of the HKZ system?
- What do you think it will bring for you personally?
- What do you think it will bring for the practice?

Facilitators and barriers in relation to the contextual characteristics.

- When you look at the contextual developments, what do you think are the main barriers in implementing the HKZ system?
- When you look at the contextual developments, what do you think are the main facilitators in implementing the HKZ system?

Implementations from the past.

- Can you describe a successful implementation? Why was it a success?
- Can you describe a less successful implementation? Why was it less successful?

2. Development of the structured diagnostic interview.

In preparation of this study, two test interviews were conducted to formulate the questions in such a way that they would be understood as they were meant.

- In the first test interview, questions about the innovation were asked. In this study, the HKZ system is the innovation that had to be implemented, though this was not obvious. Innovation was changed into HKZ system in all questions. In the second test interview, it was entirely clear that the questions regarded the implementation of the HKZ system.
- In the first test interview, contextual barriers and facilitators were requested: "What are contextual barriers for implementing the innovation?", though this was not obvious. The question was changed into: "When you look at the contextual

developments, what do you think are the main barriers in implementing the HKZ system?” In the second test interview, it was entirely clear that the questions regarded developments within the context, as well as the barriers and facilitators that were related to these contextual developments.

Appendix 2

Interpretation rules of the WIK and WAK.

The interpretation of the scores on the WIK and WAK was done according to three rules: (1) Do the participant’s attribute certain characteristics to the innovation and to what extent do they agree on these characteristics? For example, participants score positively (≥ 4) or negatively (≤ 2) on the configurations (and not ‘neither agree nor disagree’ (3)), and do so in a comparable manner. (2) Do the innovation or organization have an internal fit (single or multiple)? Single internal fit occurs when the innovation or organization scores on one of four configurations and on all three layers positively (≥ 4). This entails that the innovation or organization is solid on a certain configuration, and that the three layers of the innovation or organization match and fit together. Multiple internal fits occurs when the innovation or organization scores on two or more out of four configurations and on all three layers positively (≥ 4). This means that the innovation or organization is hybrid. (3) Is there a fit between innovation and organization (external, single or multiple)? An external fit is only possible when there is an internal fit. Single external fit occurs when organization and innovation both score the same configuration, for instance, if the innovation and the organization are both GO (and not any other configuration). Multiple external fit occurs when organization and innovation score on two or more of the same configuration, for example, when the innovation and the organization are both GO and TO.

Appendix 3

Table 3

Previous implementations.

What facilitated successful previous implementations?	Participant(s)
Prior and during the implementation, proper arrangements were made during multiple meetings.	1, 3, 5, 8
The whole team was aware of the importance of implementation.	3, 4, 5, 8
Pressure from the context (insurance companies).	4
What hindered less successful previous implementations?	
The innovation was not secured after implementation.	3, 4, 5, 8
I was not fully aware of the innovation, which makes that I couldn’t fully use it in the first period. (i.e. we didn’t receive proper education about the innovation)	1, 3, 5

Appendix 4

Table 4

Definition and purpose of the HKZ system according to participants.

What is the HKZ system / What can you tell me about the HKZ system?	Participant(s)
A system that can be used for an internal quality check for the processes in the practice.	3, 4, 5, 7, 8
A system for quality improvement and quality indicators.	1, 6
It tells something about the quality of care, based on standards. After auditioning you can get a certificate.	1, 2
What is the purpose of the HKZ system?	
To maintain the quality of the physical therapy on a high level.	1, 2, 5, 6, 8
Being transparent in what you are doing.	2, 3, 7
HKZ may contribute to structure in the practice.	1
Control on work processes.	4

Appendix 5

Table 5

Barriers

Barriers by theme	Participant(s)
Barriers within the organization	
Lack of time to implement and use the HKZ system. (i.e. to get feedback on your tasks, responsible for many tasks)	1, 2, 3, 4, 5, 6, 7, 8
The innovation is not supported by everyone. (i.e. not clear how, when and why we are implementing the HKZ system)	1, 3, 4, 5, 6, 7, 8
The managers do not make a good example regarding the implementation and use of the HKZ system. (i.e. openly negative about the implementation process)	3, 4, 5, 6, 7
We are obliged to use the management system.	3, 5, 6, 8
The organization is messy.	2, 7, 8
The innovation is not used to improve quality.	5, 6
People have difficulty with change, and they quickly fall back into old habits.	5
There are too few moments to discuss progress.	1
The team is not on the same level with respect to the HKZ system.	4
Personal barriers	
I would only use the system and have nothing to do with the implementation.	3, 4, 6, 7
I need to be involved in order to devote myself; I'm not sufficiently involved. (i.e. information, feedback)	1, 5
I am not sufficiently familiar with the system.	2, 4
Lack of personal planning during the day.	5
Personal turmoil because there are so many needs.	5
I need passionate people around me to be passionate. Not everybody is passionate.	4
There is a moderately developed innovative culture in the practice.	8

<i>Barriers within the innovation</i>	
There are lot of unnecessary rules that don't contribute on the quality of care for the patient.	2, 3, 4, 7
It's a lot of hassle to implement and use the HKZ system.	3, 5, 7
It's a quality system on paper, it leaves a lot of room to do things differently in practice.	2, 5
<i>Barriers from the context</i>	
Due to HKZ, health insurance companies gain insight into our quality and can set high goals for improvement.	1, 2, 3, 4, 5
Revenues for the physiotherapy decline for years, because of this, the focus will be on more revenues and not on quality management.	3, 4, 7, 8
HKZ is only for the management of interest and not for the individual physiotherapist.	4, 8
Practices are increasingly competing with each other, including in the field of quality management systems. This is at the expense of the quality.	5
<i>Note.</i> The bold statements form the themes.	

Table 6

Facilitators

Facilitators by theme	Participant(s)
<i>Facilitators within the organization</i>	
The practice has clearly in mind in which direction they want to go.	1,3, 8
The management keeps calm, sees opportunities, give feedback, and is optimistic.	2, 4, 7
We have all the necessary ICT equipment at the practice to carry out the work as efficiently as possible.	2, 3, 7
The whole team wants to deliver care of good quality.	2, 8
I can see that the management team is working pretty hard.	4
<i>Personal facilitators</i>	
When you work according to the HKZ model it gives structure and rest.	3, 4, 5, 7
I receive constructive feedback that focuses on how to do better.	5
When you work according to the HKZ model it helps you to improve the quality of your work.	2
The HKZ model is an excellent guide to enhance your knowledge and skills related to entrepreneurship.	1
Personal appreciation in the form of extra free time.	6
<i>Facilitators within the innovation</i>	
The HKZ model ensures stability and insight about the processes in the practice.	1, 2, 3, 5, 8
the HKZ model gives transparency about the processes and quality in the practice.	1, 2, 3, 6, 8
The HKZ model helps to develop the quality of care.	1, 4, 8
The HKZ model ensures that certain processes are performed in the same way.	3, 5
<i>Facilitators from the context</i>	

Having a certified HKZ gives you possibility's to differentiate yourself from other practices which are not in possession of a HKZ.	3, 4, 5, 6, 8
It is good for the physical therapy as multiple practices meet certain requirements in order to be transparent about quality.	2, 8
It gives patients an extra indicator to choose for quality.	1, 6

Note. The bold statements form the themes.