

## MASTER

### Design of a change process model for the implementation of an innovation in a healthcare organisation

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*Award date:*  
2014

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MASTER THESIS (1BM96)

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DESIGN OF A CHANGE PROCESS  
MODEL FOR THE IMPLEMENTATION  
OF AN INNOVATION IN A  
HEALTHCARE ORGANISATION

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20<sup>TH</sup> OF JUNE 2014



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## PREFACE

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The master thesis project is the result of a long journey and much work. I have been lucky to be surrounded by wonderful people that have supported me and made this result possible. I thank first of all Irene Vanderfeesten, my mentor, for her help, her kindness and great effort that she invested in the project. The (weekly!) meetings with her have given me the much needed guidance and motivation and I am very grateful for the confidence she managed to instil in me and my work. I also thank Pascale Le Blanc, my second supervisor, for her input and the effort she took to support me, attending meetings, and taking from her free time to provide me feedback. I would like to thank Mark Bloemendaal as well, my company supervisor, for his trust and effort. He has been very involved in every step of the project and has sacrificed his free time (even on a Sunday) to contribute to and support my work, for which I am immensely grateful.

The most support I have received from David Brandstädter, who helps me in everything I do and believes in me more than anybody else. Thank you for all you do for me every day.

I thank Melania Mateias for her help and kind words.

I also owe a big “thank you” to Robbert Bloemendaal, Carline Nauta, Wilke Schut and David Grim for their input, patience and effort that constitute a great contribution to the quality of the master thesis.

Last, but not least, I thank Implementation IQ for giving me the opportunity and providing me with all the necessary support to conduct my research in the best conditions a master student could wish for.

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## ABSTRACT

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The master thesis research delivers a refined change process model (RCPM) for the implementation of an innovation in a healthcare organisation. The model is a design artefact that addresses the need expressed in scientific literature for process-oriented documentation and guidance of the innovation implementation journey.

The RCPM is the improved version of the conceptual change process model (CCPM) derived from literature. Through the analysis of 56 publications, the content relevant to the innovation implementation process is extracted and synthesised using an integrative methodology. The results of the literature synthesis are used to design the CCPM through a step-wise, iterative methodology. The applicability of the CCPM is assessed via two innovation implementation processes successfully used in practice, employing a comparative methodology. An twofold evaluation, theoretical, by reference model, and empirical, by expert panel, is carried out. The development points revealed by the application and evaluation steps are processed into refinement modifications to the CCPM, resulting in the RCPM.

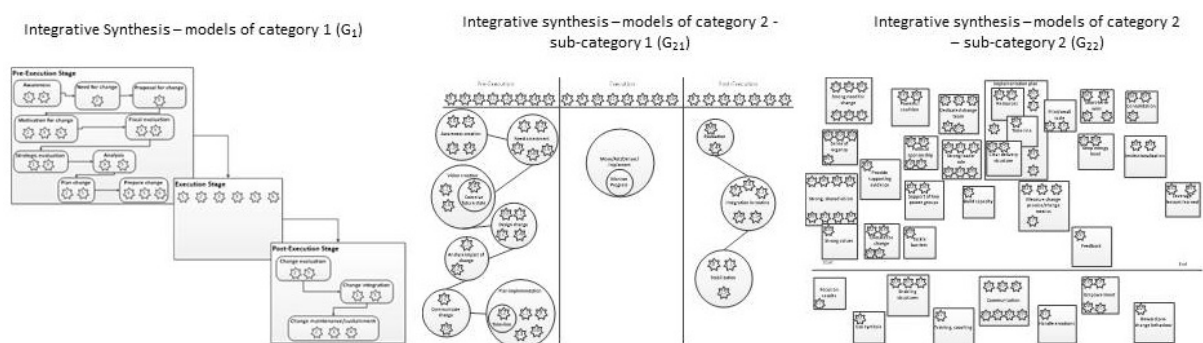
## EXECUTIVE SUMMARY

Driven by the need for process-oriented guidance aimed at the implementation of an innovation in healthcare, coupled with the lack of a tool to serve this purpose, the master thesis research sets out to deliver a change process model that describes in detail the implementation journey, from the first contact of a healthcare organisation with the innovation, until its long-lasting, sustainable use in the day-to-day operations of the organisation.

A literature analysis of over fifty publications in the areas of innovation diffusion and change management proves the absence of a comprehensive, detailed and user oriented process-model and a lack of consistency and agreement among authors regarding the implementation process. The results of the analysed literature, relevant to the goal of the master thesis, are systematically synthesised and integrated, with the purpose of extracting all best practices and successful experience, that can form the building blocks for a change process model to satisfy the need for more detailed and better specified guidance. The endeavour of leveraging the literature results for the creation of a process model proves challenging when the 33 structured models for innovation diffusion and change implementation provide an insufficient level of detail and exhibit little prescription power. The information extracted from the models is highly aggregated and does not provide the necessary depth required to build a process tool that can offer valuable support and guidance to healthcare innovation implementation seekers. This can be noticed from the integrative diagrams, which are also previewed in the figure below.

Thus, the scope of the literature analysis is expanded to the non-structured content, the free text. The integration of the free text content brings an additional detail and specification level that enables the construction of the desired change process model.

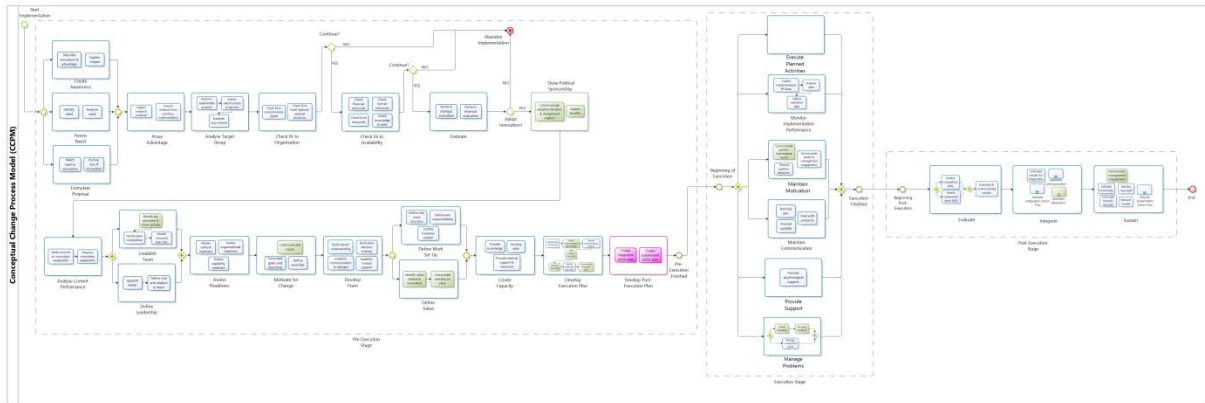
FIGURE 1: PREVIEW OF THE INTEGRATIVE DIAGRAMS OF THE STRUCTURED MODELS



Building upon the literature integration, a conceptual change process model is iteratively modelled. The conceptual change process model (CCPM), unifies all the literature information that is advocated to contribute to the success of the implementation. The CCPM presents a three-stage structure that temporally divides the process into a set of actions performed before the innovation is brought to use, the Pre-Execution stage, a set of actions performed during the introduction of the innovation to all required layers of the organisation, the Execution stage, and a set of actions performed after the introduction of the innovation, the Post-Execution stage. The model contains two further levels of aggregation, a higher level, depicted in clusters of actions and a lower level, represented by actions within the clusters. The CCPM exhibits both sequential and parallel flow derived from data, resources and process actors interdependencies.

The design of the model is aimed at comprehensiveness, such that the CCPM can assist all types of users, the less experienced ones just as successfully as the experienced implementers. The user can choose to skip or adapt certain actions or even clusters of actions, however, the model provides the complete set of actions that the literature prescribes.

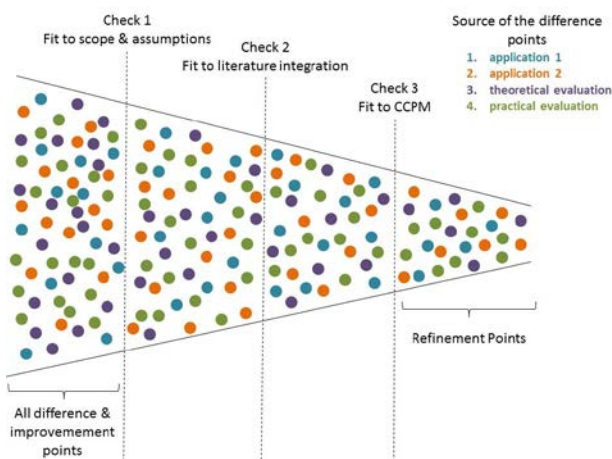
FIGURE 2: PREVIEW OF THE CONCEPTUAL CHANGE PROCESS MODEL (CCPM)



To investigate its applicability, the CCPM is compared with two implementation processes that have been successfully used in practice for the introduction of an innovation in a healthcare organisation. The first application source is the implementation process followed by Implementation IQ in their work as expert change agency and the second is the implementation process used for the introduction of an innovation at Radboud University Medical Center. The comparison of the CCPM with the two applications reveals a strong overlap that demonstrates the applicability of the CCPM. Furthermore, it generates a discussion regarding the identified differences.

A two-fold evaluation of the model is performed, a theoretical evaluation and an empirical evaluation. The theoretical evaluation is accomplished by the cross-check analysis of the content of the CCPM and that of the conceptual model for the spread and sustainability of innovations in service delivery organisation resulted from the extensive literature review of (Greenhalgh et al., 2008) on diffusion of innovation in healthcare. This evaluation reinforces the theoretical support for the CCPM’s content and proves its added-value, through a higher level of detail and specificity brought by the actions within the clusters. The empirical evaluation is performed through semi-structured interviews with four innovation implementation experts. This evaluation brings practical support for the content and the general flow of the CCPM, and proves its applied added-value. The experts deem the model useful and express the intent to use it in their work. The two evaluations reveal improvement points that can further develop the CCPM.

FIGURE 3: PREVIEW OF THE REFINEMENT METHOD



The master thesis leverages the development potential offered by the application and evaluation and proceeds to a refinement of the CCPM. The difference points resulted from the two application comparisons and the improvement and development points extracted from the two evaluations are assessed in light of the CCPM characteristics and partially translated into a series of alterations of the CCPM. The resulting refined change process model, or RCPM, is thus richer and better aligned with practice.

In conclusion, the master thesis successfully fills a research gap and, through the RCPM, it delivers a design artefact to guide the process of implementing an innovation in a healthcare organisation. The RCPM is a novel tool, with a much needed process-orientation and an increased assistance power through high level of detail and specificity. Through its ability to provide added value to innovation implementation experts, the model demonstrates a strong guidance power to a wide user target group, especially to inexperienced implementers.

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# 1 INTRODUCTION

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## 1.1 PROBLEM DEFINITION

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The need for innovation in healthcare is an undisputable fact. Issues like aging population, increasing healthcare costs & expenditure and the shortage of qualified healthcare staff can be addressed through innovation, as acknowledged by the European Commission<sup>1</sup> and the Wall Street Journal<sup>2</sup>. New research findings and inventions can prove useful to the field of healthcare and can help to better cope with these threatening problems.

The uptake of innovation and research evidence in the healthcare field, however, is proving very challenging. This problem is widely recognised and accepted, as portrayed by (Waddell, 2001)'s article titled "So much research evidence, so little dissemination and uptake". In another article about the translation of research-originated findings to healthcare, (Grimshaw et al., 2012) state: "One of the most consistent findings from clinical and health services research is the failure to translate research into practice and policy. As a result of these [...], patients fail to benefit optimally from advances in healthcare [...]". (Coye et al., 2003) describe that "the rate of adoption for evidence-based technologies and innovations varies widely, and slow rates of adoption for many beneficial technologies contribute to the inefficiencies of the health sector [...]". Similarly, (Liddell, 2007) states regarding innovative technology that "despite the potential benefits of technology, it is generally acknowledged that its adoption within the health care sector is slow and disparate". In sum, the transfer of the findings from research to practical use in healthcare is slow and too often unsuccessful.

This problem recognition raises the question why is this the case? Among several answers to this question, like the lack of "mechanisms and infrastructure to accomplish this translation in a systematic and coherent way" (Sung et al., 2003), a new problem becomes salient: the high failure rate of innovation adoption endeavours. The Harvard Business Review<sup>3</sup> points out that "despite this enormous investment in innovation and the magnitude of the opportunity for innovators to both do good and do well, all too many efforts fail, losing billions of investor dollars along the way". (Beer and Nohria, 2000) state in their article: "the brutal fact is that 70% of change initiatives fail" and (Lorenzi et al., 2008) estimate a 28% success rate for information technology related implementation projects in healthcare.

(Greenhalgh et al., 2008) have thoroughly investigated this aspect. Their book, "Diffusion of Innovations in Health Service Organisations", is the result of a very much needed systematic literature review on "how, why and when research can be translated into beneficial change". This work is of special significance to the graduation project as it provides motivation, direction and a source of validation for the research in question. (Greenhalgh et al., 2008) performed a detailed systematic review of over 1,000 scientific papers on the diffusion, spread and sustainability of innovation in health service organisations that resulted in an integrative conceptual spread and sustainability model and a series of recommendations for further investigation. One of the directions recommended by (Greenhalgh et al., 2008) embodies the scientific motivation of the graduation research project.

(Greenhalgh et al., 2008) have identified seven directions for potential further research and have argued what kind of further investigation is appropriate for each of those seven. They found the area of "implementation" to be studied from a pragmatic approach and presented as "grey literature reports". They recommend further research to be performed from an academic perspective.

Within the area of implementation, the "most serious gap in literature" that they found was "by what processes are particular innovations in health service delivery and organisation implemented and sustained (or not) in particular contexts and settings, and can these processes be enhanced". So, what is the sequence of steps or the actions that can be followed to successfully bring an innovation, e.g. a new surgical device, in a healthcare organisation, like, for instance, a hospital.

The literature review performed as the first step of the graduation project has indicated the absence of such an innovation-specific and healthcare-specific implementation process in the scientific literature. During

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<sup>1</sup> [http://ec.europa.eu/research/regions/index\\_en.cfm?pg=projects&lg=en&country=spain&region=es62&project=readiforhealth](http://ec.europa.eu/research/regions/index_en.cfm?pg=projects&lg=en&country=spain&region=es62&project=readiforhealth)

<sup>2</sup> <http://online.wsj.com/news/articles/SB10001424052748704608504576208533502726292>

<sup>3</sup> <http://hbr.org/web/extras/insight-center/health-care/why-innovation-in-health-care-is-so-hard>

the creation of the research proposal, a literature quick-scan has reinforced the belief that such a process has not been built yet. This has later been proved to be true by the literature analysed in the master thesis, which will be detailed in chapter 2.

Following the problem description presented above, the aim of the master thesis is to deliver an implementation process that can guide the journey of bringing an innovation to use in the healthcare field.

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## 1.2 RESEARCH SCOPE AND OBJECTIVE

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The aim, of bringing an innovation to use in the healthcare field, is vague and thus a clear scope needs to be defined. Because of little previous scientific research on the matter, however, there are few justified grounds for scope division and refinement. In the recommendations of (Greenhalgh et al., 2008) not only do they describe the issue in coarse concepts, but they also recommend broadening the research horizon to include also change management science besides innovation diffusion.

In light of findings and recommendations from previous research, the aim of the master thesis can be distilled in the following specific objective: *The design of a change process model for the implementation of an innovation in a healthcare organisation.*

The change process model universally maps the sequence of steps needed to implement a generic innovation in a generic healthcare organisation. This change process model can then be instantiated in practice with a concrete innovation and a specific healthcare organisation by the user of the model.

(Greenhalgh et al., 2004) warn the reader in the first chapter of their book about the ambiguity surrounding terminology and the high dependency between terminology and context. Terms such as “innovation”, “implementation”, “adoption” and even “organisation” vary in meaning across publications. Thus, there is a need for clarification of the terms used to describe the objective. Below a definition is provided for the relevant terms, which will characterise them throughout the master thesis report.

The first step towards specification and clarity is defining the term “innovation”. “Innovation in healthcare can take many forms, ranging from drug therapies, surgical procedures, devices and tests, through to new forms of health professional training, patient education, and management, financing and service delivery models. ‘Innovation’ is widely assumed to be positive in its effects” (Dixon-Woods et al., 2011). In this thesis innovation represents a product, service, procedure or behaviour that is new to the staff of the institution where it is to be implemented and that is expected to bring a positive effect in terms of health outcomes, work and administrative efficiency, cost effectiveness and user experience.

The term “implementation” will denote the conscious procedure through which the recipient healthcare organisation transitions from not using the innovation in question to using the innovation as part of the routine (cure, care, work, administrative, etc.) processes it affects (Greenhalgh et al., 2004). The implementation assumes the existence of a fully-developed innovation and does not include the development of the innovation.

The term “change process” represents “a collection of related, structured activities or tasks” (Keen et al., 2011) that produce the change needed so that the organisation uses the innovation as part of routine. The content and sequence of the actions in the change process are the enabler of the implementation.

A “healthcare organisation” will, from here on, be regarded as an institution that engages in any combination of cure and care delivery including primary, secondary, tertiary or quaternary care<sup>4</sup> and including the public, private or the mixed healthcare funding models (Lameire et al., 1999).

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## 1.3 RESEARCH METHODOLOGY

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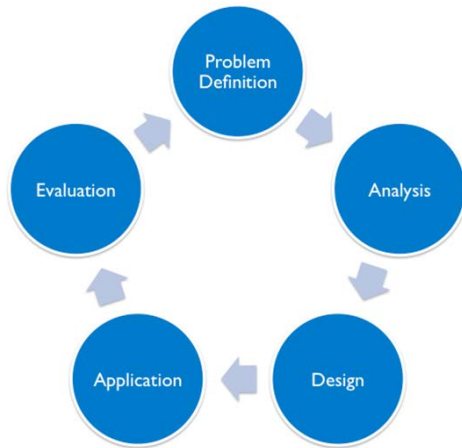
The research conducted to achieve the objective of *designing a change process model for the implementation of an innovation in a healthcare organisation*, follows van Strien’s framework for the development of design science artefacts, also known as the Regulative Cycle (van Strien, 1997). The regulative cycle is an appropriate framework for the research at hand because it enables a “structured organisational problem solving process that is guided by grounded design rules” (Heusinkveld, 2009). The *change process model* is a design artefact, which is intended as a solution to the problem formulated in section 1.1. It has an intrinsic

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<sup>4</sup> <http://patients.about.com/od/moreprovidersbeyonddocs/a/Stages-Of-Care-Primary-Secondary-Tertiary-And-Quaternary-Care.htm>

organisational characteristic through the context in which it is set: the healthcare organisation, and the design rules that guide the development of the artefact are provided by the design science knowledge base.

FIGURE 4: STRUCTURE OF THE MASTER THESIS RESEARCH – THE REGULATIVE CYCLE



literature review of “Facilitators and Barriers of Business Process (Re)Design in Healthcare” and a literature search focused on the process of innovation implementation in the healthcare field. The practical part of the problem definition focused on Implementation IQ, a consultancy firm specialised in healthcare innovation implementation, its activity and its need and interest in academic research of the innovation implementation process for healthcare. The supporting activities for this part include the study of knowledge materials of Implementation IQ, interviews with the Implementation IQ experts and the execution of a mock-case analysis for an under-development-innovation with the help of one of Implementation IQ’s software tools.

The second stage, the **Analysis**, is aimed at thorough investigation of the problem and of possible solutions. The *Goal* of the Analysis is a detailed overview of the research coverage of the topic. The *Deliverable* of this stage is a synthesis of the research content. The activity that enables the Analysis is an in-depth literature study of a body of literature representative for the topic of investigation.

The *Goal* of the third stage, the **Design**, is the development of a change process model for the implementation of an innovation in a healthcare organisation. The *Deliverable* of this stage is the change process model with all accompanying artefacts. A series of design activities leverage and build upon the findings of the Analysis stage for the creation of a change process model.

The fourth stage is the **Application**, in which the conceptual design of the change process model that has been derived from literature is compared to the implementation process for a concrete innovation that has been successfully implemented in a specific healthcare organisation. The *Goal* of the Application is to test the applicability of the conceptual model. The *Deliverable* of this stage is a detailed comparison of the process elements and flow.

The last stage of the research cycle is the **Evaluation**, which has the *Goal* of theoretically and empirically assessing the conceptual model and contributing to its further development. The *Deliverable* of this stage is a refined version of the change process model.

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### 1.3.1 RESEARCH QUESTIONS

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The main research question that logically follows from the problem definition is “How can a change process model for the implementation of an innovation in a healthcare organisation look like?”. The objective of the master thesis is to provide an answer to this central question.

Following the structure of the research cycle, sub-research questions arise for each stage of the research.

### Analysis

*RQ1: What previous research findings from literature are relevant to the topic of innovation implementation in healthcare and to the design of the change process model?*

To answer this question, an investigation of literature on innovation diffusion and change management is performed to uncover the relevant findings, which are then analysed and synthesised using an integrative methodology. The investigation focuses on process oriented descriptions and structured models for innovation diffusion and for change management.

### Design

*RQ2: Based on the findings from literature, how can the change process model for the implementation of an innovation in a healthcare organisation look like to enable a positive outcome?*

Using the integrated findings of the previously mentioned literature investigation as input, a change process model is designed by using an incremental methodology and serves to guide the user in the endeavour of implementing an innovation in a healthcare organisation.

### Application

*RQ3: How does the conceptual change process model developed in the Design stage compare to a successful implementation of a concrete innovation in a specific healthcare organisation?*

The conceptual change model is compared to two distinct change processes stemming from practice to investigate its applicability from an artefact perspective, by identifying similarities and differences and discussing their implications.

### Evaluation

*RQ4: How can the change process model be further improved and developed?*

The change process model is evaluated by cross-check analysis with a theoretical model from literature and is empirically assessed by experts in the field of innovation implementation in healthcare. Based on this double evaluation and on the results of the Application, appropriate alterations that can improve the completeness, accuracy, level of specification and usability of the mode are acknowledged. The identified changes are implemented to create a refined version of the change process model.

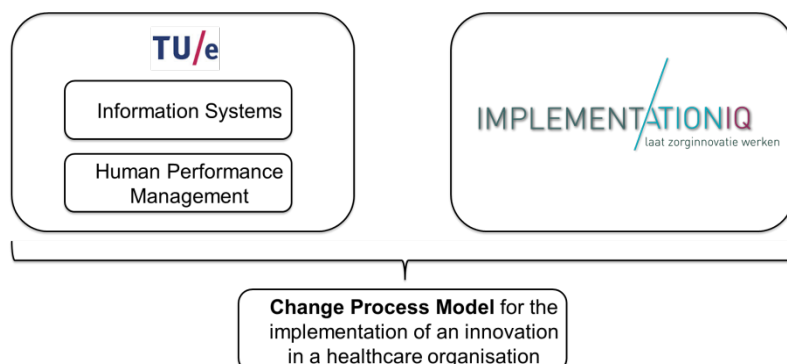
## 1.4 RESEARCH SET-UP

This thesis report summarises the results of a graduation research project on the topic of “implementation of an innovation in a healthcare organisation”. The graduation project consists of three parts: the literature review, the research proposal and the master thesis, which are performed and delivered in this order. The first part, the literature review has been delivered in September 2013 and has treated the topic of “Facilitators and Barriers of Business process (Re)Design in Healthcare”.

The two remaining parts of the graduation research project have been realised through the collaboration between Eindhoven University of Technology, specifically the Information Systems and the Human Performance Management departments of the School of Industrial Engineering and Innovation Sciences, and Implementation IQ, a Dutch consultancy company founded in 2011 that specializes in the wide scale implementation of innovation in the healthcare field.

The project aims at the design of a change process model that can be applied for the implementation of an innovative product or service in a healthcare organisation.

FIGURE 5: COLLABORATION STRUCTURE OF THE RESEARCH PROJECT



Implementation IQ specializes in the wide-scale implementation of innovation in the healthcare field. The Implementation IQ experts guide and consult the innovator and the healthcare institutions towards a successful implementation of innovative products and services. The success is defined not only by the proper use of the innovation in the field with the promised health and social return, but also by the reduction of cost, effort and duration of the implementation project. Implementation IQ guides the adoption of the innovation from beginning to the very end. Thus, the activity of Implementation IQ spans all steps of the “implementation journey”. Details about Implementation IQ and their activity can be found in Section 4.2.

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## 1.5 THESIS LAYOUT

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The remainder of the master thesis report is structured as follows: chapter 2 presents the analysis of the literature and the integration of the analysis results, chapter 3 describes the design of the conceptual change process model for the implementation of an innovation in a healthcare organisation, chapter 4 portrays the comparison of the conceptual change process model with two implementation processes successfully applied in practice, chapter 5 depicts a theoretical and an empirical evaluation of the change process model and chapter 6 details the development of the conceptual change process model into a refined version. The last chapter, number 7, provides the conclusion of the master thesis research, including recommendations for further research.

## 2 LITERATURE ANALYSIS

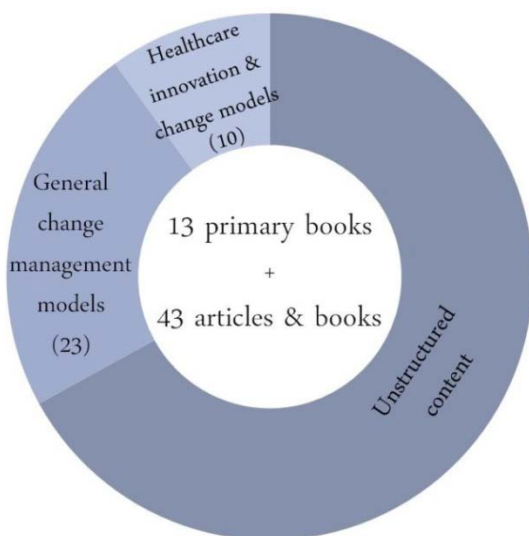
The Analysis phase of the research sets out to investigate the literature that is relevant to the topic of innovation implementation in healthcare and to the development of the change process model. This literature analysis provides first of all a detailed picture of the knowledge base that exists on this topic. Secondly, it delivers the key elements that constitute the input for the change process design.

### 2.1 ANALYSIS METHODOLOGY

Choosing the body of literature to analyse was the first step of the analysis. The subject of innovation in the healthcare field was the first source to tackle. The literature scan performed in the problem definition stage indicated that the literature on healthcare innovation or innovation diffusion, adoption and spread was weak with regards to implementation and almost non-existent in terms of process of implementation. This issue was supported by (Greenhalgh et al., 2004), as it has been described in section 1.1. It became clear that the literature scope needs to be widened and that the source for the solution to the issue at hand is not only the innovation diffusion literature pool. As the objective of the master thesis underlines, change is a vital concept to the topic of innovation implementation. (Greenhalgh et al., 2004) recognise this and recommend using the literature on change management as an additional source for answering the implementation process question: “are there any additional lessons from the mainstream change management literature (to add to the diffusion of innovation literature reviewed here) for implementing and sustaining innovations in health care organisations?” Thus the scope has been widened to include also literature on *change in healthcare* and *general change management*.

The target of the analysis were now the findings from innovation diffusion, change in healthcare and general change management. A quick search revealed a staggering amount of literature with the newly widened scope. The time and resource constraints of the standard master thesis research set-up have excluded the possibility of a systematic and complete literature review. Thus, another technique has been selected to ensure a proper coverage of the topic. A series of 13 books has been chosen as a *representative* sample for the three investigation directions: *innovation diffusion*, *change in healthcare* and *general change management*.

FIGURE 6: DIVISION OF THE ANALYSIS LITERATURE CONTENT RELEVANT FOR THE TOPIC OF IMPLEMENTATION CHANGE PROCESS



These books have been selected based on recommendations from and discussion between three experts in the fields of change management, innovation implementation in healthcare and business process management. The 13 books were used as a primary source. Employing the backward snowball technique for literature search (Corbin and Strauss, 2008), other relevant literature has been identified by means of the 13 initial books and 43 other journal articles and books have been selected for investigation. Appendix 10.1 provides an overview of all the publications covered by this analysis.

The literature content has been analysed by criteria of relevance towards the specific topic of implementation change process. The content was considered relevant when it involved the specific description of a *formal model*, a *framework*, *method*, *process* or *account* of a *change*, *innovation diffusion*, *adoption* or *implementation* from practice. The content deemed relevant to the specific topic was summarized and synthesized and is presented in the following section. The relevant

literature content has been categorized in *structured content* and *unstructured content*. The structured content comprises formal models, where formal denotes the fact that they are presented as models by their authors and by the literature where they are extracted from and can be graphically depicted. These models have been further categorized into healthcare-related innovation and change models and general change

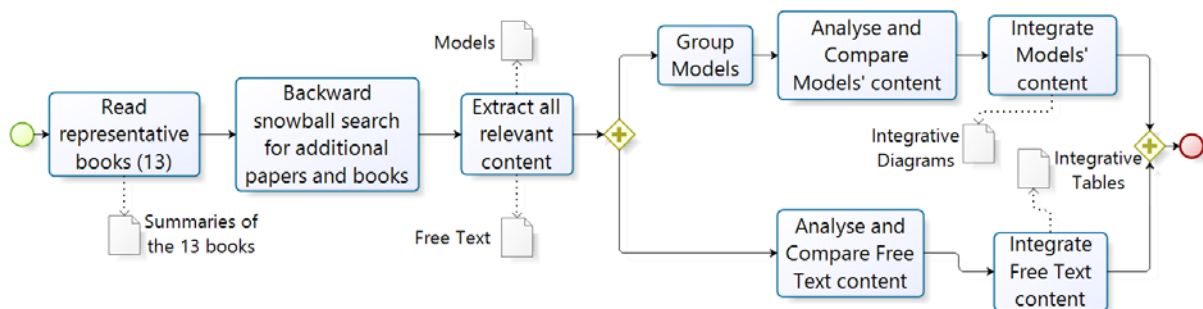
management models. The unstructured content was predominantly of the descriptive and narrative type. The content division is portrayed in Figure 6.

The rationale to separate and extract the formal models is to uncover the existent knowledge and best practice that is delivered in a format similar to the one of the objective of the master thesis, the change process model. 33 formal models were uncovered, out of which seven are specifically applicable to the healthcare field and 26 stem from general innovation diffusion and change management literature with a wide and unspecified organisational applicability.

The models are summarised in the Appendix 10.2 presenting the seven healthcare-related models of change and innovation diffusion and 10.3 the 26 general models for change and innovation diffusion. As one can notice from the Appendix, the models vary in structure and level of detail, making the analysis of their contents challenging. For example, Lewin's three step model (Lewin, 1951) presents a highly aggregated sequence of three stages that make up the change process, while Cawsey's model of organisational change (Cawsey et al., 2011) presents not only the succession of the steps, but also details almost each step with content recommendations, creating a more concrete model with a higher specification and guidance power. The same applies for the unstructured content, where the variability was even higher.

Figure 7 depicts the process by which the analysis is achieved. The analysis of the content is performed through an integrative review technique (Grbich, 2007) that aims at a comprehensive synthesis. The content relevant to the topic of the change process is divided in structural elements that are then compared among the different literature sources. The duplicate elements are merged and the unique elements are added, such that the synthesis comprises all elements from all literature sources. The elements do not carry a weight, importance or relevance characteristic and are all treated as having the same level of relevance for the synthesis. The results of the analysis are presented in integrative diagrams (Corbin and Strauss, 2008), integrative tables and free text. For the analysis of the models, the level of detail or aggregation of the diagrams follows the level of aggregation of the majority of the models in that group, which is usually high. The few more detailed models are also included in the synthesis of the remainder of the content, the one in free text, to ensure no loss of information through aggregation and oversimplification. (Dixon-Woods et al., 2004) underline the distinction between integrative and interpretive review techniques. Although the methodology aimed for is the integrative one, the interpretive technique is inevitably employed for the comparison, the determination of duplicate elements and the establishment of the elements' order and sequence.

FIGURE 7: THE METHODOLOGICAL PROCESS OF THE LITERATURE ANALYSIS



## 2.2 ANALYSIS RESULTS

First some general results and observations extracted from the entire body of literature are presented after which each of the content groups portrayed in Figure 6 will be described separately. The results of the analysis constitute the input for the design of the change process model, which is described in the next chapter, Chapter 3.

### 2.2.1 GENERAL RESULTS AND OBSERVATIONS

The first observation from the literature is the inconsistency in the utilised terminology, issue about which (Greenhalgh et al., 2004) also warn in their publication. Although many such discrepancies have been noticed, here only the ones of importance to the design of the change process model are discussed.



The term of “implementation” varies among models and among different publications. Some, like (Meyer and Goes, 1988), (Cawsey et al., 2011a) or (Yetton et al., 1999) use the term to denote one of several stages of the change process: the roll-out or the application of a previously developed change plan, while others, such as (Grol et al., 2013), (Hewitt-Taylor, 2013) or (Inozu et al., 2011) use it to denote the entire change cycle that includes also the phases before and after the actual roll-out. In this report the definition presented in section 1.2 is followed.

The concept of “change” and the “change process” also differ throughout the analysed literature. In some cases the change process has a much wider span than in others. The literature on general change management has no focus on the change object. It is of little importance whether the change is generated by an innovation or an item of novelty or by restructuring, for example. This body of literature, while it does not deny the link between the object, for our case the innovation, and the particularities of the change process, it provides theory that is independent of the change object. For the literature that focuses on innovation or change by the introduction of novelty, some publications, like the ones of (Inozu et al., 2011) and (Butler and Caldwell, 2008) assume the creation and development of the innovation as part of the change process, while for authors like (Rogers, 2010) and (Zaltman et al., 1973) the innovation is a previously developed artefact and the change process is responsible for the delivery of the innovation use in the designated organisation. The definition of change process is used in this report as described in section 1.2.

This observation leads to one of the most important realizations regarding the concept of “innovation”. Some authors see innovation as a novelty artefact that can be a product or a service which was developed externally by an innovator and not by the healthcare organisation where it is being implemented. Other authors include in the notion of “innovation” also the internally developed artefacts, like the improvement of a certain work-process. The internally developed innovations are in most cases performance improvement endeavours, which are incremental and in some of the cases also continuous. This external or internal characteristic brings a significant difference to the change process as the internal innovation change process includes a development phase that does not exist for the external type. As it was mentioned in section 1.2, Research Scope and Objective, the design of the change process model assumes the pre-existence of the innovation. The implications of this assumption will be further discussed in the Application and Evaluation sections, namely chapters 4 and 5.

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## 2.2.2 DETAILED CONTENT ANALYSIS

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The content of the analysed literature is categorised in structured content, containing 33 formal models of innovation diffusion and change management and unstructured content, comprising descriptive and narrative text.

Because the 33 formal models, which are summarised in Appendix 10.2 and 10.3, vary in structure and level of detail, further classification has been employed to facilitate the analysis and comparison of the contents. Table 1 provides an overview of the classification of the 33 models. The models are classified in two main categories: the first category, models that are healthcare related (coded for ease of reference as  $G_1$ ) and the second category, general models which are not healthcare-bound (coded for ease of reference as  $G_2$ ). While the first category consists of seven models, the second category contains 26 diverse models. Thus, the second category has been further de-aggregated in five sub-categories by the type of the models ( $G_{21}$ ,  $G_{22}$ ,  $G_{23}$ ,  $G_{24}$  and  $G_{25}$ ).

The first sub-category comprises the models that have a process approach, a sequence of actionable steps with an inherent temporal flow. The second sub-category denotes the models with a guideline approach, a set of recommendations and factors that can be applied during the change process, but which are not all actionable and do not always follow a temporal flow. The third sub-category consists of models with an interaction approach, in which the change process is achieved through the interaction of organisational sub-systems. The fourth sub-category contains the models with a dynamic approach and the last category covers the remaining models, which cannot be attributed to a certain group.

TABLE 1: THE CLASSIFICATION OF THE 33 FORMAL MODELS EXTRACTED FROM THE ANALYSED LITERATURE

Cat.	Sub-Cat.	Nr	Author	Model name <sup>5</sup>
Healthcare innovation diffusion and change management	(G <sub>1</sub> )	1	(Meyer and Goes, 1988)	“Decision-making stages in the assimilation of medical innovations”
		2	(Hewitt-Taylor, 2013)	“Step-by-step guide”
		3	(Inozu et al., 2011)	“Four-phase improvement approach”
		4	(Martin et al., 2010)	“The trans-theoretical model of change”
		5	(Grol et al., 2013)	“The Grol and Wensing Implementation of change model”
		6	(Elliott et al., 1998)	“Three factor model”
		7	(Greenhalgh et al., 2004)	“A conceptual model for the spread and sustainability of innovation in service delivery and organisation”
General innovation diffusion and change management	Process approach (G <sub>21</sub> )	8	(Lewin, 1951)	“Lewin’s three step model”
		9	(Bullock and Batten, 1985)	“Change model”
		10	(Taffinder, 1999)	“Transformation trajectory”
		11	(Anderson and Anderson, 2010)	“The nine-phase change process model”
		12	(Kirkpatrick, 2009)	“The step by step change model”
		13	(Palmer et al., 2009)	“The stages of change”
		14	(Cawsey et al., 2011a)	“Model of organisational change”
		15	Attributed to Ulrich by (Jabri, 2012)	“The 7 step model”
	Guideline approach (G <sub>22</sub> )	16	(Jabri, 2012)	
		17	(Luecke, 2003)	
		18	(Kotter, 1995)	
		19	(Cameron and Green, 2012)	
		20	(Kanter et al., 2003)	“The 10 commandments”
		21	(Pendlebury et al., 1998)	
		22	(Nadler, 1997)	“The 12 action steps”
		23	(Mento et al., 2002)	“The 12 step framework”
		24	(Light, 2005)	
		25	(Leppitt, 2006)	“The Integrated model”
	Intr. (G <sub>23</sub> )	26	(Nadler and Tushman, 1989)	“Congruence model for change management”
		27	(Carnall, 2007)	“Carnall’s change management model”
	Dyn. (G <sub>24</sub> )	28	(Burke, 2002)	“Transformational and Transactional factors of change dynamics”
		29	(Stermann, 2001)	“System dynamics model of change”
	Other (G <sub>25</sub> )	30	(Yetton et al., 1999)	
		31	(Rogers, 2010)	“The adoption curve”
		32	(Van de Ven et al., 2008)	„Cyclical model of divergent and convergent activities”
		33	Attributed to Beckhard by (Cameron and Green, 2012)	“Beckhards’s change formula”

<sup>5</sup>Some models do not have a given name; the models are to be identified throughout the report by author and not by name

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MODELS FROM THE LITERATURE ON INNOVATION DIFFUSION AND CHANGE MANAGEMENT IN  
HEALTHCARE

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All seven models from the literature on innovation diffusion and change management in healthcare can be seen in Appendix 10.2.

The five models of (Meyer and Goes, 1988), (Hewitt-Taylor, 2013), (Inozu et al., 2011), (Martin et al., 2010) and (Grol et al., 2013) take a sequential approach and structure the change journey in steps or phases. The model of (Grol et al., 2013) is more detailed than the rest and the first one to de-aggregate change phases into actionable elements. Also, the model of (Hewitt-Taylor, 2013) is accompanied in their book by detailed examples which, although not suitable to be translated in the model, provide insight and inspiration for the creation of actionable steps. The five models with a process approach have in common an execution/application/rollout stage. While the (Meyer and Goes, 1988) model ends with this execution step, all the other models have at least one step after the execution. Also, they all have several steps that precede the execution. From the comparison of these five models three main phases can be deduced: a pre-execution phase, an execution phase and a post-execution phase. The content of the pre-execution phase varies a lot among the different models while the post-execution phase is fairly consistent, including evaluation, integration and maintenance or sustainment.

The model of (Elliott et al., 1998) has a cyclic approach and although it is highly aggregated, it does suggest a sequence of phases. The structure of this model is somewhat different than the structure of the previous ones. It describes that the predisposition for change and innovation adoption is a prerequisite of the capacity for change and innovation adoption. Together, the predisposition and the capacity are prerequisites for the implementation of innovation. These three elements together constitute the change block, which results in a certain impact. The reinforcement, which depends on the impact, brings feedback and enables the beginning of a new change cycle.

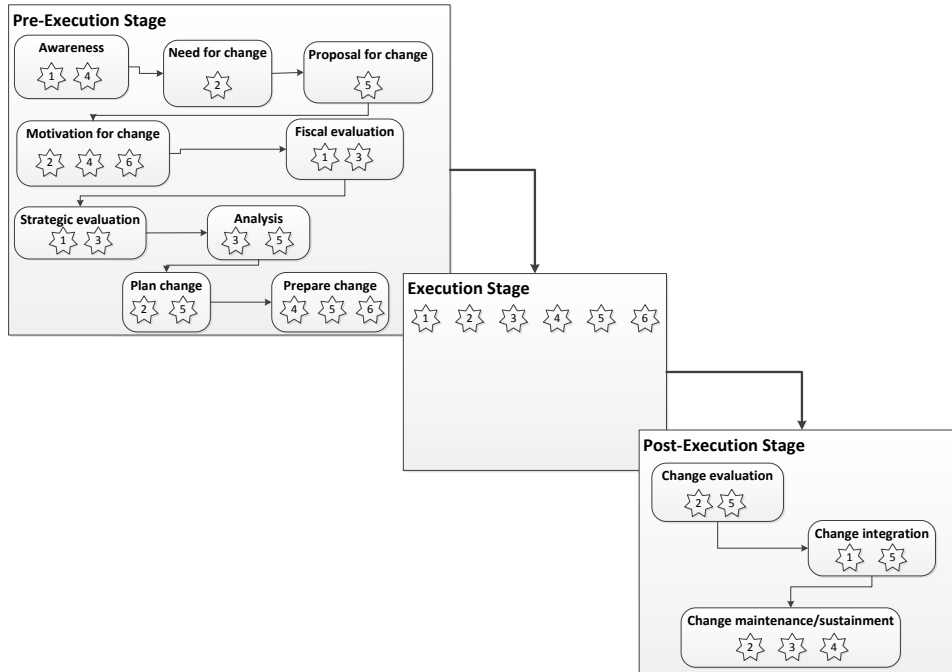
The (Greenhalgh et al., 2008) model is the most complex and detailed of all. It is the result of a thorough literature review that includes also some of the publications from which other models presented in this report originate. It supports the idea of an iterative cycle and makes an attempt at delivering a complete picture by mapping all the elements that were not translated into a process step, but which influence certain aspects of the change process. Although it does not prescribe concrete actions, it provides detailed insight into the relevant elements that increase the success likelihood. The detail level discrepancy between this model and the rest of the models in this group make it impossible to incorporate this model in the integration without losing vital information. Other model that have exhibited a higher level of detail are dealt with in the integration of the free text. This model, however, presents also a higher level of detail than the rest of the free text content and the integration with the free text would result in information loss as well. This unique characteristic and the desire of properly exploiting the details. lead to the decision of not including the Greenhalgh model in the literature integration. Because this model has both a high reliability and a comprehensive content through the nature of the research that produced it, it has been reserved for validation purposes instead. Its content will be presented in detail in section 5.2, where the theoretical evaluation of the conceptual change process model is performed.

Thus, the content of the six models from this category, excluding the (Greenhalgh et al., 2004) one, has been synthesized in Figure 8. Every element of the synthesis is accompanied by numbers that represent the source model where they originate from. For example, model number 1, which belongs to (Meyer and Goes, 1988) as portrayed in Table 1 and model number 4, of (Martin et al., 2010) are the sources from which the Awareness element has been synthesized in the integrative diagram in Figure 8. "Stage 1: Knowledge Awareness" of the (Meyer and Goes, 1988) model and the "Pre-Contemplation" phase of the (Martin et al., 2010) model have been matched during the comparison as both denoting an awareness creation step and have resulted in the Awareness element of Figure 8 through the integration. Model number 5, of (Grol et al., 2013) has a higher level of detail than the rest and is thus also included in the analysis of the free text.

By comparing these six models the following can be concluded: the implementation process can be temporally divided into three main phases, the pre-execution or preparation phase, the execution or rollout phase and the post-execution phase. The pre-execution phase is the most investigated phase and also the one for which least agreement exists among models. It contains actions aimed at awareness creation, need assessment, change proposal, motivation creation, fiscal and strategic assessment, problem analysis, planning and preparation. The execution stage is supported by all models, but they all present it at the highest level of aggregation and no details are provided about it. For the post-execution phase the level of

agreement is higher in terms of consistency and it includes actions aimed at evaluation, integration and sustainment. The steps of the process laid out in Figure 8 are influenced by the following factors: the inner and outer context of the organisation, the characteristic of the innovation itself, the support systems and the communication. However the influence of these factors is vaguely presented and a clear causality or a timeline cannot be described.

FIGURE 8: INTEGRATIVE SYNTHESIS – MODELS OF CATEGORY 1 (G<sub>1</sub>)

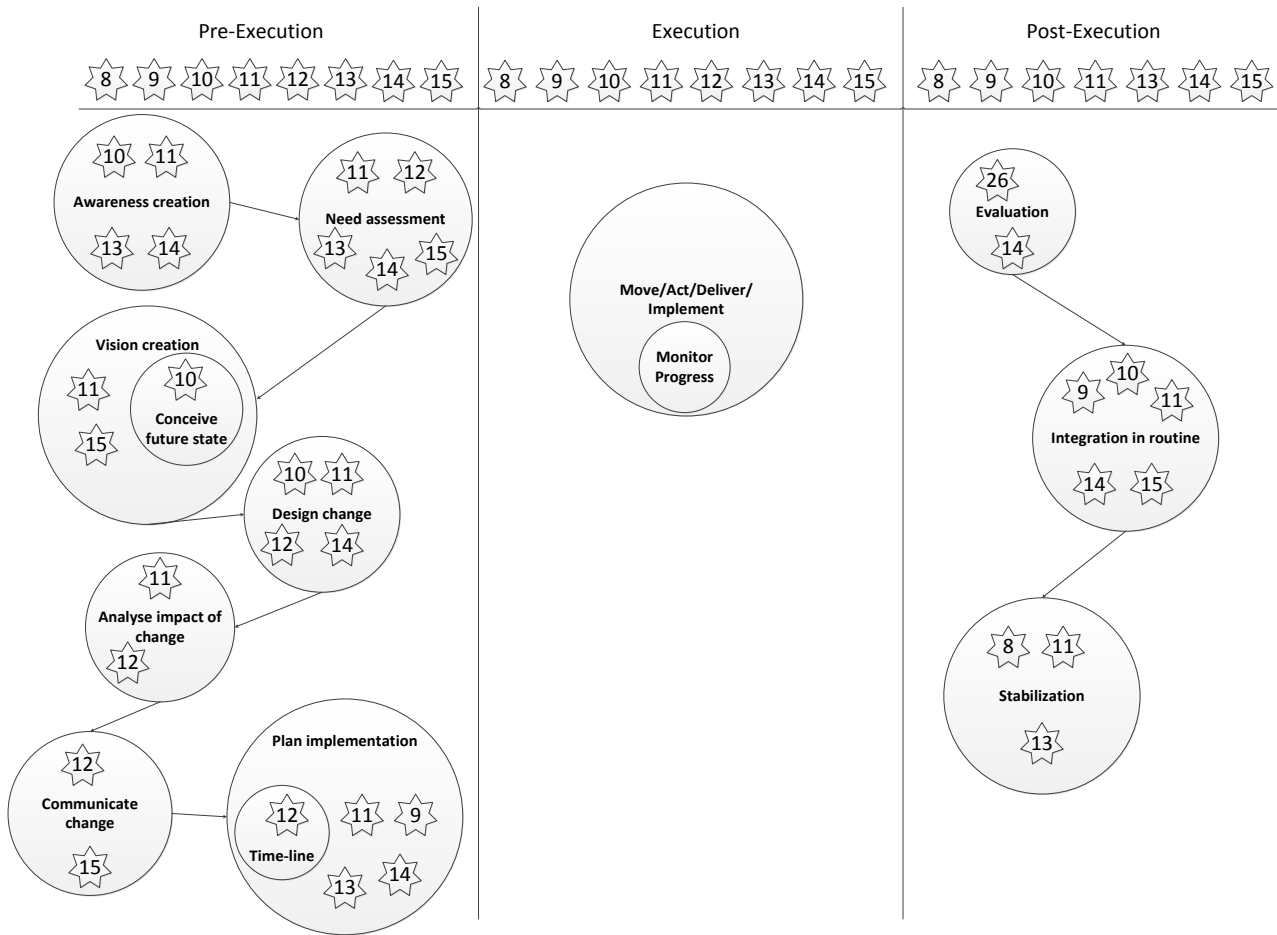


#### MODELS FROM THE LITERATURE ON GENERAL INNOVATION DIFFUSION AND CHANGE MANAGEMENT

Although the literature on general innovation diffusion and change management presents some applications and case studies in a healthcare setting, the theory and the models are built for the general context of a generic organisation. In this category, 26 models have been extracted, and can be classified in five groups, as it can be seen in Table 1.

The first sub-category consists of models with a **process approach**, in the sense of a temporal sequence of actionable steps. These models structure the flow in anywhere between three to nine steps. Starting with (Lewin, 1951)'s very popular unfreeze-move-refreeze sequence and ending with (Anderson and Anderson, 2010)'s nine-phase change models, the pattern of three main phases identified in the models from the previous category, is maintained in this category as well, with the exception of model number 12, of (Kirkpatrick, 2009), which stops at the implementation step. The model of (Palmer et al., 2009), number 13, presents the planning and the acting in one combined step, which is distinctive and not found in the other models. Model number 15, attributed to Ulrich by (Jabri, 2012) is the only one that details the execution stage with a monitoring progress action. Model number 14, of (Cawsey et al., 2011a) has a significantly higher level of detail than the rest and is thus also included in the analysis of the free text. In Figure 9, the steps suggested in these eight models with a process approach, are synthesised. Similar to the models extracted from the healthcare-related literature, the ones of the first category, there is agreement regarding the steps in the post-execution phase, there is no breakdown of the execution phase in steps and most of the steps are found in the pre-execution phase, which is also the most detailed one.

FIGURE 9: INTEGRATIVE SYNTHESIS – MODELS OF CATEGORY 2 - SUB-CATEGORY 1 (G<sub>21</sub>)

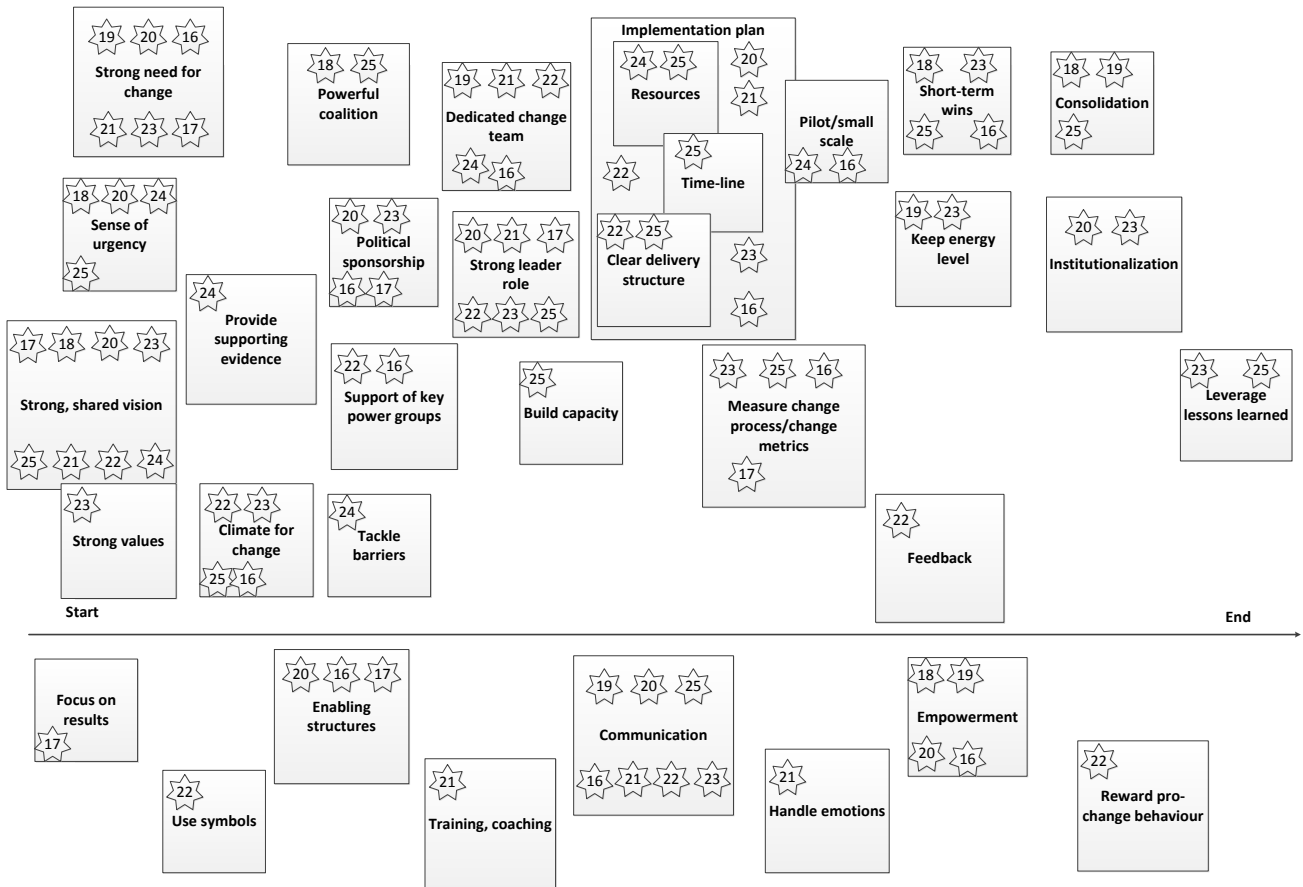


The second sub-category comprises the models that are structured as a set of **guidelines**, rather than steps. From important factors that influence the success of change, these models have formulated a set of guiding principles to steer the change. While some models, like the one of (Kotter, 1995), have the guidelines structured in temporal sequence, others, like the one of (Pendlebury et al., 1998), do not attribute any temporal flow. The main difference between these models and the ones of the first sub-category is that the “steps” are not all concrete actions, some take the form of mere advice. Moreover, many of these guidelines cannot be clearly attributed to one or more concrete stages, phases or actions during the implementation process, which makes these models unrepresentable in a process format. Figure 10 synthesizes the content of the models and attempts to attribute a loose temporal element to some guidelines. Thus, the elements above the temporal line are arranged in the order of their use during the life-cycle of the implementation project, while the elements below the temporal line cannot (yet) be attributed to a certain temporal point. They may occur several times throughout the process and maybe even continuously.

The temporal distribution of the elements above the line has been performed based on the models that do indicate a temporal sequence. For example, the “Strong need for change” element stems from models number 16, 17, 19, 20, 21 and 23. Out of these six source models, three attribute a temporal sequence to the guidelines, model number 19 of (Cameron and Green, 2012), model number 20 of (Kanter et al., 2003) and model number 23 of (Mento et al., 2002). In these three models with a temporal indication, the guideline from which the element “Strong need for change” derives is in all three models the first one in the list of guidelines. By this rationale, the “Strong need for change” element has been placed in the very beginning of the implementation project life-cycle. The same thought process is employed for the placement of every element above the temporal line.

The guidelines with the strongest support in literature are the creation of an implementation plan, the creation of a strong, shared vision for change and the use of communication towards all parties involved.

FIGURE 10: INTEGRATIVE SYNTHESIS - MODELS OF CATEGORY 2 - SUB-CATEGORY 2 (G<sub>22</sub>)



For the remaining three groups of models no integrative diagram has been created as a result of the synthesis because of their complex nature that makes them unsuitable for systematic integration. Their content could be only partially integrated. Furthermore, they have constituted little to no input for the design of the conceptual change process model, as it will be explained at a later point, in section 3.1 of the Design chapter.

(Nadler and Tushman, 1989), model number 26, and (Carnall, 2007), model number 27, form the third sub-category and present a different view on organisational change. Their models depict change as an interaction of organisational sub-systems. The interaction does not follow a pattern and cannot take the form of a process which unfolds over time. Certain aspects, like the daily activities, the culture of the organisation or the skills of the employees always influence organisational change, but the magnitude and the manner of this influence cannot be anticipated or modelled as it changes for each new iteration.

The fourth sub-category of models, those of (Burke, 2002) and (Sterman, 2001), illustrate organisations as complex systems and specifically define organisational change as a non-linear, dynamic system, in which the output is not directly proportional to the input.

The last sub-category is an artificial one as it consists of the unique models that cannot be grouped together by any criterion.

(Yetton et al., 1999)'s model makes a distinction between the individual and the group level regarding the adoption of innovation and clarifies that innovation theory addresses the individual level while implementation process theory addresses the group and organisation level. For the context at hand the main implication of this is in terms of resource allocation and managerial involvement, which is dependent on and has to be adapted by context and task complexity. (Rogers, 2010)'s diffusion of innovation model is the only one that addresses the individual level only, all the other models address the group level or both individual and group levels. The model of (Van de Ven et al., 2008) has a cyclic approach and gives no prescriptive guidance. It describes that the change process is a continuous cycle of convergent and divergent sets of behaviour that alternate under the influence of constraining and enabling factors.

The last model is the change formula attributed to Beckhard by (Cameron and Green, 2012), model number 33. The model takes the form of an inequation and conveys a very intuitive formula according to which change only happens if the product of the variables representing the dissatisfaction with the current situation, the desirability of the new end state and the practicality of the change, is higher than the cost of changing.

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SYNTHESIS OF THE FREE TEXT CONTENT THAT IS PRESENTED IN DESCRIPTIVE OR NARRATIVE  
FORMAT

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The models discussed previously represent just a part of what has been extracted from literature and what can be used as input for the design of the desired process model. Most of the information cannot be synthesised in a model because of the loose form in which it is delivered. The descriptive and narrative text provides diverse information, from assumptions and advice to accounts of singular events or success and failure factors. The majority of the analysed literature contains rich information that is rarely actionable.

The synthesis results from the analysis of the models present high level input that can provide a “backbone” for the change process model. This skeleton can be completed with actionable information at a more detailed level by leveraging the information in the remainder of the literature content. The loose information extracted from literature, however, needs to be structured, classified and synthesized to a form that is adequate to be used as building blocks for the design of the process model.

For this purpose, the relevant elements have been integrated as explained in the methodology section of this chapter and synthesized in the tables presented in Appendix 10.4. The three tables represent the three main stages of the implementation flow that have become apparent already early on and that can be observed also from the models: the pre-execution, synthesized in Table 3, during execution, synthesized in Table 4 and post-execution of the implementation project, synthesized in Table 5. The structure of these three tables is intended to reveal the “what”, the steps that need to be taken, and the “how”, the actions or the way in which the steps materialise. For traceability reasons, the tables also contain the source of each synthesized element.

The synthesis of the free text format of the literature content brings a higher level of detail and completes many of the elements extracted from the synthesis of the models with specifications. Through the specification, each element becomes more actionable and thus evolves into a step of the change process.

To exemplify, the element of “Awareness creation”, which has already been extracted as a process step from two groups of models,  $G_1$  portrayed in Figure 8 and  $G_{21}$ , depicted in Figure 9, is also supported by the synthesis of the free text and can be seen in the first row, first column of Table 3 in Appendix 10.4. In the second column of the same row, three actions were extracted as embodiment of the “Awareness creation” element. While “Awareness creation” could be actionable into a task called “Create Awareness”, the three actions extracted from the free text give a more specific and concrete indication of how the awareness can be created: namely through giving a description of the innovation, through explaining its advantage and through explaining its impact. These three concrete actions give a clearer indication of what can be done to create awareness and thus increase the guidance power of the “Awareness creation” element. The third column of this row indicates three sources from which the three actions were extracted, in order to provide traceability and transparency to what is a complex analysis and integration result.

Similarly, most of the other steps in the three tables are accompanied by actions that are aimed at providing specificity and detail and helping to build an as concrete and detailed change process model as it can be derived from the analysed literature.

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DISCUSSION

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The analysed literature on innovation diffusion and change management provides considerable amounts of information and the endeavour of distilling the one relevant for the change process is a challenging task. The elements extracted represent two levels of aggregation, the high level, or steps or clusters of actions and the low-level, the actions that embody the clusters.

The results from the formal models have a higher level of abstraction than the ones from the free text, but they provide more indication regarding the sequence of the elements than the free text.

Table 2 presents an overview of the high-level elements extracted as relevant for the change process. The presence of each element is marked with a “v” sign for each content group. The groups of models follow the notations used in Table 1 and are also explained again in the legend at the end of Table 2. As it can be seen,

the main source is the free text, with only one extracted high-level element not covered. The second richest source is the group of models with a guideline approach, G<sub>22</sub>. The last group of models, G<sub>25</sub>, is the one with the least coverage of elements followed by the groups of models with a dynamic approach, G<sub>24</sub>, and the ones with an interaction approach, G<sub>23</sub>. G<sub>1</sub> and G<sub>21</sub>, the groups of models with a process approach, cover the high-level elements only partially and provide almost no low-level elements. This reinforces the initial claim of the lack of a comprehensive change process model and indicates that the integrative synthesis of the free text is the most valuable part of the analysis for design purposes.

The free text also provides six additional elements that are not covered by any of the model groups. However, undoubtedly the biggest contribution of the free text synthesis results are the low-level elements, or the actions recorded in the second column of the integrative tables in Appendix 10.4 and that are not comprised in Table 2, which only maps the high-level elements. Most of these high-level elements will transform into clusters of actions later in the design of the change process model.

TABLE 2: PRESENCE OF THE HIGH LEVEL ELEMENTS OF THE CHANGE PROCESS IN LITERATURE

Element		Models						Free text
		G <sub>1</sub>	G <sub>21</sub>	G <sub>22</sub>	G <sub>23</sub>	G <sub>24</sub>	G <sub>25</sub>	
1	Awareness	v	v					v
2	Change proposal	v						v
3	Advantage proving/Supporting evidence			v				v
4	Need assessment	v	v	v	v			v
5	Target group analysis	v		v				v
6	Fit check to organisation							v
7	Fit check to resources							v
8	Strategic evaluation	v						v
9	Fiscal evaluation		v					v
10	Adoption decision		v					v
11	Current performance analysis	v						v
12	Change readiness assessment			v				v
13	Team establishment			v				v
14	Leadership definition			v				v
15	Motivation for change			v				v
16	Team development			v				v
17	Work set-up definition	v	v	v		v		v
18	Value definition			v	v	v		v
19	Capacity creation	v		v				v
20	Execution plan development	v	v	v				v
21	Predisposition creation							v
22	Political sponsorship			v	v			
23	Monitoring		v	v				v
24	Data collection							v
25	Feedback							v
26	Motivation			v	v	v		v
27	Communication			v				v
28	Problem management			v	v			v
29	Complexity mitigation							v
30	Operational focus							v
31	Integration	v	v	v				v
32	Evaluation	v	v	v				v
33	Sustainment	v	v	v				v
	Total	12	10	20	5	3	0	32

Where:

G<sub>1</sub> - healthcare innovation diffusion and change management models

G<sub>21</sub> - general innovation diffusion and change management models with a process approach

G<sub>22</sub> - general innovation diffusion and change management models with a guideline approach

G<sub>23</sub> - general innovation diffusion and change management models with an interaction approach

G<sub>24</sub> - general innovation diffusion and change management models with a dynamic approach

G<sub>25</sub> - general innovation diffusion and change management models - others

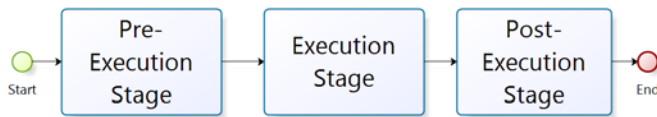
	Elements attributed to the Pre-Execution Stage
	Elements attributed to the Execution Stage
	Elements attributed to the Post-Execution Stage



### 3 CONCEPTUAL DESIGN OF THE CHANGE PROCESS MODEL

The conceptual design of the change process model uses the results of the analysis presented in the previous chapter for the creation of an integrative artefact meant to combine best-practices and successful experiences documented in literature. Building upon the findings of previous research, the conceptual change process model (CCPM) brings a higher level of detail than any of the individual models analysed previously. It provides the user with a greater degree of guidance for the implementation process, through increased specification.

FIGURE 11: OVERVIEW OF THE CONCEPTUAL CHANGE PROCESS MODEL



The model is designed for a generic innovation and a generic healthcare organisation. Due to this broad scope, the model does not assume a prescriptive position. The user is in charge of instantiating the model, by choosing the clusters and actions that apply to a specific innovation and a concrete organisation. Thus

the user may choose to apply the change process model entirely or partially.

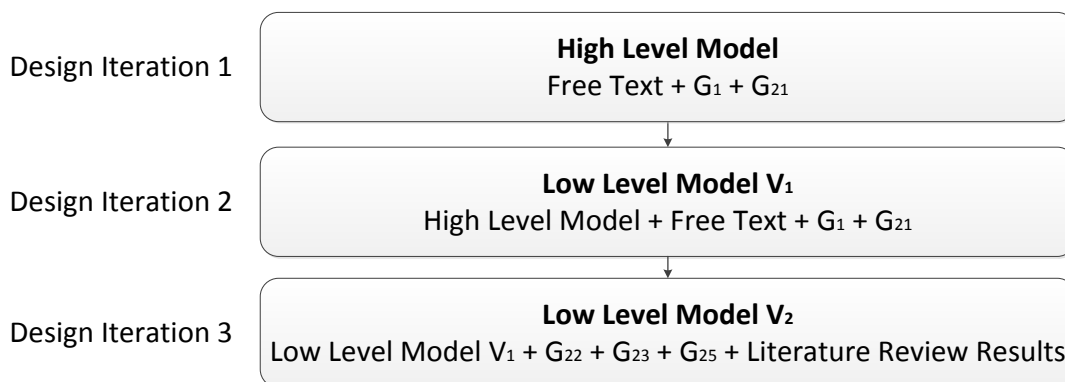
The design endeavour resulted in a conceptual change process model with three levels of aggregation. Following the structure indicated by the results of the analysis, the implementation process model has three stages with a sequential flow, as depicted in Figure 11.

#### 3.1 CONCEPTUAL DESIGN METHODOLOGY

The methodology for the design of the change process model employs the convergence method, in which the development of the final artefact is achieved through incremental steps (Jones, 1970). The CCPM, which will be presented in the next section, is the result of a three iteration development, portrayed in Figure 12. Each Design iteration brings detail to the model through the step-wise integration of additional sources. The sources for each iteration step were chosen based on their type and the nature of their analysis results. The more process oriented sources with higher prescription power were used first, followed by the sources of looser forms, with lower to no prescription power.

The design process starts by dividing the change process model into the three stages of Pre-Execution, Execution and Post-Execution, as it was a sensible division with strong support from literature (see section 2.2.1). This initial division helped focus the design per block and localise the effort for higher design effectiveness.

FIGURE 12: DESIGN DEVELOPMENT



The first design iteration was based on the higher level information of the Free Text analysis results, namely the steps extracted in the first column of the tables in Appendix 10.4, and on the higher level analysis results of the G<sub>1</sub> and G<sub>21</sub> categories of models. The sources were tackled per block and the results were integrated through the same integration method as the one presented in the Analysis chapter. The result is a high level model, which contains only undetailed clusters of actions and can be visualized in Appendix 10.5.1. This high-level model already maps most of the clusters and establishes a flow based on the combined indication of the three sources.

The second design iteration builds upon the High Level Model and integrates the lower level results of the Free Text analysis, the actions contained in the second column of the tables in Appendix 10.4, and the lower level results of the  $G_1$  and  $G_{21}$  model categories. In order to keep this iteration structured and systematic, this was performed by two approaches, one starting from the clusters of the High Level Model and searching for content that can translate into actions of each cluster and the other starting from the results and assessing to what cluster each activity-type element belongs. This integration step also entailed a revision of the elements' flow. The result of this iteration step encompasses all elements depicted in blue in Figure 13, Figure 14 and Figure 15. By comparing the result of this iteration step with the result of the previous one, it can be observed that this step populated all clusters of actions with at least two more specific actions, except of the *Provide Support* cluster in the Execution stage, which is the only cluster populated by only one activity. This iteration step also brought certain flow changes. For example in the Pre-Execution stage the changes are the parallel flow of the first three clusters, the sequence flow of the *Check Fit to Organisation* and *Check Fit to Availability* clusters, the relocation of the *Assess Readiness* cluster and two additional decision points. In the Execution stage the *Monitor KPIs* cluster has been renamed because the three actions that populate it indicate that the name *Monitor Implementation Performance* is more appropriate.

The third design iteration builds upon the first version of the Low Level Model and integrates the results from the remaining groups of models,  $G_{22}$ ,  $G_{23}$  and  $G_{25}$  and the results of the literature review conducted as the first step of the graduation project. The group of models with a dynamic approach,  $G_{24}$ , has not been used as input for the design because the dynamic, non-linear approach is not suited for a single-implementation-process.

The integration approach for this third iteration step was content-led. Starting from the analysis results of the mentioned sources, a check was performed to identify the presence of each content element in the version 1 of the Low Level Model. A mapping was done for each content element and a new process element, cluster, action or flow change, was added to the model for the content elements that could not be mapped or indicated a necessary change. Table 6 in Appendix 10.5.2 provides an example of this integration approach, for the  $G_{22}$  group of models, the general innovation diffusion and change management models with a guideline approach. The elements, clusters and actions, marked in green in Figure 13, Figure 14 and Figure 15, are additions of the third iteration and stem from the sources mentioned above. For example, the *Identify key advocates and power groups* action in the *Establish Team* cluster originates in the  $G_{22}$  group of models and can be seen in the ninth row, last column of Table 6. The *Show Political Sponsorship* cluster and its content are marked in green because they are derived from the literature review results, portrayed in Figure 45 in Appendix 10.5.2. Similarly, all the other elements marked in green in the three figures originate in the literature review or the  $G_{22}$  group of models. The groups  $G_{23}$  and  $G_{25}$  have also been used as input in this step, but their content did not yield any new elements as all their elements had already been covered by the first two design iteration steps.

The cluster and actions marked in red at the end of the Pre-Execution stage do not stem from literature and are an addition made for logical reasons. The execution of a previously developed integration action plan and sustainment action plan is required in the Post-Execution stage, but no such plans are created in the preceding part of the model, thus a cluster was added for the development of these two action plans.

The result of the third iteration step, the Low Level Model version 2 is the conceptual model of the change process presented in the following section.

This methodology and the explained approaches were chosen because of the evidence provided by (Claes et al., 2012) in their book chapter about the quality of the process of process modelling, that “an approach that emphasizes successive phases of thorough and localized modelling (i.e., within blocks) is more attractive than diverting one’s attention across different parts of a model at the same time”.

### 3.2 CONCEPTUAL DESIGN DESCRIPTION

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In this section the details of the change process will be presented. The change process is modelled using the BPMN modelling language, with all accompanying notations, objects and artefacts, as described by (Dumas et al., 2013). The components of the conceptual model are: low-level *activities*, high-level *clusters of activities* which contain low-level activities, *decision points*, flow *branching points* between sequential and

parallel flow, and events. In accordance to the user guide<sup>6</sup> of the Bizagi Modeller<sup>7</sup> open-source tool for BPMN modelling, the low-level activity is depicted by the task element and the high-level cluster of activities is modelled through an expanded sub-process element. The decision points are modelled through divergent exclusive gateways. The flow alternation points are modelled through divergent and convergent inclusive gateways.

There are two types of branching points in the model, parallel branching and inclusive branching. The parallel branching, marked by the divergent parallel gateway with a “+” sign inside, denotes that all alternative paths are to be executed for the convergence to happen. The inclusive branching, marked by the inclusive divergent gateway with a circle inside, denotes that the alternative paths have been placed in parallel because no decision could be made regarding the flow type of those paths. The activities within a cluster are depicted sometimes with a flow and other times without connections, depending on whether or not a certain flow could be identified from the analysed literature.

The model does not exploit all BPMN concepts and elements. The “actor” concept is not employed in the modelling, so the model does not contain lanes that identify the participants. However, for the explanation and interpretation of the actions of the process, certain participant roles can be identified: *decision making body*, which can be the board of directors or the management, *innovator*, the developer of the innovation, the *change agency*, the external participant which facilitates the process, the *change leader*, the one participant that has the role of leading the change team, the *change team*, the group of organisation staff which actively work on creating the change and the *relevant organisation staff*, the staff that is affected by the change process.

The complete CCPM can be seen in Figure 52 of Appendix 10.15. In the following three sub-sections that detail the contents of the three stages of the CCPM, a certain degree of own interpretation is used to describe each action and each cluster. The descriptions provided in the following part have been deduced mainly from the free text content where explanations, accounts and examples are given by the authors. For the elements where the individual explanations differ, the shared view or the aggregated view was chosen. For example, for the *Assess Need* cluster (Cawsey et al., 2011) provide a more detailed and accurate picture for the description than the other authors that advocate this element. However, for the description provided below, the shared view was used, so a description that is in line with all the different views and that ultimately is less detailed than the one given by (Cawsey et al., 2011), which includes the establishment of a change vision and of a level of need pressure (the degree to which the organisation has a choice regarding the change). The construction of the shared view description is in itself a result of own interpretation through an assumption of agreement that cannot be validated.

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### 3.2.1 PRE-EXECUTION STAGE

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The Pre-Execution stage can be seen in Figure 13 and starts with an inclusive branching of three activity clusters: *Create awareness*, *Assess Need* and *Formulate Proposal*. This denotes that it is not decided if a sequence exists between the three clusters and especially between the activities of the three clusters. *Create Awareness* is a cluster focused on the innovation, in which the advantage and desired impact or outcome are presented by the innovator or by the change agency to the decision making body. *Assess Need* is an organisation-focused cluster in which the decision making body identifies a certain need within the organisation and then analyses this need in terms of cause and possible solution, either independently or with the assistance from the innovator or the change agency. The *Formulate Proposal* cluster brings together the two previous clusters by matching the innovation to the need and by describing the way in which the innovation would be used to satisfy the need. The action *Portray use of innovation* incorporates the vision creation, as it implicitly paints a picture of the future state.

The *Prove Advantage* cluster that follows is meant to reassure the decision-making body by substantiating the advantage claims with evidence from research and from previous implementations of the innovation, if any exists. This cluster can be performed by the innovator or by the change agency. The *Analyse Target Group* cluster is meant to provide the innovator or the change agency information regarding the target group of the innovation, which includes the decision making body, the change team, the leader, the relevant staff and any possible end-users of the innovation, like the patients, if applicable. By performing a

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<sup>6</sup> <http://help.bizagi.com/bpmsuite/en/>

<sup>7</sup> <http://www.bizagi.com/>

stakeholder analysis, the determinants and barriers for change are identified and, based on that, a buy-in level is established. The buy-in level provides an indication of how likely it is for the innovation to be adopted or “bought”. The determinants and especially the barriers can be used as input later in the *Develop Execution Plan* cluster, specifically in the *Decide implementation actions* activity.

The *Check Fit to Organisation* cluster verifies whether the innovation is compatible with the mission, vision and goals of the healthcare organisation and with laws, regulation or directives at local, regional and national level. This check can uncover an unsolvable barrier and that is why after this cluster a decision point is placed. If any of the two checks indicates that the implementation is not viable, the implementation is aborted. The *Check fit to local/regional/national directives* includes the context or external environment elements and a positive check result can represent not only the possibility for continuation of the process, but also an advantage, if the directives happen to be supportive (like in the case of subsidies). This check can be performed by the decision making body alone or together with the innovator or change agency.

The *Check Fit to Availability* cluster performs also a verification, but of an availability nature. The actions within this cluster verify whether the organisation possesses the financial, human, time and knowledge & skills resources to adopt the innovation. This check addresses the minimum level or the “critical mass” needed to continue and a more thorough assessment is performed later on in the process. This check too can render the implementation not viable, thus another decision point is placed right after this cluster.

The *Evaluate* cluster represents the last check before the adoption decision. The evaluation activities include a strategic evaluation and a financial evaluation. The strategic evaluation determines whether the innovation will bring long-term advantages in line with the organisation strategy. The financial evaluation assesses the cost-effectiveness of the adoption and the specific financial return of the innovation use. This evaluation cluster is followed by the adoption decision point, where the decision-making body makes the choice of whether or not to adopt and implement the innovation.

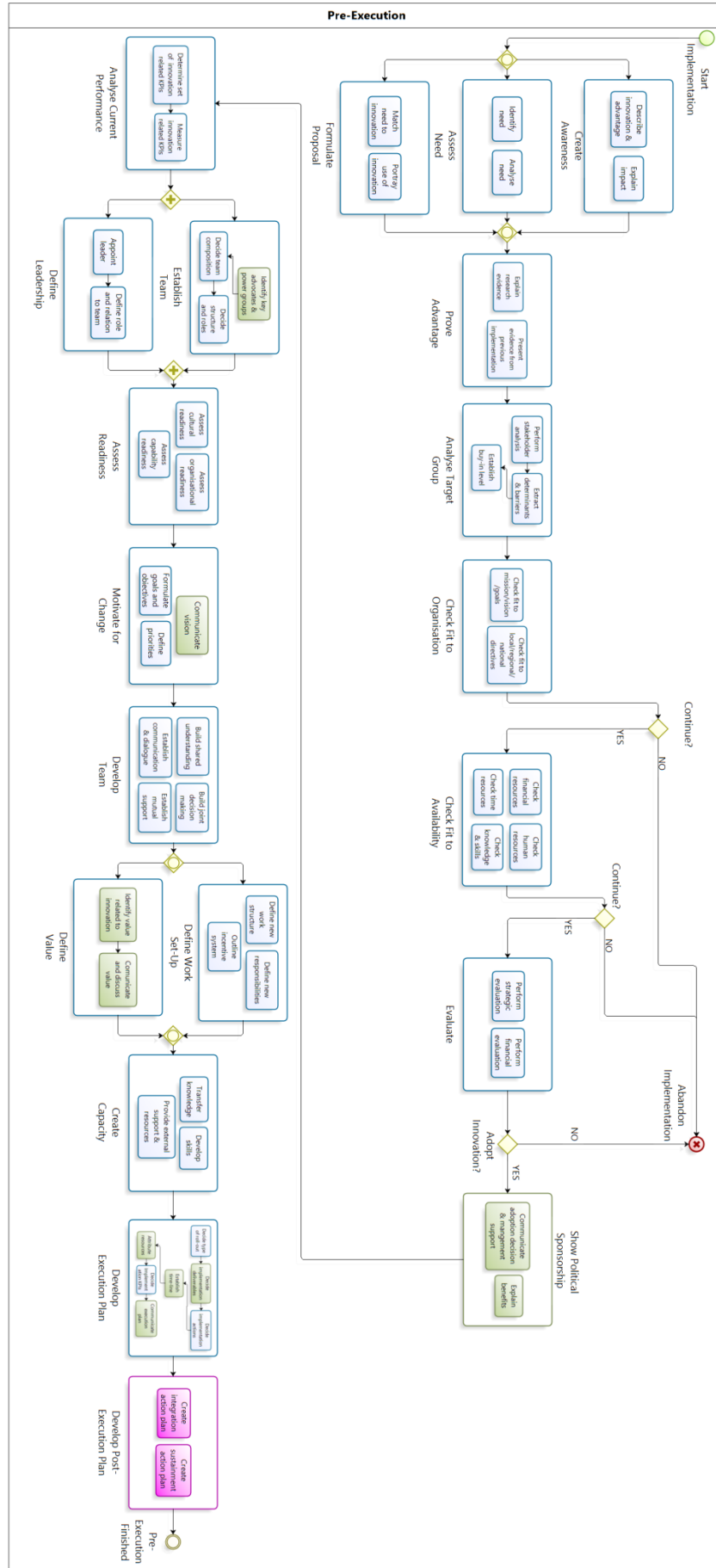
If the adoption decision is positive, it is followed by a *Show Political Sponsorship* cluster in which the adoption decision is communicated by the decision-making body or by the management to the relevant staff. The *Explain benefits* action denotes that the demonstration of political sponsorship should include an explanation of the rationale and of the benefits of the innovation in order to bring the relevant staff on board with the implementation.

The cluster that follows is the *Analyse Current Performance* cluster, which is meant to provide a benchmark against which the added value of the innovation can be measured. The first action of the cluster is to determine a set of performance indicators for the work processes, which are influenced by and the target of the innovation implementation. The action of measuring the chosen indicators will provide the “before” introduction performance that can later be compared to the “after” introduction performance to decide the extent of the improvement.

The next two clusters, *Establish Team* and *Define Leadership* are parallel action clusters. The *Establish Team* cluster contains three actions in sequence. The first action is to identify the key advocates of the innovation within the healthcare organisation and the power groups, which can facilitate the dissemination of a positive attitude towards the innovation. These groups and individuals are then involved in the composition of the team, either by becoming part of it or by helping choose the best suited staff members to be part of the team. Once the composition of the team is decided, the structure of the team and the roles are defined. After the action of choosing and appointing the leader, his/her role and relation relative to the team are defined. This entails aspects such as leadership style and leader responsibilities.

The following cluster is the *Assess Readiness* cluster, in which three actions are performed by the change team and the leader and are aimed at the assessment of the cultural readiness, organisational readiness and the capability. The cultural readiness addresses how change is regarded in the organisation and if it constitutes a common element (change happens often and easily in the organisation) or an element treated with adversity. The organisational readiness refers to structures and provisions that facilitate change in the organisation. The capability readiness regards the knowledge and skills of the relevant staff and the assessment represents the base for decisions and actions meant to increase capability, so part of the input for the *Create Capacity* cluster.

FIGURE 13: CONCEPTUAL DESIGN OF THE PRE-EXECUTION STAGE OF THE CHANGE PROCESS MODEL



The *Motivate for Change* cluster aims at motivating both the change team and the relevant staff for adopting the innovation. The motivation is achieved through the communication of the vision for change, the way in which the innovation will work and its benefits, the formulation of specific goals and SMART objectives<sup>8</sup> as well as the definition of priorities and milestones. Breaking down the change into sections decreases the anxiety towards the challenge and helps the staff feel more psychologically capable to take on the endeavour.

The *Develop Team* cluster that follows is meant to consolidate and unify the team for an effective and efficient execution. The first action of this cluster is for the team to build a shared understanding of the innovation, of its purpose and its use. The second action is aimed at instilling a type of decision-making within the team that is achieved through consensus reaching. The third action establishes a culture of open communication and dialogue among the team members. The last action aims at the establishment of a mutual support culture in which the change team member leverage the individual strengths for the success of the entire team.

The next two clusters, *Define Work Set-Up* and *Define Value*, have an undefined flow. *Define Work Set-Up* is the set of actions aimed at outlining the new work processes that are affected by the innovation and the *Define Value* is aimed at uncovering the value of the innovation particularly for the professionals involved and their work. The new structure of the work and new responsibilities are defined for each profession while eventual incentive systems are detailed. Uncovering the value to the professional's work can facilitate adoption among staff and motivate them for the effort that they will have to invest.

The *Create Capacity* cluster represents the actions meant to ensure that the change team has both the capacity and the capability to develop and carry out the execution plan. The required knowledge is transferred from the innovator or the change agency to the change team and leader, if applicable, and the required skills are developed, through actions like training or practice sessions. The provision of external support and resources is the activity meant to ensure the required team capacity and can translate into additional external team members or coaches, provided by the innovator or by the change agency that can support the change team if needed.

The cluster *Develop Execution Plan* comprises a set of actions that represent the input for the next stage of the process, the Execution stage. First the type of roll-out is decided, which can be trial, phased, big-bang, etc., then the deliverables of the implementation are set. Depending on the deliverables, the actions required to achieve the deliverables are decided. Then a time-line is established to the previously decided set of actions and the needed resources are attributed. Next the set of implementation-related key performance indicators (KPIs) are decided. These performance indicators characterise the implementation project only and are independent from the innovation and its eventual KPIs. A discussion will follow later on the implementation-related KPIs. After this the execution plan is communicated to the relevant staff.

The next cluster consists of the creation of actions plans for the integration and the sustainment of the innovation, which will be described in the Post-Execution Stage of the process.

The Pre-Execution stage of the process ends here and the Execution stage may now begin.

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### 3.2.2 THE EXECUTION STAGE

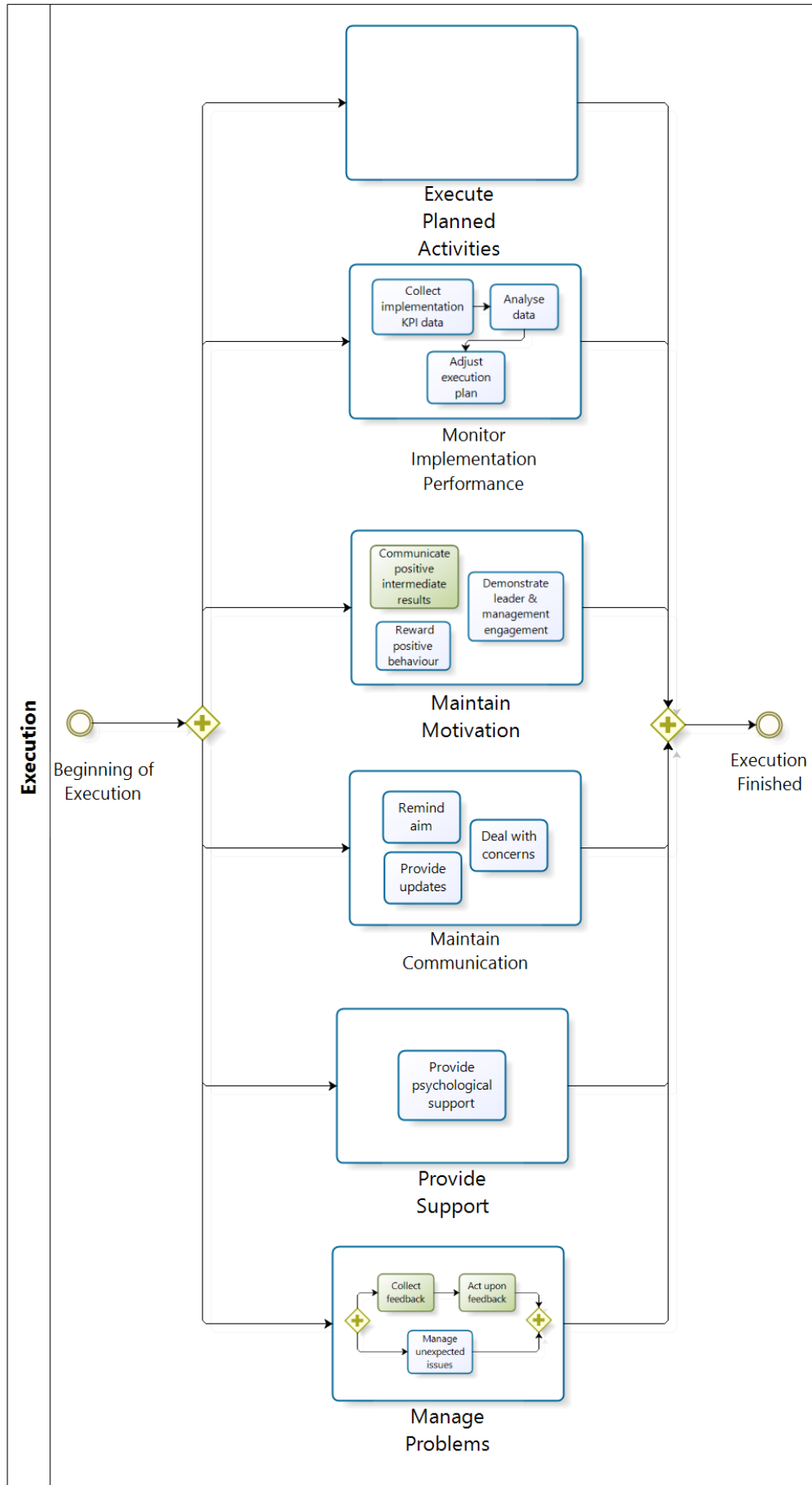
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The Execution stage, presented in Figure 14, is composed of six clusters of action modelled in parallel. The *Execute Planned Activities* is the cluster that gives the characteristic of the stage, that of roll-out or operational introduction of the innovation throughout all the relevant layers of the organisation. This cluster is critical for the success of the implementation. However, little to nothing can be detailed about it in general terms. This cluster contains the actions which are decided upon in the *Develop Execution Plan* cluster of the Pre-Execution stage of the process. These actions are entirely innovation and organisation dependent and because of that no guidance can be provided about them due to the scope of the change process model. The activities required to introduce an innovative surgical instrument are completely different from the activities required to introduce a new electronic health record. In the same manner, the activities required to introduce the new electronic health record in an elderly home are very much different than those required for a hospital type of healthcare organisation.

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<sup>8</sup> [http://en.wikipedia.org/wiki/SMART\\_criteria](http://en.wikipedia.org/wiki/SMART_criteria)

FIGURE 14: CONCEPTUAL DESIGN OF THE EXECUTION STAGE OF THE CHANGE PROCESS MODEL



The remaining five clusters however, which support and enable the first one, can be described in general terms and seem to be universally applicable. They ensure the good execution of the first cluster and increase the success likelihood of the introduction.

The *Monitor Implementation Performance* cluster aims at the supervision of the implementation project. The actions that make up this cluster are a sequence of implementation KPI data collection, the analysis of this data and the eventual adjustment of the execution plan as a result of the data analysis. Few implementation projects described in literature manage to satisfy all pre-established indicators such as *cost* or *duration* and monitoring these aspects is vital for the ultimate success of the implementation since it provides the possibility for “course correction”. More details will be provided about the implementation-related KPIs in the discussion section of this chapter.

The *Maintain Motivation* cluster is aimed at ensuring that the motivation generated in the Pre-Execution stage is preserved throughout the execution and that the staff does not abandon the execution due to the loss of motivation. Change represents strain and effort and coping with that can lead to loss of motivation and thus loss of performance. To avoid that from happening, three actions can be performed: first communication of positive intermediate results creates intrinsic reassurance and justification of efforts and can energize the staff. Secondly, the rewarding of positive behaviour is an extrinsic justification of efforts and push for active participation. Third, the demonstration of engagement by the leader and the management can also sustain the staff motivation by reinforcing the feeling of importance and demonstrating solidarity.

Because the change team and the staff are preoccupied with the execution of the planned activities, communication can be neglected. The *Maintain Communication* cluster provides actions to ensure a minimum necessary level of communication among the stakeholders. Reminding the aim and the objectives and providing regular updates stimulates discussion and interaction. Dealing with people’s concerns and engaging in dialogue is an important part of stimulating communication.

The *Provide Support* cluster is meant to actively help people manage the transition. The action of providing psychological support helps the staff cope with the feelings of stress, anxiety and even loss (which can happen in a transition that “involves perceived hardship, layoffs or role disruptions” (Gabel, 2001)). This can be performed by the leader, the change team, the change agency or a mixture of those.

The last cluster, *Manage Problems*, is concerned with the trouble-shooting of problems that arise throughout the execution. Unexpected issues may come up and they need to be solved by the leader, change team and/or change agency. Some issues may not be noticed on their own, so feedback from staff is collected to identify such hidden issues and to solve them.

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### 3.2.3 POST-EXECUTION STAGE

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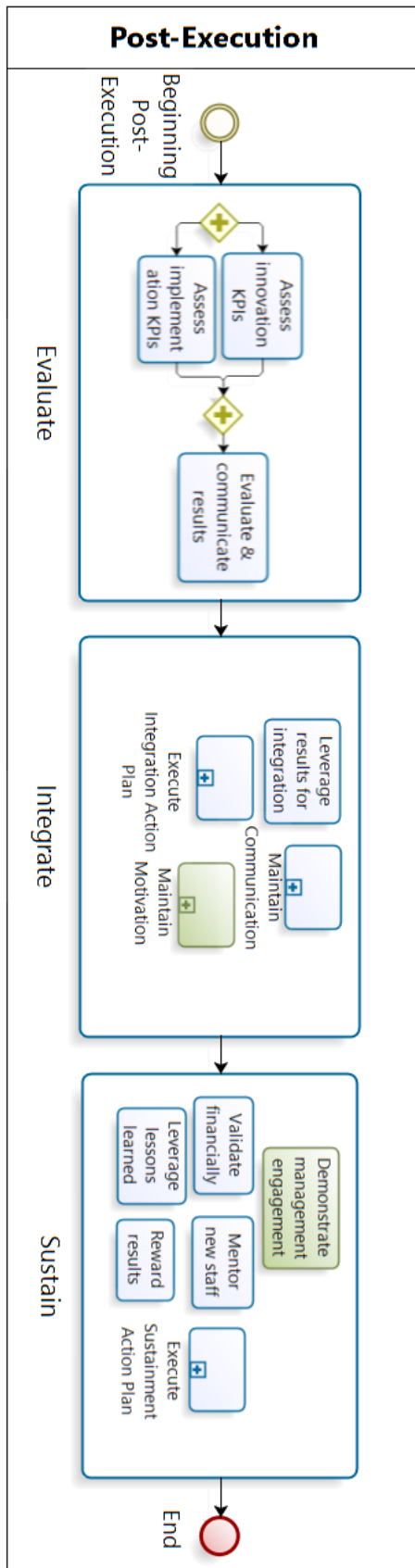
The Post-Execution stage, shown in Figure 15, comprises three clusters of actions: *Evaluate*, *Integrate* and *Sustain*. The *Evaluate* cluster aims at the assessment of the results, both in terms of innovation and of implementation. From the innovation perspective, the innovation-specific KPIs are collected and from the implementation project perspective, the implementation-related KPIs are collected. Thus, the evaluation establishes results in terms of the performance of the innovation and its benefits and added value and in terms of the performance of the introduction.

The *Integrate* cluster has the purpose of embedding the innovation into common practice and making the use of the innovation part of routine. There are cases in which the innovation does not get disseminated to the extent to which it is initially intended, so measures need to be taken to ensure that it becomes common practice. Thus, after the integration, the innovation is no longer regarded as new. Here, the integration plan that was created in the Pre-Execution stage is carried out. This plan too is innovation and organisation dependent and cannot be described in general terms.

To facilitate the execution of the integration action plan, the *Maintain Communication* and *Maintain Motivation* clusters described in the Execution stage of the process, are reused. The action of leveraging the results is intended to use the outcomes of the *Evaluate* cluster to both fine-tune and motivate the integration.



FIGURE 15: CONCEPTUAL DESIGN OF THE POST-EXECUTION STAGE OF THE CHANGE PROCESS MODEL



The *Sustain* cluster is aimed at ensuring the long-term use of the innovation and preventing the organisation from going back to the old way of working. Many accounts indicate that there is a high risk of implementation failure still at this point in the process and that a successful execution and integration and a favourable evaluation do not ensure sustainment. Thus, a sustainment action plan is executed in this cluster, action plan that has been developed in the last cluster of the Pre-Execution stage. Just like the execution and integration action plans, the sustainment one is also innovation and organisation dependent and cannot be pinpointed for the general context. Five more actions have been identified to contribute to the innovation sustainment. The demonstration of the management engagement is important for this purpose because it emphasises the necessity and importance of the sustainment. The financial validation that can be performed after the integration represents a logical motivator for sustainment efforts. The rewarding of results and appreciation of achievements also facilitates sustainment and dedication from staff towards the use of the innovation. The lessons learned from the integration should be exploited for deriving improvement points and for maximising the value obtained from the innovation. Finally, the new staff that joins the organisation later and have not participated in the execution and integration phases should be mentored or trained for the use the innovation.

A long term-sustainment of the, what by this point would no longer be an innovation, concludes a successful implementation process.

### 3.3 CONCEPTUAL DESIGN DISCUSSION

The three stages of the CCPM are differently exposed in the analysed literature. The Pre-Execution and the Post-Execution stages receive more attention and are subject to more investigation than the Execution stage. Many times the Execution stage is regarded as an atomic action. In the cases where it is not, little detail and guidance is provided regarding its content. Extracting the content of the Execution stage required a higher effort of deduction and interpretation than the other two stages. The amount of information existent in literature regarding the Pre-Execution stage is the highest, but it also exhibits a high degree of variability among sources. Different sources describe and prescribe different elements and the opinions are divided, making it hard to obtain conclusive support for some of the individual elements. As it can be seen in the section 3.2, the Pre-Execution stage is the stage most populated with elements. Because the integration seeks comprehensiveness, the Pre-Execution stage brings together all best practices, becoming extensive. The Post-Execution stage is the one with the highest consistency among sources. The main elements are similarly described and there seems to be agreement among authors about what the Post-Execution stage entails.

The flow of the clusters and actions is vaguely or not at all described in literature, thus it is the model aspect with the lowest substantiation, depending highly on interpretation. This issue was the reason why the actions of many of the clusters are not depicted in a flow, but as loose elements. This denotes that no flow could be conclusively established and the model gives no guidance regarding the order. The same applies for the formations of parallel clusters marked with an inclusive type of gateway (the gateway with a circle inside). This signifies that it is not clear whether the clusters are in a parallel or sequential flow.

The situation is similar in terms of process participants. The first section of this chapter attributes participant roles to certain clusters and actions, but that involves a high level of own deduction. Many times, the guidance provided by literature takes a non-personal form or the roles are merely implied rather than voiced out.

The first three clusters of the Pre-Execution stage are in an uncertain flow. That is the case because the sequence between actions might involve switching back and forth between clusters. However a true parallelism can also not be conclusively established.

For the uncertain flow between the *Establish Team* and *Define Leader* clusters, there is some evidence in literature that the team leader is also involved in the action *Decide structure and roles*. However, a decision was made not to include the leadership definition into the team establishment cluster due to the high emphasis in literature on the leadership definition sub-process and its complexity, e.g. (Gabel, 2001).

The last cluster of this stage, *Develop Post-Execution Plan*, is an own addition, entirely independent of literature. The decision was taken to add this cluster due to the presence of the actions *Execute Integration Action Plan* and *Execute Sustainment Action Plan* in the Post-Execution Stage. The action of executing a plan implies that previously a plan was created. However, such a plan creation was not present anywhere in the preceding part of the process. For this logical reason the cluster was added as an own initiative.

The *Execute Planned Activities* cluster in the Execution stage is the only unpopulated cluster of the model. As explained in section 3.2.2, this is the case because the content of this cluster is innovation- and organisation-dependent. The information uncovered about it, mainly through case descriptions, provide a myriad of possibilities that a general model could not capture. The content of this cluster, however, would dictate many important aspects of the execution, like duration, cost, resource necessary and ultimately complexity. The application presented in chapter 4 provides exemplification for possible content of this cluster.

The *Provide psychological support* action is the one action of the *Provide Support* cluster. This is the sole cluster in the model to be populated by only one action, which could render the very use of a cluster unnecessary. Nevertheless, the *Provide Support* cluster seems to entail more than just the psychological aspect, although what exactly, could not be pin-pointed and translated into an action.

For the Post-Execution stage, the *Execute Integration Action Plan* and *Execute Sustainment Action Plan* elements are treated as actions in the description of the model. Their depiction however is that of a cluster or sub-process. That is because they are in fact not atomic. They contain several atomic actions, maybe even a complex process. This content however is again innovation and organisation dependent and cannot be captured in a general model.

The *Integrate* cluster contains a *Maintain Communication* and *Maintain Motivation* cluster. These are also depicted as sub-processes or clusters because their content is presumed to be the same as the one in the Execution stage.

Although this aspect is in no way emphasized in the conceptual process model, the implementation-related KPIs have sparked an interest due to the lack of description. None of the publications investigated in the analysis presents a clear set of performance indicators by which a generic (innovation) implementation project should or could be assessed. Even some of the most comprehensive publications, such as the one of (Greenhalgh et al., 2008) do not make an attempt at attributing KPIs to the implementation project, as was also observed by (Cook et al., 2012). Explicit performance indicators mentioned by publications such as (Berler et al., 2005) or (Grol et al., 2013), characterise the clinical process of cure or care. Examples of such performance indicators are: mortality rate, average length of stay, patient admission rate or mean cost of medical treatment per patient. The innovation implementation project can improve these indicators through its effect, if the implementation is successful and the innovation brings the advantages that it promises. However, these KPIs do not indicate the performance of the implementation itself.

Because of this intriguing gap, further investigation has been performed in an effort to uncover an adequate set of implementation-related KPIs. This implementation-KPIs-focused investigation started with an additional literature search, which has provided generic pointers, but no concrete KPI set. In order to solve this issue, the findings from this additional literature search have been combined with the resources provided by the literature examined in the Analysis chapter 2. The free text part of the analysed literature, which is summarised in Appendix 10.4, has been re-examined with a focus on KPI. The concerns described in the free text have been cross-analysed with the generic pointers provided by the additional literature search. This cross-analysis has yielded a set of four implementation-related KPIs: *cost*, *lapse time*, *integration* and *emotional impact*. This implementation-KPI investigation is presented in detail in Appendix 10.6.

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## 4 APPLICATION

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### 4.1 APPLICATION METHODOLOGY

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The application step of the regulative cycle as described by (van Strien, 1997) is somewhat different than the application-oriented actions performed in the research step described in this chapter. The (van Strien, 1997) view of application is that of testing the design result in practice to check its usability and uncover improvement points. Due to the time and resource limitation of the master thesis setting, such an application is not possible for the conceptual change process. Using the CCPM in practice for the implementation of an innovation in a healthcare organisation would require minimum several months, time span that is not available in this context.

Instead, the applicability of the model is shown by comparing it to successful innovation implementation processes used in practice. Consequently, the purpose of the application presented in this chapter is to investigate the CCPM's applicability from an artefact perspective. This investigation takes the form of a comparison between the CCPM entirely derived from literature and practical benchmarks, two change processes successfully used in practice. The comparison treats both *the high level elements*, the cluster of actions, and *the low level elements*, the actions, as well as *the flow of the process models*. The mapping or correspondence between the models' elements is determined based on the description of each element in the two compared models. In the cases of aggregation discrepancies, when the element of one model is presented in more or less detail than the corresponding element of the other model, the purpose or aim of the two elements is the base for correspondence. The similarities and differences represent points for discussion. All difference points will constitute potential improvement points and will be considered in the refinement of the CCPM, which is detailed in chapter 6.

The two application processes used have been provided one by Implementation IQ and the other by the REshape & Innovation Center at the Radboud University Medical Center. The processes have been provided and explained in an interview set-up. While Implementation IQ already had their general implementation process documented in a model, the process model from REshape & Innovation Center has been created during the interview, based on the verbal descriptions provided by two experts that have been involved in the implementation project as change agency. Throughout the interview discussion, the process model has been drafted and the experts have contributed to the creation and have validated the model already in the course of the interview.

The remainder of this chapter will present first the Implementation IQ application and then the Radboud University Medical Center one. First, a short introduction of the organisation providing the application is given. Then the application process model is presented, followed by an explanation of the comparison between the CCPM and the application. The chapter ends with a short conclusion section.

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### 4.2 IMPLEMENTATION IQ

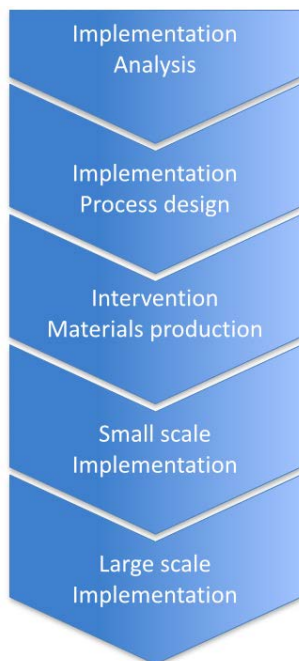
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Implementation IQ (IIQ) is rapidly developing as the innovation implementation expert for healthcare. In their fast growth towards servicing the complete innovation implementation process flow, depicted in Figure 16, they face the need for an innovation-specific, healthcare-specific change process strategy to enable the wide-scale implementation of innovation in healthcare. This strategy comprises a set of methods for change implementation that enable the successful long-term adoption and use of innovation. The application of the strategy in a concrete case, develops into an implementation project that can guarantee the *desired result*, of complete and long-term use of the innovation, and *efficient delivery*, within a certain budget, duration and resource use.

The first phase of the implementation process is the **Implementation Analysis**. In this phase the innovative product or service to be implemented is analysed with the help of a software tool called the Implementation Analyser. This analysis discovers the stakeholders of the innovation together with the sets of wishes and demands that they have regarding the innovation. Then the analysis determines the level of compliance of the innovation to the collection of wishes and demands of its stakeholders. It also assesses the amount of effort and the extent of the change that the stakeholders have to invest in order to adopt the innovation. The coupling of the compliance level and of the change investment help position the innovation at a certain level of embracement. This level of embracement portrays how the recipients perceive the

innovation and how ready this innovation is to continue the implementation process. A more detailed description of the Implementation Analysis is provided in Appendix 10.8.

FIGURE 16:  
IMPLEMENTATION IQ'S  
INNOVATION  
IMPLEMENTATION  
PROCESS FLOW



The second phase, the **Implementation Process Design**, embodies the design and definition of the implementation project steps and sequence. This phase is the one of particular interest to the master thesis research and is still to be completed with a concrete software tool. The comparison of the CCPM with the application of IIQ represents one step in IIQ's development of this phase, through theoretical support.

The third phase represents the production of the materials that are necessary for the practical implementation of the innovation in the healthcare field, materials such as presentations, reports, manuals, tutorials, etc. They can take different forms and vary in complexity from innovation to innovation. Implementation IQ provides the templates and enforces its expertise in guiding the fast, easy and professional production of all required materials.

The last two phases of the implementation process are the **Small-scale** and **Large-scale Implementation**, which represent carrying out and managing the implementation project in the designated healthcare institutions.

The scope of IIQ's strategy is wide scale innovation implementation. The first step in the development of this strategy is the mapping of the change implementation of an innovation within a single organisation. IIQ has developed through the synthesis of their experience and best-practice, an own change process model which they employ in the projects they consult with.

The graduation project, which delivers a literature-based conceptual model of the change process, represents for IIQ a scientific benchmark. For the master thesis, the change process model developed by IIQ is an application opportunity that can help bridge the gap between theory and practice and can offer discussion points and a base for the refinement of the CCPM towards a higher alignment with practice.

#### 4.3 IMPLEMENTATION IQ'S CHANGE PROCESS MODEL

The model presented in Figure 17 is the general change process model that IIQ applies in their work of guiding and consulting in innovation implementation projects in healthcare. The process is designed to maximise standardisation and it aims at minimising the organisation dependency. For a set innovation, the variation of the implementation in different healthcare organisations is minimum. That does not imply that "one model fits all", but that the process has been optimised to the minimum required degree of organisation-dependent adaptation.

The implementation project depicted in Figure 17 presents three levels of aggregation. The first level has three main phases: the **Adoption**, the **Operational Integration** and the **Normalization** phase. The **Adoption** and the **Normalization** phase are de-aggregated into another level of detail, while the **Operation Integration** phase is de-aggregated into two more hierarchical detail levels.

The **Adoption** phase encompasses three acceptance clusters of actions. Each cluster is followed by the decision to continue or to abort the implementation. In the innovation fit analysis cluster a check is performed to assess whether the innovation solves a problem that the organisation has, or if the organisation wants to have the innovation. This analysis takes a few hours of work and is performed through a check-list. The second cluster, the return on implementation analysis, is aimed at balancing the benefits brought by the innovation against the costs, both of buying the innovation and of implementing it. This cluster takes two to three working days. If the benefits outweigh the costs, the decision is positive and the implementation process continues. The last acceptance cluster of actions is the implementation project analysis in which an assessment is performed to establish whether the organisation is capable of carrying out the implementation project.

The **Operational integration** phase follows the **Adoption** and is composed of two sub-phases: the **Initiation** and the **Execution**. The **Initiation** starts with an announcement cluster aimed at marking the

moment and bringing awareness among the staff regarding the innovation implementation. Then a parallel formation of clusters follows. First a project team is formed. This team comprises a project leader and an IIQ consultant plus at least one representative of each stakeholder group. **Project adaptation** is the cluster where the organisation specific fine-tuning is done. The change team analyses the pre-defined plan and decides whether and what adaptations are required. In this cluster of actions it is decided how the deliverables will be achieved. The **Project planning** cluster defines the time-line of the activities and the resource allocation cluster the required resources. In parallel to this sequence of four clusters, a communication and a monitoring & issue handling clusters are performed. The **Communication** cluster encompasses all communication activities that support the first four sequential clusters. The **Monitoring and issue handling** cluster assesses whether the project is developing according to plan and creates changes for course-correction if issues arise.

The Execution sub-phase also starts with an announcement cluster that has the same purpose or awareness bringing as the one of the Initiation sub-phase. Then three clusters are executed in parallel. The **AACE cluster graph** stands for “Aware, Accept, Change, Embed”. This cluster contains the innovation-related required activities that have been revised and adapted in the project adaptation cluster of the Initiation sub-phase. It is called a cluster graph to underline the graph-like structure of actions that it contains. Figure 51 in Appendix 10.9 portrays an example of the content of the **AACE cluster**. This example describes the actions required to introduce the “BodyTwister” innovation in a healthcare organisation, an instrument aimed at helping nursing staff in elderly homes to move immobile patients faster and easier.

In parallel to the execution of the activities entailed by the **AACE cluster**, a **Communication** cluster and a **Monitoring & issue handling** cluster are again present and they serve the same purposes as the one in the Initiation sub-phase.

The **Normalization** phase, as the name denotes, aims at “normalising” the innovation, making it part of routine such that it is no longer regarded as something new or as change, but as a regular part of the work process. This phase also starts with an **Announcement** cluster that brings awareness about the progress of the project and about the status quo.

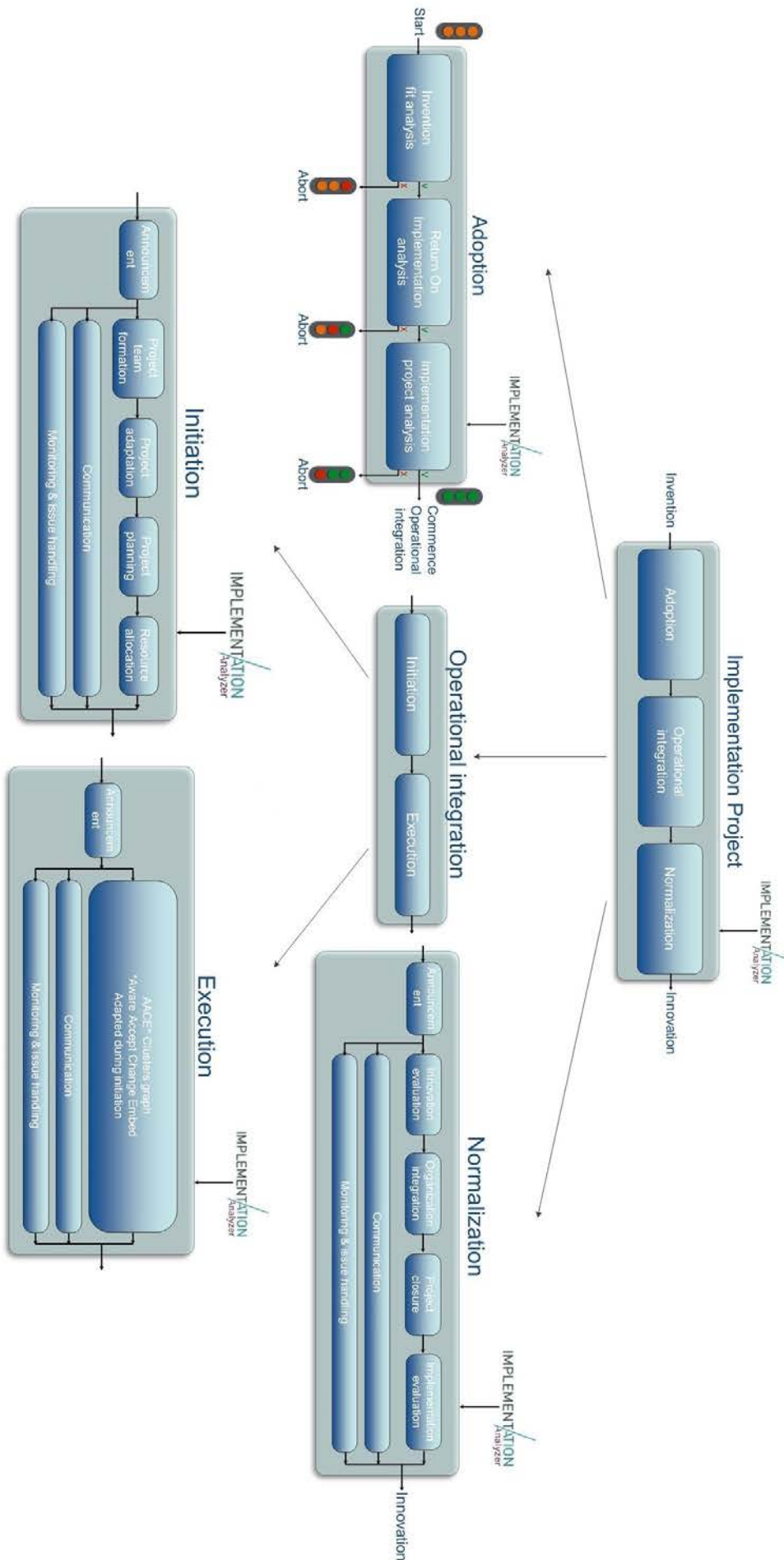
Similar to the **Initiation** sub-phase, after the **Announcement** cluster, the **Normalization** phase contains four sequential clusters which are executed in parallel with a **Communication** and a **Monitoring and issue handling** cluster of actions. The first cluster of the sequence is the **Innovation evaluation** cluster, which measures if and to what extent the innovation brings the benefits that were promised in the beginning of the implementation. The **Organisation integration** cluster contains innovation-dependent actions that are aimed at embedding the innovation into the work process. The result of this action is that the innovation becomes part of routine. The **Project closure** cluster contains actions aimed at dismantling the temporary structures required for the change process. This has also an important psychological role as it brings closure and recognition and the feeling of achievement, which all contribute to the long-term sustainment of the innovation. The **Implementation evaluation** is an action meant to assess the performance of the implementation process.

The **Communication** parallel cluster contains all required communication-related actions that support the four sequential actions. The **Monitoring and issue handling** cluster keeps track of development, monitors the progress and applies changes and corrections when deviations are observed.

Figure 17 shows that all phases and sub-phases receive input from the **Implementation Analyser**. The Implementation Analyser<sup>9</sup> is the software tool that IIQ uses to perform the pre-implementation analysis. This analysis is described in detail and portrayed in Appendix 10.8.

<sup>9</sup> [https://www.healthcareinnovationportal.nl/hip/wat\\_is\\_de\\_hip\\_analyse/](https://www.healthcareinnovationportal.nl/hip/wat_is_de_hip_analyse/)

FIGURE 17: IMPLEMENTATION IQ'S CHANGE PROCESS MODEL FOR THE IMPLEMENTATION OF AN INNOVATION IN A HEALTHCARE ORGANISATION



#### 4.4 COMPARISON BETWEEN THE CCPM AND IMPLEMENTATION IQ'S CHANGE PROCESS MODEL

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The mapping between the elements of the CCPM and the elements of the IIQ change process model can be seen in overview in Table 8 of Appendix 10.10.

The high level overview of the IIQ model (see Figure 17) presents a three-phase structure, similar to the CCPM, however the close examination of the elements will show that the **Adoption, Operational integration** and **Normalization** phases cannot be mapped one-on-one to the Pre-Execution, Execution and Post-Execution stages. The Pre-Execution stage of the CCPM extends beyond the **Adoption** phase and includes also the Initiation sub-phase of the **Operational integration** phase. Thus the Execution stage can be compared to the **Execution** sub-phase of the **Operational integration**. The Post-Execution stage fits the **Normalization** phase.

The **Invention fit analysis** corresponds to the first three clusters of the Pre-Execution stage: *Create Awareness, Assess Need* and *Formulate Proposal*. A decision point follows right after this element, while in the CCPM the first decision point is only three clusters later. These three clusters of actions, though, *Prove Advantage, Analyse Target Group* and *Check Fit to Organisation*, are all part of the Implementation Analysis. The Implementation Analysis is performed in IIQ's model before the start of the actual implementation process, which is depicted in Figure 17. Considering that, the first decision point is in the same logical location in both models. The order of the clusters is, however, different, with *Prove Advantage, Analyse Target Group* and *Check Fit to Organisation* happening before *Create Awareness, Assess Need* and *Formulate Proposal*.

The **Return on implementation analysis** element serves the same purpose as the *Evaluate* cluster. Just like in the CCPM, this element is followed by a decision point. The **Implementation project analysis** element corresponds to the *Check Fit to Availability* cluster and they are both followed by a decision point. The difference between the two models is in the flow of this section, as the IIQ model presents the correspondent of the *Evaluate* cluster before the correspondent of the *Check Fit to Availability*.

The **Announcement** element is present three times in the IIQ model, at the beginning of the **Initiation** and **Execution** sub-phases and at the beginning of the **Normalization** phase. In the CCPM this has one correspondence in the *Communicate adoption decision and management support* action of the *Show Political Sponsorship* cluster. At the beginning of the Execution and Post-Execution stages, no such announcement correspondent exists. But, at the end of the Pre-Execution stage, in the *Develop Execution Plan* cluster, there is the activity *Communicate Execution Plan*, which can partially correspond to **Announcement**. The announcement, though, seems to have a function beyond just that of communication and information, fulfilling also a motivational function.

The **Project team formation** element corresponds to the *Establish Team* and *Define Leadership* clusters. This element in the IIQ model requires the team to contain at least one representative of each group of stakeholders, requirement that is not present in the CCPM.

The **Project adaptation** element is not covered by the CCPM because the IIQ model assumes a pre-defined set of planned execution and post-execution activities that are merely adapted from one organisation to the next, while the CCPM assumes that the plan is organisation-dependent and developed at every implementation instantiation.

The **Project planning** element partially corresponds to the *Develop Execution Plan* and *Develop Post-Execution Plan* clusters. While the *Develop Execution Plan* comprises many actions, the Project planning element focuses only on time-line. The *Attribute resources* action of the *Develop Execution Plan* cluster corresponds to the next element in the sequence of the IIQ model, the **Resource allocation**.

The **Communication** element is portrayed in the IIQ model as a black box that comprises all communication-related activities, while the Pre-Execution stage explicitly presents four communication actions in four different clusters. The Execution and Post-Execution stage have a partially corresponding cluster in *Maintain Communication*, but in the CCPM the *Maintain Communication* cluster does not comprise all communication-related actions and some communication actions are still present outside of this cluster.

The **Monitoring and issue handling** element in the **Initiation** sub-phase has no correspondent in the CCPM, as the Pre-Execution stage is not monitored or assessed. The monitoring and issue handling is



performed in the CCPM only in the Execution stage. Such, the same element present in the **Normalization** phase is also not covered by the CCPM.

The **AACE clusters graph** element in the **Execution** sub-phase corresponds to the *Execute Planned Activities* cluster and, like the *Execute Planned Activities* cluster it is innovation-dependent. Thus its content cannot be described in general terms. It also corresponds to the *Create Capacity* and *Develop Team* clusters, thus placing these two clusters in the Execution stage, instead of the Pre-Execution stage, like in the CCPM.

The **Innovation evaluation** and **Implementation evaluation** elements of the **Normalization** phase correspond to the *Assess innovation KPIs* and *Assess implementation KPIs* of the *Evaluate* cluster. In the CCPM these two actions are performed simultaneously, while in the IIQ model they happen at different moments in time. The **Innovation evaluation** is performed first, and the **Implementation evaluation** is performed later, after **Organisation integration** and **Project closure**. The **Organisation integration** corresponds to the *Integrate* cluster and **Project closure** has no correspondent in the CCPM.

The IIQ model considers that the Initiation which corresponds to part of the Pre-Execution stage and the Normalization which corresponds to the Post-Execution stage also have to be monitored and course-corrected if necessary, while in the CCPM, only the Execution stage is being monitored and corrected. Also, the IIQ model considers the integration of the innovation relevant for the assessment of the implementation, while in the CCPM the assessment of the implementation is performed already before the *Integrate* and *Sustain* clusters. The rationale behind the IIQ 's model structure is that the integration and sustainment are also part of the project: require resources, effort and time, and thus count in the performance of the implementation project.

*Prove Advantage*, *Analyse Target Group*, *Check Fit to Organisation*, *Assess Readiness*, *Analyse Current Performance*, *Define Work Set-Up* and *Define Value* are all outside of the presented process model and part of the Implementation Analysis that is performed prior to the implementation. This is a matter of user experience and expertise. While IIQ represents the change agency that supports an organisation with the implementation and is thus the expert party, the CCPM has a wider user target group. The target of the CCPM is any party or stakeholder interested in implementing an innovation in a healthcare organisation. This user can represent the change agency, but also a staff member of the healthcare organisation or the innovator/developer of the innovation. Thus, if the user is less experienced than IIQ or does not have the support of IIQ, performing these six clusters of actions already prior to the implementation is not feasible.

The IIQ model in Figure 17 is presented in a lower level of detail than the CCPM. The mapping is rarely performed in terms of actions, most of the times in terms of clusters of actions. The IIQ model is missing the following elements that are present in the CCPM: *Motivate for Change* cluster, *Maintain Motivation* cluster, *Provide Support* cluster and *Sustain* cluster. Although they are not explicitly depicted in the IIQ model, some of the functions of these missing clusters are being performed by other elements. The motivation element is to a certain extent contained in the Announcement clusters of the IIQ model as well as in the content of the AACE clusters graph. The support element is contained in the AACE clusters graph and is also inherent to the very involvement of IIQ in a project, as it acts as a facilitating expert taking over the planning and even the execution of many actions. The sustainment element is assumed as implicit to the Normalization phase, such that the execution of the content of the Normalization phase will automatically result in sustainment.

The low level of detail of IIQ's change model is ,however, compensated by a very high level of detail of the Implementation Analysis, which is not visible in the change process model in Figure 17. The seven clusters of the CCPM that are covered by the Implementation Analysis are treated in the **Implementation Analyser** tool in much more detail than they are treated in the CCPM. The Implementation Analysis (see Appendix 10.8) has a very complex flow, in which the performed actions are strongly linked to the stakeholder definition. Thus, the *Analyse Target Group* correspondent incorporates the other six cluster's correspondents, as every action is executed from a certain stakeholder perspective. The correspondent of the *Perform Stakeholder Analysis* action is much more detailed in the Implementation Analysis than in the CCPM. This entails a stakeholder definition per level of involvement with the innovation, an identification of a complex set of wishes and demands per each stakeholder, an assessment of each wish and demand that results in a rating and an assessment of the amount of effort the innovation requires from each stakeholder. This can be translated into four separate actions. The concept of "stakeholder" used by IIQ is wider than the concept of "target group" used in the CCPM, such that every role and entity constitutes a stakeholder in the Implementation Analysis and is treated as such. The advantage proving, the fit check, the readiness check, the work set-up definition and the value definition are, thus, performed per each stakeholder, while in the

CCPM that applies explicitly only for *Extract determinants and barriers* and *Establish buy-in level*. The “intelligence” resulted from this very detailed analysis is then fed forward into every action of all phases and sub-phases, making the actual level of detail of the IIQ model much higher than portrayed in the change process model of Figure 17. The content of the analysed literature from which the CCPM is developed does not provide such a high level of detail as the Implementation Analysis. Furthermore, the integrative methodology employed for the analysis, prevents an aggregation discrepancy between different sections of the CCPM (no more than three levels of aggregation are possible). All identified differences are considered as potential improvement points for the refinement of the CCPM, which is detailed in chapter 6.

Despite all the identified differences, the similarities of the two models are strong and many elements of the CCPM are validated by the IIQ model. The three-stage structure is supported, as well as most of the clusters of actions and the three decision points. With some exceptions the flow is generally similar as well. Some of the differences stem from a difference in perspective rather than disagreement, since IIQ is an expert in the field while the CCPM is addressed to a generic user with unknown experience level.

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#### 4.5 RADBOUD UNIVERSITY MEDICAL CENTER

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The REshape & Innovation Center is a program set up by the Radboud University Medical Center with the purpose of facilitating the uptake of (mainly technology based, but not only) innovations in the healthcare field to help solve the issues it is confronting, like increasing demand, decreasing budgets and shortage in skilled personnel. The work and research performed by the team of experts at REshape & Innovation Center is patient-centred: with the aim of embracing the patient, their family and informal care into the healthcare team, which they call ‘Patient as Partner’ mentality.

“We nurture the [REshape] movement by setting up conferences to exchange thoughts, visions and listen to each other. But also by doing research on the different aspects of participatory healthcare which helps to move forward. As a vehicle for the (needed) changes we are scouting, inventing and sharing innovations (inter) nationally to improve healthcare”<sup>10</sup>.

Together with their internal implementation partner consultancy group “Procesverbetering & Innovatie” (Process improvement and innovation - PVI), the REshape & Innovation Center experts act as change agency in the innovation implementation projects that they assist with at Radboud University Medical Center (Radboud UMC).

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#### 4.6 ONLINE COMMUNITIES INNOVATION AT RADBOUD UNIVERSITY MEDICAL CENTER

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The REshape and Innovation Center and the consultancy group at Radboud UMC have supported the implementation of a series of online communities innovation. Figure 18 depicts the process model followed for this implementation. 50 communities have been set up, each representing a certain patient group or diagnosis. The community serves to easily bring together and establish communication and information exchange between patients, caregivers and medical professionals. The idea for the innovation was developed by the managerial board of Radboud UMC as a means to better accomplish the ‘Patient as Partner’ mission. Soon after the concept was mature and the scope of 50 communities was set, a developer was searched that could help with the building of the innovation, especially from a technical perspective. For that purpose, MijnZorgnet<sup>11</sup> was selected.

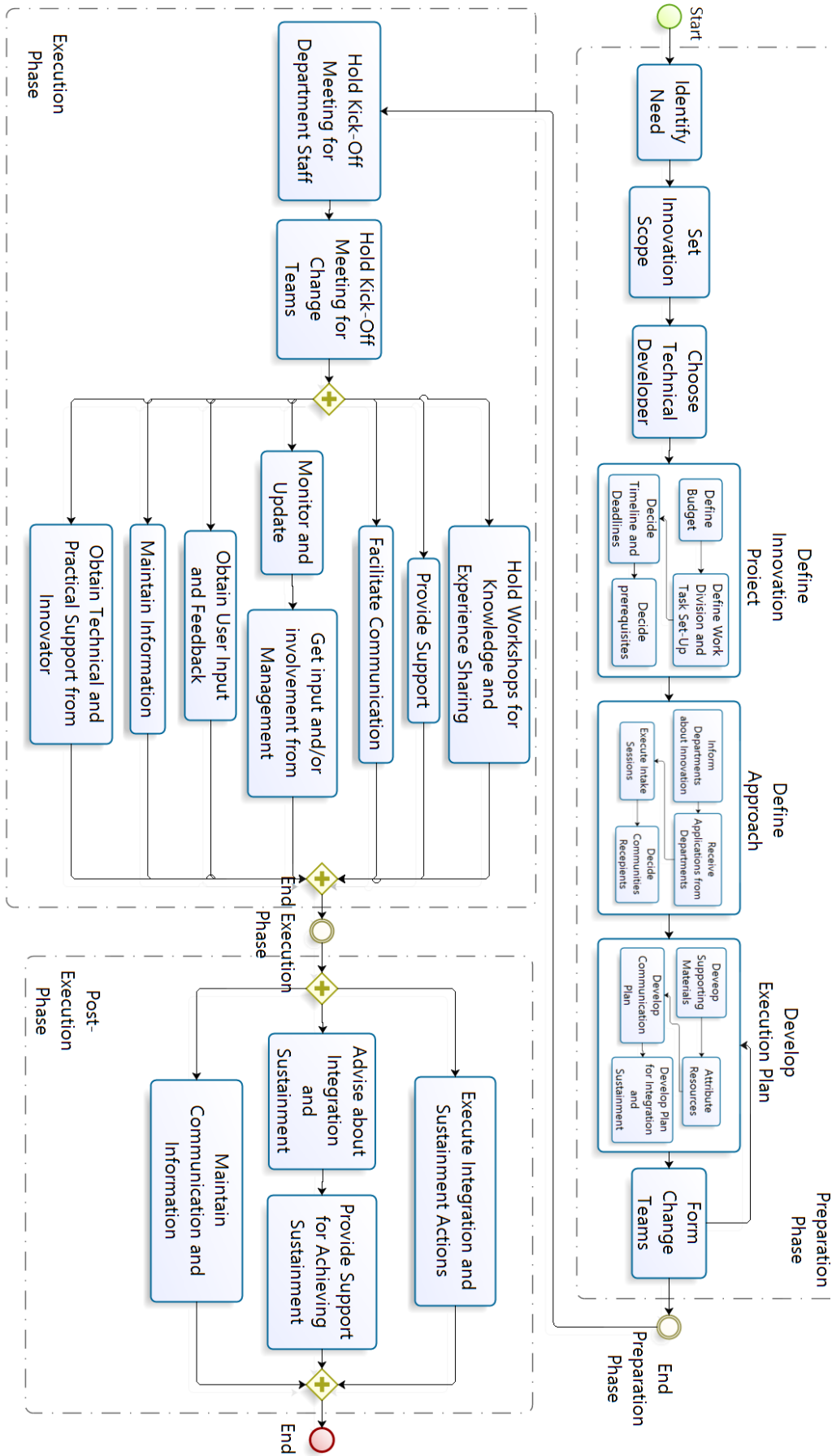
After that, the Innovation Project was defined, in terms of budget, work division and task set-up and in terms of timeline and deliverables deadline. Also the prerequisites were decided, by which a certain applicant department would be selected to receive support in developing a community. The approach of the project was a program type, meaning that a series of supporting activities would be performed by the change agency, the innovation and implementation experts, for the benefit of all recipient departments. The departments were informed about the innovation and the interested departments sent in an application to receive support in setting up a community. Intake sessions were performed to decide based on the prerequisites (motivation and dedicated resources) which departments would be selected to receive support.

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<sup>10</sup> <http://radboudreshapecenter.com/about/>

<sup>11</sup> <https://www.mijnzorgnet.nl/>

FIGURE 18: IMPLEMENTATION PROCESS FOR THE COMMUNITITES INNOVATION AT RADBOD UMC



An Execution Plan was developed by the consultancy group PVI, which included supporting materials, resource attribution, communication plan and a plan for integration and sustainment. After that, the change teams were formed, one per each department and community. After the formation of the team, the execution plan was revisited and improved with the help of the teams, so that it would satisfy the specific needs of each department. This concluded the Preparation phase.

The Execution phase started with a kick-off meeting for the staff members of the departments that were implementing a community. This was optional and given only to the departments that have requested one. Then, a kick-off meeting was arranged for the change teams, with the purpose of informing and discussing the execution plan. Next, a series of three workshops were provided to the change teams with the purpose of knowledge sharing and skill development. The first workshop was directed at providing the knowledge and skills needed to set-up the virtual community. The second workshop was focused on attracting members to the community. The third workshop was directed at monitoring the activity of the community and sustaining it over time.

In parallel to these workshops, support was provided by the experts in terms of conceptual elements of the virtual community, content of the websites and desired functionality. Also, the experts facilitated the communication between the stakeholders by attending and sometimes moderating their meetings, like the meetings of the departments that were implementing a community. The experts performed also a monitoring of the activity, reported the progress to the management and provided them with updates. Based on that, if needed, the management provided input or support. Also, the input of the users was obtained, like the patients, caregivers and the medical professionals that would be the members of the community. This input was used for the improvement of the community. The experts have also maintained the information about the communities and their progress to all the stakeholders. Support was also offered from the innovator's side with technical and practical aspects of the virtual communities.

The Post-Execution phase was the responsibility of each department and change team and the experts have only provided support in parallel to the execution of the actions directed at integration and sustainment. The experts have provided advice and support to the change teams, which was directed at achieving sustainment and have also maintained the communication among the stakeholders and have kept them informed about the post-execution progress.

#### 4.7 COMPARISON BETWEEN THE CCPM AND THE COMMUNITIES INNOVATION IMPLEMENTATION PROCESS

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The mapping between the elements of the CCPM and the ones of the Communities innovation can be seen in a quick overview in Table 9 of the Appendix 10.11.

The Communities innovation implementation process starts with an **Identify Need** activity that partially corresponds to the *Identify Need* activity of the *Assess Need* cluster in the CCPM. The need identification in the communities implementation was a lot more complex, including also the development of the innovation concept. The management board that performed this action already decided that the innovation would be a virtual community, which will bring together all relevant stakeholders and also defined the innovation as necessary. Thus, all the persuasion-related activities in the CCPM, like the *Create Awareness* cluster, *Portray use of innovation*, *Prove Advantage* and *Check Fit to Organisation* clusters become redundant for this case.

Next, a **Set Innovation Scope** activity was performed in which the management board decided upon the number of such communities that would receive the financial support, namely 50. The CCPM assumes an inner scope definition that is established through the nature of the innovation, e.g. in the case of an innovative new scalpel, the scope would be every surgical kit available in the organisation. However, in the case of service-like innovations a scope definition can be relevant as part of the process model.

The following action is **Choose Technical Developer**, which also has no correspondence in the CCPM. The CCPM does not consider internally-driven innovations and this action applies only to this scenario.

The **Define Budget** element is partially correspondent with the *Perform financial evaluation* activity of the *Evaluate* cluster, though the financial evaluation is more complex than a budget definition. It also corresponds partially to the *Decide implementation KPIs* action of the *Develop Execution Plan* cluster, as the budget can be equivalent to cost, one of the implementation-relevant KPIs. In the case of the Communities innovation, there was a strong desire and high management commitment, so the evaluation, in the sense of

balancing cost versus benefit, was performed implicitly in the need identification action. Thus, the adoption decision preceded the entire implementation process. For this reason, some other actions aiding in the adoption decision-making of the conceptual change process were omitted, like those of the *Prove Advantage* and *Analyse Target Group* clusters.

The **Define Work Division and Task Set-Up** element was mapped against three activities of two different clusters. In the case of the Communities innovation, the division of work and the task definition was shared between parties, rather than between the individual members of a team. The three parties of this division were the REshape Center as change agency, the PVI-Process Improvement and Innovation Center, also as change agency, and MijnZorgnet, as technical developer of the innovation. Each received a certain workload and set of responsibilities, thus the mapping against the *Decide structure and roles*, *Define new work structure* and *Define new responsibilities* actions of the *Establish Team* and *Define Work Set-Up* clusters.

The **Decide Timeline and Deadlines** element corresponds to the *Establish timeline* activity of the *Develop Execution Plan* cluster, but the **Decide Prerequisites** element does not have a correspondence in the CCPM. The prerequisites were a set of characteristics that a certain applicant department had to fulfil in order to be selected to receive support in building a virtual community. So, this activity is entirely innovation-dependent and thus outside the scope of the CCPM.

Among the activities of the **Define Approach** element, only the **Inform Departments about Innovation** has a correspondent in *Communicate adoption decision and management support* of the *Show Political Sponsorship* cluster, while the other three actions are not applicable, being innovation-dependent.

In the **Develop Execution Plan** element **Develop Supporting Materials** and **Attribute Resources** correspond to *Attribute Resources* of the *Develop Execution Plan* cluster, and **Develop Plan for Integration and Sustainment** corresponds to the *Develop Post-Execution Plan* cluster. The **Develop Communication Plan** element, however, is not covered in the CCPM. The CCPM does have an action of communicating the execution plan, but it does not entail the development of a plan especially for communication.

The **Form Change Teams** corresponds to the *Establish Team* cluster, with the observation that in the case of the Communities innovation, the implementation process was composed of a series of 50 parallel sub-implementations per department. Thus, 50 change teams were formed.

The **Hold Kick-Off Meeting for Department Staff** and **Hold Kick-Off Meeting for Change Teams** partially correspond to the *Communicate Execution Plan* activity of the *Develop Execution Plan* cluster. However, the Kick-off meeting is more exact than the communication activity of the CCPM, which does not give an indication of how the communication should be done. Also, in the Communities innovation implementation, these two actions are the first in the Execution phase, while in the CCPM, the communication activity is still part of the Pre-Execution stage.

The **Hold Workshops for Knowledge and Experience Sharing** element corresponds to the *Create Capacity* cluster. The knowledge transfer and skill development is achieved through the workshops, while the experts holding the workshop are the external support and resources of the *Create Capacity* cluster. Again, this action is in the Communities innovation part of the Execution phase, while in the CCPM it is part of the Pre-Execution stage still.

The **Provide Support** element corresponds to both *Provide external support & resources* activity of the *Create Capacity* cluster in the Pre-Execution stage and to the *Provide Support* cluster of the Execution stage. The support that the experts provided was innovation-dependent and had also a psychological-safety-creation impact.

The **Facilitate Communication** element corresponds to the *Maintain Communication* cluster and the **Monitor and Update** element to the *Monitor Implementation Performance* cluster. The **Maintain Information** element is also covered by the *Maintain Communication* cluster. The **Obtain Technical and Practical Support from Innovator** could be covered by the *Provide support* cluster, although in the CCPM this cluster contains little (only one) low-level information about how this support can be achieved. Support in terms of technical help can constitute a useful addition to the cluster, improving its specificity. The **Get Input and/or Involvement from Management** and **Obtain User Input and Feedback** elements are not covered by the CCPM, although they are not innovation-dependent and can be applicable to any generic innovation. In the analysed literature, user involvement was recommended in the development of the innovation, which was outside the scope of the CCPM. However, user involvement in implementation

could still be of value for certain cases, especially when the innovation has a parameterization and customization possibility.

The **Execute Integration and Sustainment Actions** element corresponds to the *Execute Integration Action Plan* of the *Integrate* cluster and to *Execute Sustainment Action Plan* of the *Sustain* cluster. In the case of the Communities innovation, the experts were not involved in this activity and have only provided additional support in terms of **Advice about Integration and Sustainment, Provide Support for Achieving Sustainment**, which have no correspondent in the CCPM and **Maintain Communication and Information**, which corresponds to the *Maintain Communication* activity in the *Integrate* cluster.

Overall, the CCPM is presented in more detail than the implementation process of the Communities Innovation and it contains more actions and clusters of actions. This can be the case because the Communities innovation has a strong management “push”, which reduced the pre-adoption complexity, eliminated the decision points of the model and simplified other steps in the process as well. Also, the implementation process for the Communities innovation presented here has been developed based on the experience and accounts of the experts only, which have had a change agency role. The experience and accounts of other roles involved in the implementation, like the change teams or the management of the departments involved could have helped to paint a more complex and more detailed picture. In the Execution Phase of the Communities innovation implementation process there is no explicit cluster of actions aimed at actually developing the virtual community as a tool, which in reality did happen of course. From the perspective of the experts, this cluster acts as a black box just like the *Execute Planned Activities* cluster of the Execute stage of the CCPM. The perspective of a member of one of the change teams could have revealed a complex sub-process as part of that cluster. The same applies for other sections of the process, e.g. the execution of the sustainment-oriented actions.

The CCPM covers 20 out of the 30 elements of the Communities innovation and most of the elements left uncovered are outside the scope of the CCPM by being innovation- and case-dependent. When this dependency is factored in, only four elements remain uncovered in general terms, which denotes a very good fit between the two compared process models. The application supports the three stage structure, the general flow and the parallel structure of the elements in the Execution stage.

#### 4.8 APPLICATION CONCLUSION

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Based on the discussion of sections 4.4 and 4.7, it can be concluded that the CCPM is practically applicable. On the one hand, the two applications both support the three-stage structure of the CCPM, the majority of the clusters of actions and the general flow of the CCPM. On the other hand, the CCPM covers the majority of the elements of the first application and two thirds of the elements of the second one. This can be seen in the comparison overviews of Appendices 10.10 and 10.11. The amount and impact of the identified similarities is higher than the one of the differences. Some of the differences stem from the approach followed by the applications, the first one belonging to an expert implementer and the second following a simplified adoption path through a strong management push. All difference points constitute potential improvements. They are assessed and partially translated into refinement points in the improved version of the CCPM. This refinement is detailed in chapter 6.

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## 5 EVALUATION

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### 5.1 EVALUATION METHODOLOGY

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The evaluation performed in this chapter is twofold: a theoretical evaluation and an empirical evaluation.

The theoretical evaluation is performed through a cross-check content analysis (Grbich, 2007) between the elements of the CCPM with the elements of the *conceptual model for the spread and sustainability of innovations in health service delivery organisation* of (Greenhalgh et al., 2004). The theoretical evaluation maps the elements of the *conceptual model for the spread and sustainability of innovations in health service delivery organisation* against the elements of the CCPM in order to increase the completeness of the CCPM content by uncovering refinement possibilities and further research points & directions that can expand the CCPM. The mapping has been performed by comparing the explanations or descriptions given for each element by (Greenhalgh et al., 2004) with the descriptions of each action and cluster of actions given in section 3.2. The motivation for choosing this particular model as the tool for the theoretical evaluation is presented in the following section.

The empirical evaluation is performed through semi-structured expert interviews (Kothari, 2004). Four experts in the field of innovation implementation in healthcare have provided feedback for the CCPM. Two of the experts are consultants at IIQ, different from the supervisor of the graduation project, and the other two experts work as consultants at PVI and the REshape and Innovation Center of the Radboud UMC. All four experts have been presented with the CCPM in its final format. Based on a verbal description and explanation of the model during the interview, the experts have answered a set of pre-defined questions and have provided comments and improvement suggestions stemming from their practical experience with the implementation of innovations in healthcare. The description of the model provided in the interviews follows the one presented in Chapter 3.2. The purpose of the practical evaluation is to check the CCPM's practical usability, usefulness for the end-user and to bridge the gap between theory and practice from a user perspective by extracting improvement points to be used for the refinement of the CCPM.

Both evaluations uncover potential improvement or development points. Similar to the ones revealed by the Application, these improvement aspects are assessed and partially transformed in refinement points, which will be discussed in chapter 6.

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### 5.2 THEORETICAL EVALUATION

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This sub-chapter presents a theoretical evaluation of the CCPM achieved through the comparison with (Greenhalgh et al., 2004)'s *conceptual model for the spread and sustainability of innovations in health service delivery organisation*.

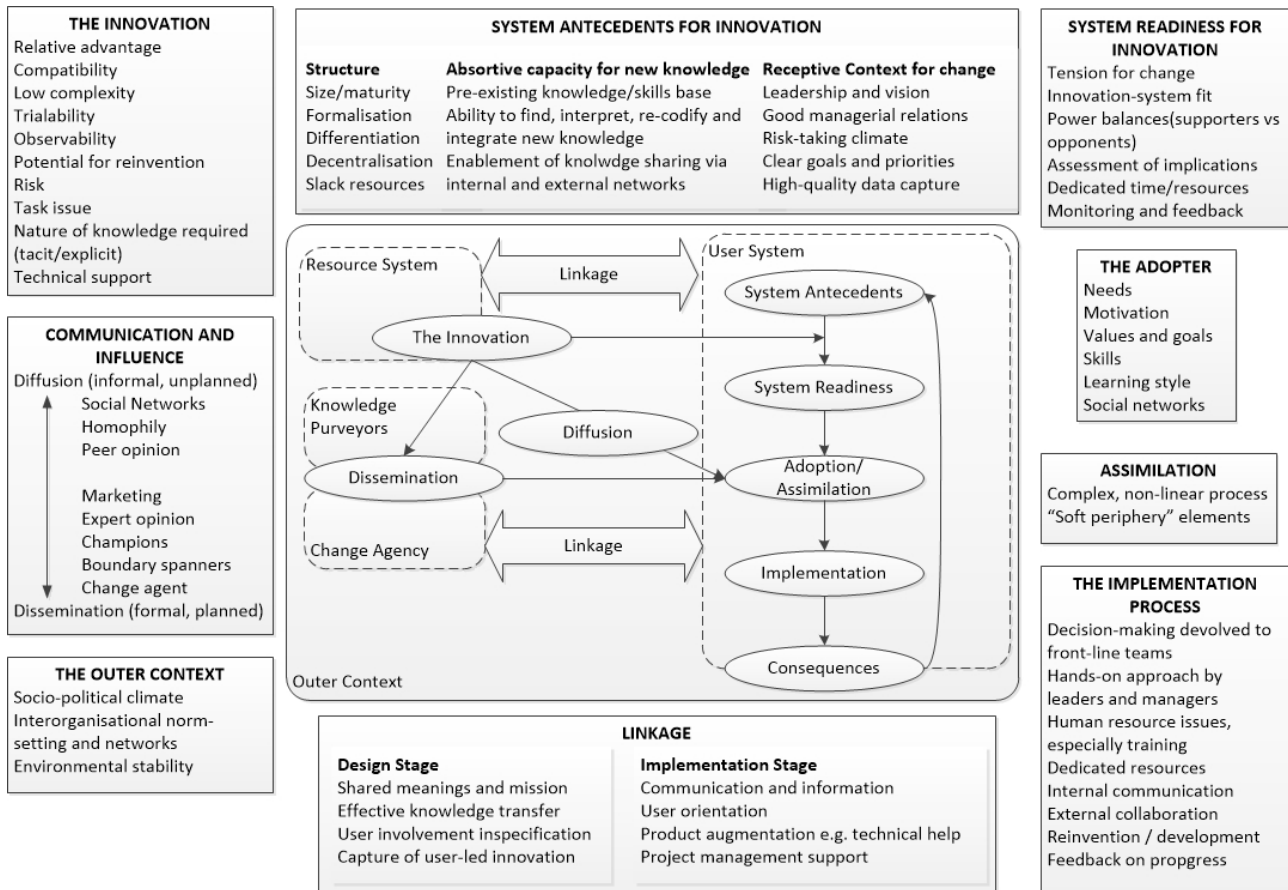
Sir Liam Donaldson, Chief Medical Officer at the UK's NHS Department of Health, states about the work of (Greenhalgh et al., 2004) that "this book is a towering work of remarkable scholarship. It bathes in light what was previously a shadowland of opacity, misconception, theory-hopping and misplaced enthusiasm". The literature review performed by (Greenhalgh et al., 2004) is highly relevant for the research of the master project through its innovation focus and healthcare context. It has already provided the scientific motivation of the research as well as several additional literature sources for the analysis. It is the most comprehensive result of all the literature investigated in the master project, incorporating over 1,000 papers. However, the detail level of the resulting model, complemented by extensive free text explanations, is much higher than the detail level of the other healthcare-related models in group G<sub>1</sub>. This strong aggregation discrepancy led to the decision of not including the Greenhalgh model in the literature integration. At the same time, this high level of detail is what makes the model distinctively valuable. This, coupled with the comprehensiveness and high reliability instilled through the systematic and rigorous research methods employed, makes the model a highly suitable candidate for a theoretical evaluation tool.

Because the (Greenhalgh et al., 2004) model does not take a process approach, the evaluation can only be performed in terms of contained elements and not in terms of process flow. The (Greenhalgh et al., 2004) *conceptual model for the spread and sustainability of innovations in health service delivery organisation*, has also a wider scope than the CCPM, so a one-on-one mapping is not possible. The (Greenhalgh et al., 2004) model, portrayed in Figure 19, synthesizes all elements found in literature to positively contribute or to influence the success of the innovation spread and sustainability, while the CCPM contains the elements

that contribute to the success of the single-organisation-implementation only. However, the mapping and especially the differences identified, can give an indication of refinement and further research points.

For this purpose, the current sub-chapter will focus on the differences rather than similarities and discuss if and how these difference points can contribute to the refinement of the CCPM or can constitute a topic for further research. For each group of elements of the (Greenhalgh et al., 2004) model, the differences will be discussed.

FIGURE 19: THE (GREENHALGH ET AL., 2004) CONCEPTUAL MODEL FOR THE SPREAD AND SUSTAINABILITY OF INNOVATION IN HEALTH SERVICE DELIVERY ORGANISATION



### The Innovation

The Innovation group present in the upper left corner of the (Greenhalgh et al., 2004) model summarises the characteristics of an innovation which increase the success of the spread and sustainability. This is the first out-of-scope group of elements and possible further investigation point. The scope of the master thesis research has been set to a definition of implementation that assumes the pre-existence of a fully-developed innovation and which excludes any innovation-development elements. However, for internally developed innovations or for the case of a close cooperation between the inventor and the healthcare organisation, an extension of the implementation process could include innovation-oriented development actions. Thus, further research could focus on expanding the scope of the change process model beyond implementation, such that it includes the innovation development process: *a change process model for the development and implementation of an innovation in a healthcare organisation*. This research would require investigating if and how the development influences the implementation and vice-versa.

### Communication and Influence

Another difference point is the **Marketing** element of the Communication and Influence group. This element has the same purpose as the *Create Awareness* cluster, of informing about the existence and advantage of the innovation. The Marketing element brings in addition the property of "tailoring of message, medium and messenger to particular audience" (Greenhalgh et al., 2004), which is not made explicit in the *Create Awareness* cluster. This can constitute a refinement point for the CCPM.

The **Expert opinion** element refers to the usage of prestige people or sources to reinforce the value of the innovation and confirm its advantage, which is also the purpose of the *Explain research evidence* action in



the *Prove Advantage* cluster. However, the naming of the *Explain research evidence* action is somewhat restrictive and it is not made clear to the user that the scope can be increased to individual expert's own opinion and not just formal research. This too can constitute a refinement point.

#### The Outer Context

The **Inter-organisational norm-setting and networks** element is not covered by the change process model, because it falls outside of the scope of the research, which only includes one healthcare organisation. This element applies particularly for informal or internally developed innovations, which again are outside the scope of this research. This element can be of interest for further research in the context of scope expansion to innovation development.

#### System Antecedents for Innovation

The **Size/maturity, Formalisation, Differentiation** and **Decentralization** elements can be covered in the *Assess organisational readiness* action of the *Assess Readiness* cluster, but are not specifically named in the change process model. Although (Greenhalgh et al., 2004) present evidence that an influence exists, the exact dependency is not clear, so further investigation would be needed to determine how the assessment based on these criteria could be done.

The **Ability to find, interpret, recodify and integrate new knowledge** element is quite detailed compared to the rest and can be covered both by the *Assess capability readiness* action of the *Assess Readiness* cluster and by the *Develop Skills* action of the *Create Capacity* cluster. They are however not specifically named in the process model and it is still to be investigated how these abilities can be generally measured or developed.

#### The Adopter

The element of **Learning style**, and especially the implications of its variation among the staff is not addressed in the change process model and can constitute grounds for further research. Specifically, how can the learning styles applicable among the staff be uncovered and how can the knowledge transfer and skill development be adapted to these different learning styles.

The **Social Networks** element is also not present in the change process model. However the evidence in favour of this element is applicable to the informal diffusion of the innovation, rather than the planned dissemination. The change process model is a tool for planned dissemination, thus this element is not applicable.

#### The Implementation Process

The element of **Hands-on approach by leaders and managers** is partially covered by the *Demonstrate leader and management engagement* of the *Maintain Motivation* and *Sustain clusters*. However, "hands-on" goes beyond engagement to include active participation. This can be part of the *Execute Planned Activities* cluster, which is organisation-dependent and outside the scope of the change process model. Further research that includes organisation specification can include this element.

The **Reinvention/development** element refers to the possibility of the innovation to evolve and grow. Since this element is innovation-dependent, it is outside the scope of this research and can be included in further research.

#### Linkage

Although the elements of **User involvement in specification** and **Capture of user-led innovation** are outside the scope of the change process model, being innovation-dependent, the user involvement concept can be applied to the implementation as well. Thus, the user involvement in the implementation can be a refinement point for the change process model.

The **Product augmentation** element is outside the scope of the change process model and can constitute ground for further research that includes the innovation development.

The remaining elements in the (Greenhalgh et al., 2004) model and the complete mapping of each element have been documented in Table 10 of Appendix 10.12. From the 54 elements of the (Greenhalgh et al., 2004) model, only 6 are not covered by the CCPM and 9 are covered partially. All clusters of the CCPM correspond to an element of the (Greenhalgh et al., 2004) model, except the *Develop Post-Execution Plan* cluster. The CCPM presents a higher level of detail and specificity than the (Greenhalgh et al., 2004) model, as only 22 of the 81 actions could find a correspondent in the (Greenhalgh et al., 2004) model.

### 5.3 EMPIRICAL EVALUATION

*“Every model is wrong, but some are useful” – George Box, industrial statistician*

The four experts have been interviewed in three sessions: the first interview session was performed with the two IIQ experts together, the second and the third interview with the Radboud REshape & Innovation Center experts separately. The interviews followed a semi-structured protocol, in which the following aspects have been tackled systematically: the clarity of the model, content completeness, process flow, usability and practical usefulness. The questions asked and a summary of each interview can be found in Appendix 10.13. The discussions of each interview have been summarised and the points extracted structured in two categories: change suggestions and general points. The observations and suggestions are combined and presented below per CCPM element, in the order of the CCPM flow.

#### Pre-Execution Stage

For the first group of elements in the CCPM, the parallel formation of the clusters *Create Awareness*, *Assess Need* and *Formulate Proposal*, the opinions are divided: experts 1 and 2 propose the sequence *Assess Need*, *Formulate Proposal* and *Create Awareness* in this order while experts 3 and 4 proposes *Create Awareness* and *Assess Need* in parallel, then *Formulate Proposal* after. Experts 1 and 2 assume a “pull” scenario, in which the need is the one that attracts the introduction of a certain innovation, while experts 3 and 4 recommend the parallel formation for the first two clusters in order to cover both scenarios of “pull” and “push”, in which the innovation is first introduced to the decision maker and then he/she decides whether a need exists for that particular innovation.

Experts 1 and 2 suggest that *Prove Advantage* is relevant to the *Describe innovation and advantage action*, and should thus be in parallel with the *Create Awareness*, *Assess Need* and *Formulate Proposal* sequence. Furthermore, they see the action *Portray use of innovation* as part of *Describe innovation & advantage* and suggest that the two can be merged.

The IIQ experts believe that the *Analyse Target Group* cluster should also include the *Define Work Set-Up* and *Define Value* clusters and that a decision point should follow right after that. Experts 3 and 4 do not advocate the merge. Expert 3 suggests that the cluster of *Check Fit to Organisation* could be placed before *Analyse Target Group* because it is less effort consuming and can already reveal a reason for abandonment of the implementation, while Expert 4 thinks that *Check Fit to Organisation* cluster could be part of the *Analyse Target Group* one.

Experts 1 and 2 see the action of *Check fit to mission/vision/goals* belonging together with the actions of the *Check Fit to Availability* cluster, under the cluster name *Check Fit to Organisation*, while the action *Check fit to local/regional/national directives* can be separate in a Check Environmental Status cluster. Expert 3 suggests that the *Check Fit to Availability* cluster could contain decision points inside, for example one after *Check financial resources*, based on the assumption that the financial check is more important than other 3 checks. The 4<sup>th</sup> expert, however, thinks that this importance varies from case to case and the financial aspect is not always the crucial one and thus suggests that, in order to cover all possibilities, nothing should change in terms of decision points.

Expert 3 suggests that the action *Perform financial evaluation* of the *Evaluate* cluster could be carried out earlier in the process. Expert 4 acknowledges that this indeed happens in practice, but warns that an early execution of this action can prove shallow or misleading due to lack of important insight at an early stage. Experts 1 and 2 propose to add a human resource evaluation within the *Evaluate* cluster and to rename it *Evaluate Added Value*.

Regarding the *Show Political Sponsorship* cluster, experts 1 and 2 explain that the current approach might be too “top-down” and that the support of the staff has to be actively obtained. In other words the current two actions of this cluster might not be enough to guarantee the support of all relevant staff. Expert 4 does not see it as an insufficient measure, but does emphasize the importance of this step in the process. The impression made by the management or decision-making-body to the staff in this step is crucial for the rest of the process, thus this step has to be treated with special attention.

All four experts agree on the fact that the *Analyse Current Performance* cluster is better placed after the *Establish Team* cluster, because in practice the current performance assessment is performed by the change team or at least with involvement from the change team and the leader.

The *Assess Readiness* cluster attracted similar observations from experts 1, 2 and 3. All three suggest that the readiness assessment is performed in practice at an earlier stage and all three indicate the *Analyse Target Group* cluster as a suitable step in the process for this assessment. Expert 3, however, points out that the cultural readiness poses difficulties in assessment at an early stage and that for this particular assessment the current location is better suited. Thus a separation is suggested by this experts, in which the organisational and the capability assessments could be moved to the *Analyse Target Group* cluster and the cultural readiness assessment would remain at its current location.

Expert 3 suggests that the *Develop Team* cluster would be better placed closer to the *Establish Team* cluster, because the sooner the group forms a strong bond and becomes an actual team, the better. Thus, it could be moved before the *Motivate for Change* cluster.

The *Define Value* cluster is seen as having an ambiguous naming by expert 3. The same expert suggests that the *Identify value related to innovation* could be performed at an earlier stage, while the *Communicate and discuss value* is very well placed currently. This is partially supported by experts 1 and 2, who suggest that the entire *Define Value* cluster be part of *Analyse Target Group* cluster.

Expert 3 is missing the point in the process where the vision is explicitly defined. The key advocated and power groups are in practice dependent on this vision definition and expert 3 suggests that the vision definition could be performed in the proximity of the *Show Political Sponsorship* cluster.

Expert 4 points out regarding the *Establish Team* cluster that using only the advocated and power groups, so people strongly in favour of the change, in the team formation is not necessarily optimal. Sceptic people and even people opposed to the change are very useful in the change team because they can bring forth a different point of view that other staff also has and can thus make it easier for the change team to be prepared to deal with objections and concerns coming from people opposed. This can help strengthen the arguments and be better prepared for upcoming challenges.

Both expert 3 and 4 point out that in practice the innovation-related KPIs and the implementation-related KPIs are not distinguished between. This “separation of concerns” does not occur. Expert 4 explains that many times the implementation KPIs are reduced to a certain budget attributed by the management, thus this budget dictates the implementation by setting limits within which the implementation needs to be performed.

As a last observation regarding the Pre-Execution stage, experts 1 and 2 point out that the *Develop Post-Execution Plan* cluster, although very important for the success of the implementation, is very often forgotten in practice and that little knowledge exists in practice about the development of this plan.

#### Execution Stage

Both experts 3 and 4 point out that the communication of positive intermediate results in the *Maintain Motivation* cluster might not be enough and that the potential negative intermediate results also have to be presented. Expert 3 suggests that the *Manage Problems* cluster is an appropriate place to deal with the negative results and their communication. Furthermore, the feedback collection could be outside of the *Manage Problems* cluster, the positive feedback can be part of the *Maintain Motivation* cluster and the negative one could be dealt with in the *Manage Problems* cluster.

Regarding the *Provide Support* cluster, the only cluster in the CCPM that has only one action, experts 1 and 2 suggest that the *Provide psychological support* action can become part of the *Maintain Motivation* cluster, thus removing the *Provide Support* cluster altogether. Expert 4, however, sees this cluster as very important in practice and suggests that there are other forms of support that can be added to this cluster, like financial support or demonstrating recognition, by offering a free day or organising an event for the change team and/or the staff involved, and thus the cluster should not be removed, but enriched.

Expert 4 points out that the *Demonstrate leader and management engagement* action in the *Maintain Motivation* cluster is of special importance and should definitely be a mandatory part of every implementation.

Expert 3 points out the *Maintain Communication* cluster as crucial, especially when the change team contains external members, so change-agency representatives. The *Provide updates* action is very important and should be part of every implementation.

Expert 4 explains that in practice the focus is often on the operational aspects and less on the people and the “soft” aspects of change, which can be a great threat to the success of the implementation.

### Post-Execution Stage

Expert 1 and 2 propose that the *Leverage lessons learned for integration* is not sufficient and that an action is required in the *Evaluate* cluster instead that performs a revision of the integration action plan. Expert 4 does not render the *Leverage lessons learned for integration* as insufficient, but does recognise that a revision of the integration action plan is useful. Similarly, experts 1 and 2 suggest for an action to be added to the *Integrate* cluster as well, that serves as revision of the sustainment action plan.

Experts 1, 2 and 4 all suggest that the *Demonstrate* management and leader engagement should be also present in the *Integrate* cluster.

Expert 3 makes the observation that in the clusters of *Integrate* and *Sustain* the actions *Leverage results for integration* and *Leverage lessons learned* are useful in practice and should be specifically performed as a written documentation (or best practice document) that would then be made available to every interested person and thus would have a bigger dissemination impact.

Also expert 3 is missing in the *Sustain* cluster a revision of the innovation-related KPIs. Expert 3 suggests that a re-measurement of the innovation-related KPIs would be of value in the *Sustain* cluster because of the longer time period on which this measurement can be done, thus yielding more robust results.

Expert 3 explains that not enough effort is invested in the *Post-Execution* stage and expert 4 points out that the *Integrate* and *Sustain* clusters are often omitted in practice, which leads to people abandoning the innovation and returning to the old way of working.

### Opinion about the CCPM and its reception by the experts

All four experts have shown a positive attitude towards the CCPM and have expressed the intention of using the model in practice. Experts 1 and 2 see the CCPM as a useful checklist for fundamental steps to consider taking in the implementation project. Expert 3 was especially content with the detail level of the *Execution* stage and is looking forward to the refined version of the CCPM. Expert 4 also finds the model useful and wishes to use it in practice.

As overall improvement points, experts 1 and 2 suggest that testing the model in practice would increase the validity and the prescription power of the model. Expert 4 expresses an interest for the relative value of each cluster (or action) in terms of success maximisation. So, in case of time and budget pressure and the impossibility to exactly follow all the steps of the model, which actions are critical and should be selected to be performed to ensure the success of the innovation.

As evaluation of the CCPM, the experts agree to the validity of all clusters and most of the actions (except the ones that are recommended for merger, or deletion) and have identified only five actions as missing in the model.

## 5.4 EVALUATION CONCLUSION

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The theoretical evaluation provides strong support in terms of high level content, with the majority of the CCPM clusters mapped to elements of the Greenhalgh model. The comparison also shows that the level of detail of the Greenhalgh model is exceeded by that of the CCPM, making the CCPM the most detailed model investigated in this master thesis research. Through this higher level of detail and specificity, the CCPM achieves the goal of providing an increased guidance power to the user.

The practical evaluation reveals a positive user reception of the CCPM. The interviewed experts practically validate the majority of the elements and the general flow. Moreover, they acknowledge certain CCPM elements as relevant additions to their commonly used implementation process models, which proves the added-value of the model both as a theoretical artefact and as a practical tool. All experts deem the model useful and express the intention to use it in their work.

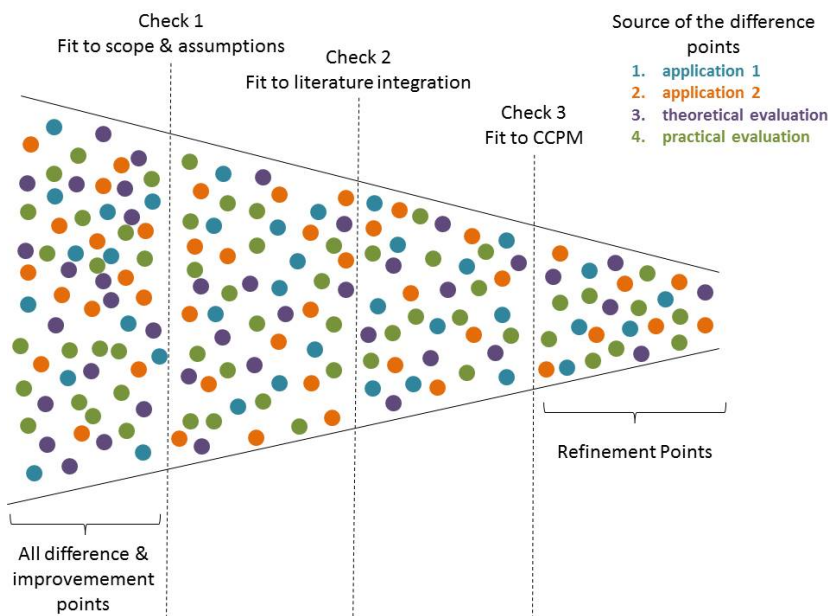
To maximise the completeness, specificity and usability of the model, the difference and improvement points resulted from the evaluation are processed into refinement elements, discussed in the following chapter.

## 6 REFINEMENT OF THE CONCEPTUAL CHANGE PROCESS MODEL

### 6.1 REFINEMENT METHODOLOGY

The refined change process model (RCPM) represents an improved version of the conceptual change process model. The purpose of the refinement is to further detail the model for an increased guidance power and to adapt the model towards a higher practical usability. The changes that constitute the refinement are derived from the two applications, the general change process model of IIQ and the Communities innovation of Radboud UMC, and from the two evaluation sources: the conceptual model for the spread and sustainability of innovations in health service delivery organisation by (Greenhalgh et al., 2004) and the interviews conducted with the four experts. The comparison between the two applications and the CCPM, as well as the comparison of the CCPM with the Greenhalgh model and the interview discussions have resulted in several points of difference or improvement suggestions. Some of the differences and improvements uncovered have been used to develop the model, both from a theoretical, but especially from a practical perspective. The selection of the refinement points is portrayed in Figure 20. The differences and improvements have been systematically evaluated to decide whether they can become

FIGURE 20: SELECTION OF THE REFINEMENT POINTS



refinement points or not. The first evaluation has been performed based on two criteria: the *fit with the scope and assumptions* of the CCPM, described in section 1.2, and the *fit with the integration of the literature evidence*, presented in section 3.2. If the difference point does not span outside the scope, does not contradict the assumptions and does not conflict with the integration of the literature evidence, it becomes a candidate for a refinement point. Then, every candidate point is assessed in the context of the CCPM in terms of level of detail. If the candidate point presents a similar level of detail as the CCPM elements, it becomes a change to

be implemented for refinement. The points with a higher level of detail than that of a CCPM action have been disregarded. By this methodology, 34 points have been identified to contribute to the refinement.

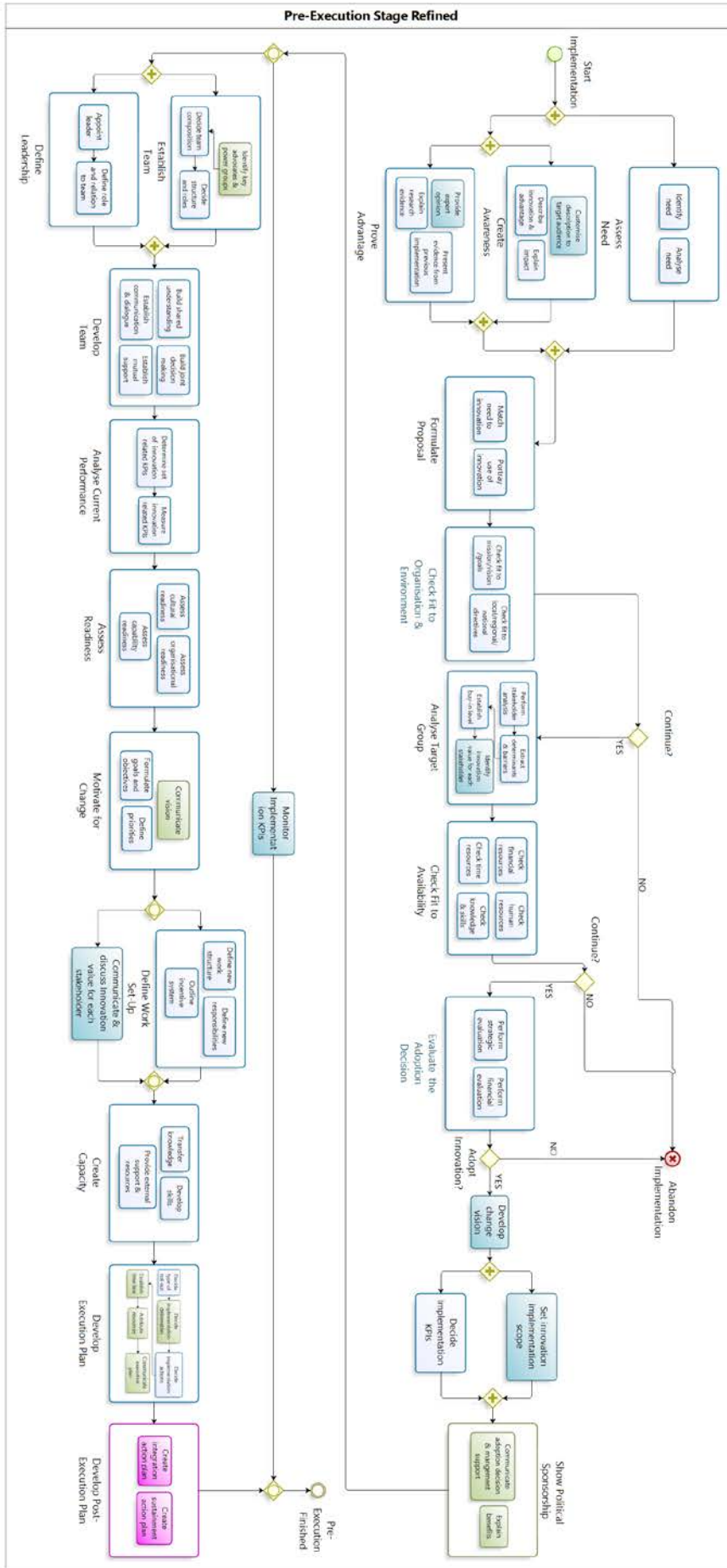
### 6.2 THE REFINED CHANGE PROCESS MODEL

The 34 refinement changes are structured per stage of the process and are summarised in Table 11 of Appendix 10.14. The table comprises the type of change performed, the exact location in the CCPM where it has been implemented and the source or sources that have led to the change. The changes involve addition of new actions, which are marked in Figure 21, to Figure 23 with a blue inner-fill, removal of actions and clusters, name changes for actions and clusters and flow changes. The complete RCPM can be seen in Figure 53 of Appendix 10.15.

#### 6.2.1 THE PRE-EXECUTION STAGE OF THE RCPM

The refined version of the Pre-Execution stage can be seen in Figure 21. Fourteen changes have been implemented for the creation of the refined version. Firstly, the initial parallel structure has been altered. The clusters of *Create Awareness*, *Assess Need* and *Formulate Proposal* are placed in the CCPM in a parallel formation because it could not be decided what their sequence should be. The expert interviews have indicated that *Create Awareness* and *Assess Need* should remain as parallel formation, as their sequence differs according to case, depending of the “push” or “pull” nature of the innovation introduction.

FIGURE 21: THE REFINED VERSION OF THE PRE-EXECUTION STAGE



Furthermore, the *Formulate Proposal* cluster can be safely placed after this parallel formation. The *Prove Advantage* cluster has been moved to an earlier point in the process and placed in parallel with the *Create Awareness* cluster due to the observation that the *Describe innovation and advantage* action is interdependent with the proving of the advantage.

A new action was added to the Create Awareness cluster, the action *Customise description to target audience*. The new action emphasizes the importance of adapting the description of the innovation to the target it is delivered to. Especially in the case of highly complex innovations this adaptation and customisation can be very important. This has been deduced from the comparison of the CCPM with the (Greenhalgh et al., 2004) model. Also based on this source another action has been added, this time to the *Prove Advantage* cluster, the action *Provide expert opinion*. Besides research evidence and previous-implementation evidence, the expert opinion can be a useful source of validation and advantage reinforcement.

The clusters *Check Fit to Organisation* and *Evaluate* have been renamed to *Check Fit to Organisation and Environment* and *Evaluate the Adoption Decision* based on the expert interviews. During the discussions it was noticed that a high degree of own interpretation is needed to attribute meaning to these clusters and that the names are not self-explanatory enough or do not fully portray the content. Thus, their names have been changed for a more accurate interpretation. Also, the cluster *Check Fit to Organisation and Environment* has been moved before *Analyse Target Group*, because it is not dependent on the *Analyse Target Group* cluster and can render a quicker abandon decision with less effort invested. Also based on the expert interviews the *Analyse Target Group* cluster has received an additional action, that of *Identify innovation value for each stakeholder*, which is the relocation and renaming of the *Identify value related to innovation* action of the *Define Value* cluster. The literature evidence does not bind the value identification to the change team, so this makes it possible for this action to be performed at an earlier stage, as the experts suggest. This action is however linked to the stakeholder analysis, so the relocation to the *Analyse Target Group* is indeed sensible.

After the adoption decision, two new actions are added and a flow change occurs. *Develop change vision* is added as the first action after the adoption. This was suggested by expert 3 and would be performed by the management or the decision making body together with (optionally) the change agency and the innovator. An explicit vision development does not happen in the CCPM and this was assumed to be formed in the *Formulate Proposal* cluster, but expert 3 considers an explicit development right after adoption as a more realistic location in the process.

After the vision definition, a parallel formation was added, formed by the actions *Set innovation implementation scope* and *Decide implementation KPIs*. The first action is an addition based on the Communities innovation application, which points out that the innovation scope can also be organisation-dependent and not only innovation dependent and can vary, thus a scope definition action was added. The location was chosen as the same relative location as in the Communities innovation, right after the adoption decision. In parallel with this action, the *Decide implementation KPIs* is to be executed. This action has been relocated from the *Develop Execution Plan* Cluster. This change has been made based on the IIQ general change model application, which, although it does not contain such an explicit KPI definition, it includes a monitoring cluster during the Initiation phase that corresponds to the second part of the Pre-Execution. This monitoring cluster of the IIQ model has pointed out that resources are being utilised already in the Pre-Execution and that should also be part of the implementation performance. Thus an action was added, *Monitor Implementation KPIs* in parallel with the sequence starting at *Establish Team* and ending at *Develop Post-Execution Plan*.

The *Analyse Current Performance* cluster has been moved after the *Establish Team* cluster and the *Develop Team* cluster has been moved right after the *Establish Team* cluster, thus altering the initial flow. The team development was seen by the experts as better suited in the very proximity of the team establishment, as the good functioning of the team is beneficial for all other clusters that follow. And the current performance assessment was seen as better suited after team establishment as the team is in practice involved in performing the assessment.

The last change to the Pre-Execution stage is the removal of the *Define Value* cluster, which was replaced by the remaining action of that cluster after the relocation of the *Identify value related to innovation* action, the *Communicate and discuss innovation value for each stakeholder*. This action is the renamed version of the *Communicate and discuss value*.

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### 6.2.2 THE EXECUTION STAGE OF THE RCPM

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The first refinement applied to the Execution stage of the CCPM is the addition of the *Announce start of execution to stakeholders* action. Both applications exhibit such an announcement action in the beginning of the execution. This helps to mark the moment and bring all stakeholders up to date with the development.

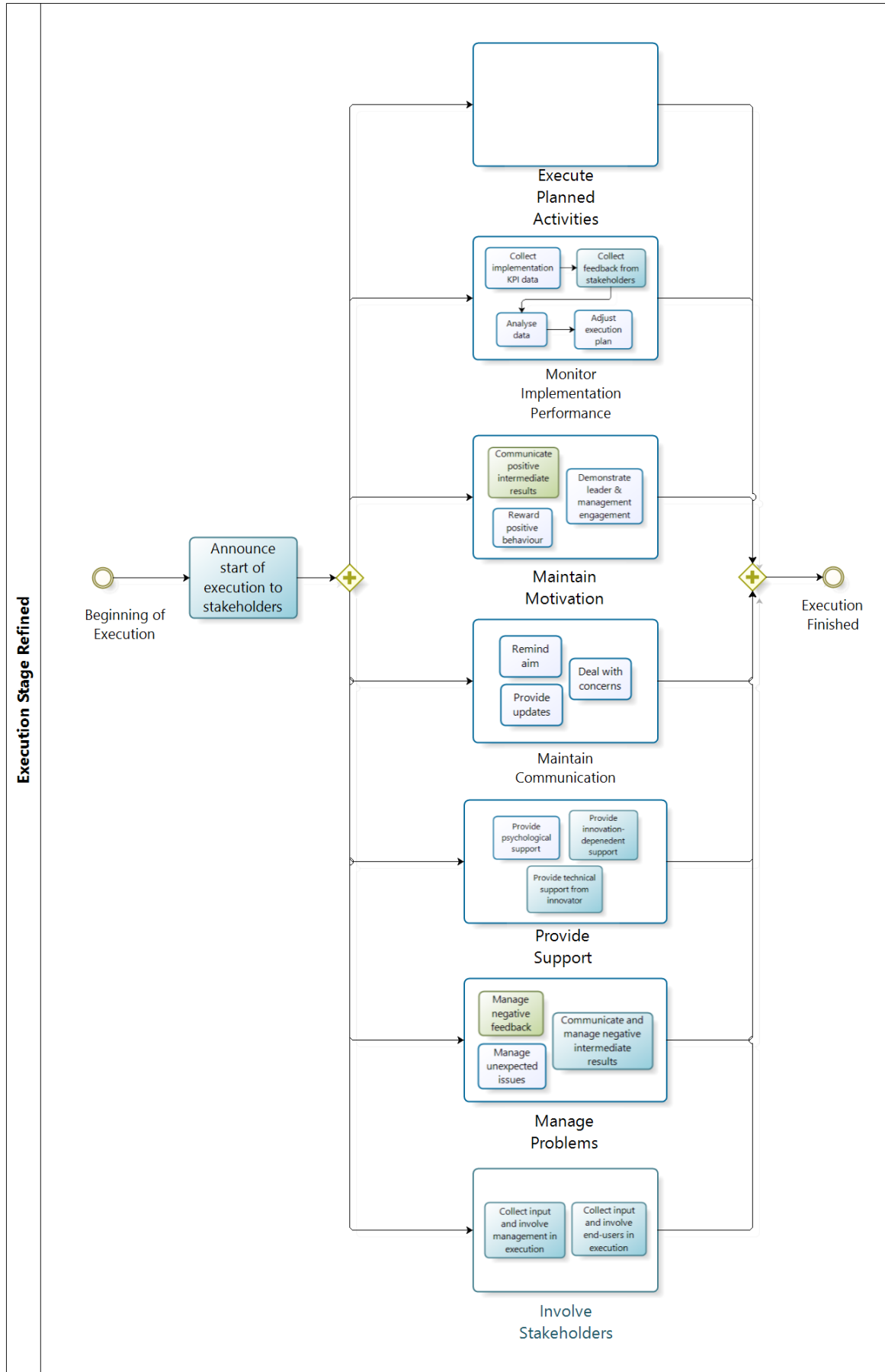
Based on the Communities innovation application two new actions have been added to the Provide Support cluster: *Provide innovation-dependent support* and *Provide technical support from innovator*. The innovation dependent support can take the form of advice and help from the change agency towards the change team in the execution of the action plan. The technical support represents assistance offered by the innovator with technical issues and challenges that the change team might face. Thus, the *Provide Support* cluster is no longer populated by one single action.

The *Collect feedback* action of the *Manage Problems* cluster is renamed to *Collect feedback from stakeholders* and moved to the *Monitor Implementation Performance* cluster. The experts have pointed out that the feedback can be both negative and positive and it belongs more naturally to the monitoring function. The resulting feedback can be treated separately in other clusters. The action *Act upon feedback* has been renamed to *Manage negative feedback* and reflects that the negative feedback is to be tackled and the issue resolved. The positive feedback is still being disseminated in the *Communicate positive intermediate results* of the *Maintain Motivation* cluster. Because of the experts' observations, the action *Communicate and manage negative intermediate results* was added to the *Manage Problems* cluster to underline that negative results should not be ignored or kept away from stakeholders, but rather actively and openly dealt with.

The Communities innovation application and the (Greenhalgh et al., 2004) model contain user involvement. Although the Greenhalgh model advocates the user involvement in the development of the innovation, which is outside the scope of the model, involvement can still be obtained for the execution of the implementation. Thus, a new cluster was added, *Involve Stakeholders*. This cluster contains two new actions: *Collect input and involve management in the execution* and *Collect input and involve end-users in the execution*. This ensures that from the pool of stakeholders at least the management and the end-users will be consulted and involved in the execution for a higher likelihood of success. Especially for the innovations that permit customization or adaptations, this involvement can lead to higher level of user satisfaction with the innovation.

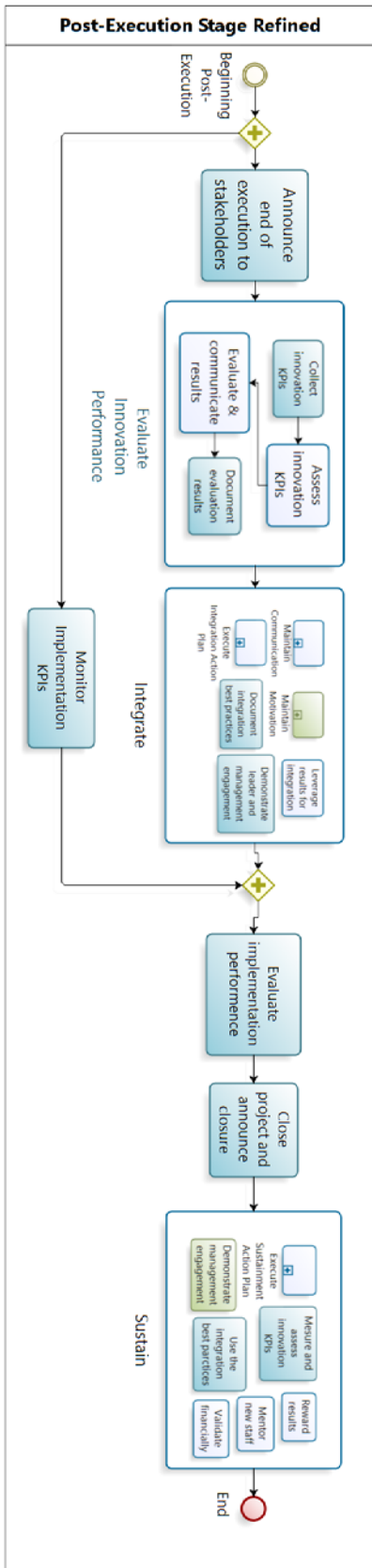


FIGURE 22: THE REFINED VERSION OF THE EXECUTION STAGE



6.2.3 THE POST-EXECUTION STAGE OF THE RCPM

FIGURE 23: THE REFINED VERSION OF THE POST-EXECUTION STAGE



The Post-Execution stage also starts with an announcement action, *Announce end of execution to stakeholders*, which marks the end of the execution and brings the stakeholders up to date with the progress of the implementation.

The IIQ application has pointed out that, since the implementation does not end with the execution, but continues to be integrated and sustained, the implementation performance evaluation should include the Post-Execution stage as well. For this purpose a series of changes has been made. Firstly, the *Evaluate* cluster has been renamed to *Evaluate Innovation Performance* and now focuses on the innovation-related evaluation only. Two actions have been added to this cluster: *Collect innovation KPIs* and *Document evaluation results*. This cluster is dedicated to the evaluation of the innovation after the execution, from collection to documentation.

The *Integrate* cluster has also received two additions: *Document integration best practices* and *Demonstrate leader and management engagement*, both based on the suggestions of the experts.

The *Sustain* cluster has suffered two alterations: the name change of the *Leverage lessons learned* action into *Use integration best practices* and the addition of the *Measure and assess innovation KPIs*.

The implementation evaluation has been removed from the former *Evaluate* cluster in order to extend its span. The implementation performance includes the first three steps of the Post-Execution cluster. A new action *Monitor implementation KPIs* is now in parallel with these three steps. After the parallel formation, the action *Evaluate implementation performance* fulfils the assessment function for the implementation. After the evaluation of the implementation performance, the project is closed and the closure is announced.

The implementation performance now spans also the innovation evaluation and the Integration, because they too are part of the implementation project and can thus influence its success. The *Sustain* cluster, however, has been kept out of the monitoring and evaluation, due to its long-term characteristic. Although it is still contributing to the implementation success, the sustainment is too lengthy to be part of the project. The sustainment can take years, and, as IIQ pointed out in their explanation of the change process model, the stakeholders involved need closure earlier than that.

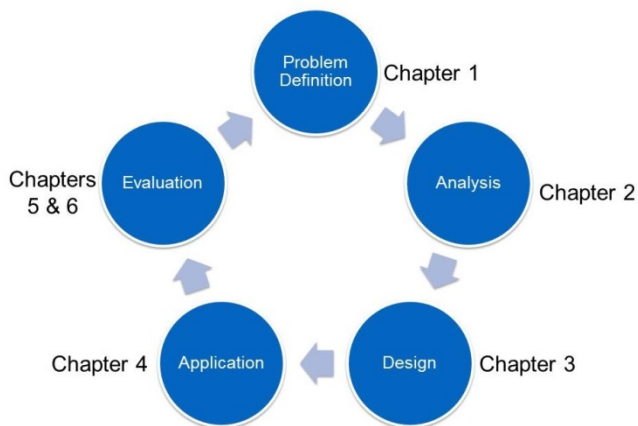
6.3 REFINEMENT CONCLUSION

The refinement leverages the difference and improvement points resulted from the application and evaluation for the further development of the CCPM into the RCPM. Through a series of flow and elements modifications, the RCPM becomes more comprehensive, better aligned with practice and provides better guidance to the end user through increased level of detail and specification. This results in an even more useful tool for the process guidance of the innovation implementation in healthcare.

## 7 CONCLUSION

The master thesis research addresses the lack of process-oriented guidance in the implementation of innovation in the healthcare field and sets out to deliver a change process model for the implementation of an innovation in a healthcare organisation.

FIGURE 24: CORRESPONDENCE BETWEEN THE REGULATIVE CYCLE AND THE STRUCTURE OF THE MASTER THESIS REPORT



The research starts by analysing a representative body of literature with regards to innovation implementation and change management, both in general terms and healthcare-related. The relevant findings from the analysed literature are divided into structured models and free text and are group-wise integrated. The results of the integration and their discussion, presented in chapter 2, provide the answer to the first research question: *“What previous research findings from literature are relevant to the topic of innovation implementation in healthcare and to the design of the change process model?”*. Based on the integrated findings from literature, a conceptual change process model for the implementation of an innovation in a healthcare organisation is developed through a step-wise, iterative

methodology. The model is described in chapter 3 and constitutes the answer to the second research question: *“Based on the findings from literature, how can the change process model for the implementation of an innovation in a healthcare organisation look like to enable a positive outcome?”*. This conceptual change process model, or CCPM, is then compared with two practical applications: one being the change process model of IIQ and the other, the implementation process followed by Radboud UMC for the introduction of the Communities Innovation. The comparison, presented in chapter 4, delivers the answer to the third research question: *“How does the conceptual change process model developed in the Design stage compare to a successful implementation of a concrete innovation in a specific healthcare organisation?”*. The answer to the fourth and last research question: *“How can the change process model be further improved and developed?”*, is provided by chapters 5 and 6. In chapter 5, the CCPM is evaluated, both theoretically, through the comparison with the (Greenhalgh et al., 2004) conceptual model for the spread and sustainability of innovations in health service delivery organisation, and practically, through interviews with four experts in the field of innovation implementation in healthcare. In chapter 6, based on the application and evaluation results, the CCPM is further developed and improved into a refined version, the RCPM. The correspondence between the chapters of the master thesis report and the phases of the regulative cycle structure followed by the research is depicted in Figure 24.

### 7.1 RESEARCH CONTRIBUTION

The master thesis research contributes both to theory and practice. From a theoretical perspective, it fills the gap of process-oriented innovation implementation guidance for the healthcare field. It provides an analysis and integration of various literature results and it builds a change process model with a higher degree of detail, through a higher number of elements and higher specificity of the elements, than any of the models uncovered from literature. The master thesis research answers the call for further research issued by (Greenhalgh et al., 2004) and incorporates additional change management sources in the development of the change process model.

From a practical perspective, the change process model offers a higher guidance power than any other discussed in the literature analysis, through increased specification and level of detail. The change process model is welcomed by the experts in the field, who are interested to apply it in their work. The ability of providing assistance and added-value to innovation implementation experts, proves the high guidance power and the usefulness to all potential implementers, especially the inexperienced ones.

Through the creation of the change process model the master thesis research helps to increase the innovation implementation success likelihood and ultimately supports the uptake of innovation in the field of healthcare.

## 7.2 LIMITATIONS AND FURTHER RESEARCH

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As any scientific work, the master thesis research also has several limitations.

The first limitation is imposed by the very scope definition. The research is limited to the implementation of previously developed innovations and does not explore the innovation development and its link to the implementation process. Thus, a point for further research is the extension of the research to include internally developed innovations and/or the production phase of an externally developed innovation. Within this scope extension, several aspects have been identified for further research based on the application and evaluation steps of the research: the choice in technical developer of the innovation, the prerequisites for the innovation development and innovation implementation, the reinvention, development or augmentation capability of the innovation and its influence on the implementation and the user involvement in the innovation development. The research is also limited to one-organisation-implementation and does not explore the influences of multi-organisation-implementation on the change process. A useful further research point would be the extension of the scope to multi-organisational-implementation and its influence on the innovation implementation success. Within this direction, one particular point has been underlined by the theoretical evaluation: the inter-organisational norm-setting and networks. Also in terms of organisation-related further research, another direction is the investigation of the link between the organisation characteristics and the innovation implementation, especially in terms of size/maturity, formalisation, differentiation and decentralization levels of an organisation.

The second limitation comes from the literature selection. Although the body of literature selected is representative and is believed to cover all major relevant findings, it cannot hold the claim of completeness. This extends to the content of the change process model, which is built based on the literature analysis. In this sense, a systematic literature review could yield a complete result, but the immense effort required to execute it might outweigh its added value.

Another limitation comes from the impossibility of practical testing. Although the process is practically validated by the experts reviewing it and by the similarity to real-life processes, it was not tested in practice on an actual innovation and a concrete healthcare organisation. Practical testing of the change process model is a highly recommended further research point. Through testing the model in practice on real innovations and concrete organisations, the model can be validated and further improved and refined. Also in terms of further refinement, the classification of innovations and organisations and the fine-tuning of the model per category group, also constitutes a further research direction. A taxonomy of innovations and organisations can help the further specification of the change process model per category and can thus increase the guidance power towards the end user. The further detailing of the actions of the change process models with sets of concrete tools for their execution would also boost the practical guidance power of the model. Concrete tools such as Gantt charts, event charters and force field analysis, can help increase the level of assistance offered to the users, especially the less experienced ones. Also, further investigation into the implementation-related KPIs and their measurement is a valid point to consider.

The practical evaluation through expert interviews is performed only with experts representing the same role, that of change agency. This limits the input variety and thus restricts the refinement. Extending the pool of interview subjects to other process roles can increase and diversify the input and thus advance the refinement.

Another direction for further research is constituted by the investigation of the stakeholder characteristics and their influence on the innovation implementation success, especially in terms of learning styles, ability to find, interpret, recodify and integrate knowledge and the hands-on approach by leaders and managers.

A last further research point is the investigation of the relative importance of each element of the process model for the success of the implementation. This relative importance can be represented through a weight system for example. As it could be seen from the application chapter, the change process model contains more elements than the practical applications and a higher level of detail, thus, if only part of the elements are to be chosen for execution, which ones are critical for the success of the implementation and which not and what is their influence.

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## 8 REFERENCES

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- Anderson, D., and Anderson, L.A. (2010). *Beyond Change Management: How to Achieve Breakthrough Results Through Conscious Change Leadership* (John Wiley & Sons).
- Bai, C., and Sarkis, J. (2013). A grey-based DEMATEL model for evaluating business process management critical success factors. *Int. J. Prod. Econ.* 146, 281–292.
- Beer, M., and Nohria, N. (2000). *Cracking the Code of Change*. Harv. Bus. Rev.
- Berg, M. (2001). Implementing information systems in health care organizations: myths and challenges. *Int. J. Med. Inf.* 64, 143–156.
- Berler, A., Pavlopoulos, S., and Koutsouris, D. (2005). Using key performance indicators as knowledge-management tools at a regional health-care authority level. *IEEE Trans. Inf. Technol. Biomed.* 9, 184–192.
- Botta-Genoulaz, V., and Millet, P.-A. (2006). An investigation into the use of ERP systems in the service sector. *Int. J. Prod. Econ.* 99, 202–221.
- Bryde, D.J. (2005). Methods for Managing Different Perspectives of Project Success. *Br. J. Manag.* 16, 119–131.
- Buchanan, D.A., Fitzgerald, L., and Ketley, D. (2006). *The Sustainability and Spread of Organizational Change: Modernizing Healthcare* (Taylor & Francis).
- Bujor, M.A. (2013). *Facilitators and Barriers of Business process (Re)Design in Healthcare* (TU/e).
- Bullock, R.J., and Batten, D. (1985). It's Just a Phase We're Going Through: A Review and Synthesis of OD Phase Analysis. *Group Organ. Manag.* 10, 383–412.
- Burke, W.W. (2002). *Organization Change: Theory and Practice* (SAGE).
- Butler, G., and Caldwell, C. (2008). *What top-performing healthcare organizations know: 7 proven steps for accelerating and achieving change* (Health Administration Press).
- Cameron, E., and Green, M. (2012). *Making Sense of Change Management: A Complete Guide to the Models Tools and Techniques of Organizational Change* (Kogan Page Publishers).
- Carnall, C.A. (2007). *Managing Change in Organizations* (Pearson Education).
- Cawsey, T.F., Deszca, G., and Ingols, C. (2011a). *Organizational Change: An Action-Oriented Toolkit* (SAGE).
- Cawsey, T.F., Deszca, G., and Ingols, C. (2011b). *Organizational Change: An Action-Oriented Toolkit* (SAGE).
- Claes, J., Vanderfeesten, I., Reijers, H.A., Pinggera, J., Weidlich, M., Zugal, S., Fahland, D., Weber, B., Mendling, J., and Poels, G. (2012). Tying process model quality to the modeling process: the impact of structuring, movement, and speed. In *Business Process Management*, (Springer), pp. 33–48.
- Cook, J.M., O'Donnell, C., Dinnen, S., Coyne, J.C., Ruzek, J.I., and Schnurr, P.P. (2012). Measurement of a model of implementation for health care: toward a testable theory. *Implement. Sci.* 7, 59.
- Corbin, J., and Strauss, A. (2008). *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory* (SAGE).
- Coye, M.J., Aubry, W.M., and Yu, W. (2003). The “tipping point” and health care innovations: Advancing the adoption of beneficial technologies. *Wash. DC Natl. Comm. Qual. Health Care*.
- Dearing, J.W. (2009). Applying Diffusion of Innovation Theory to Intervention Development. *Res. Soc. Work Pract.* 19, 503–518.

- Dixon-Woods, M., Agarwal, S., Young, B., Jones, D., and Sutton, A. (2004). *Integrative approaches to qualitative and quantitative evidence* (London: Health Development Agency).
- Dixon-Woods, M., Amalberti, R., Goodman, S., Bergman, B., and Glasziou, P. (2011). Problems and promises of innovation: why healthcare needs to rethink its love/hate relationship with the new. *BMJ Qual. Saf.* *20*, i47–i51.
- Dumas, M., La Rosa, M., Mendling, J., and Reijers, H.A. (2013). *Fundamentals of business process management* (Springer).
- Edmondson, A.C., Bohmer, R.M., and Pisano, G.P. (2001). Disrupted Routines: Team Learning and New Technology Implementation in Hospitals. *Adm. Sci. Q.* *46*, 685.
- Elliott, S.J., Taylor, S.M., Cameron, R., and Schabas, R. (1998). Assessing public health capacity to support community-based heart health promotion- the Canadian Heart Health Initiative, Ontario Project (CHHIOP).pdf. *Health Educ. Res.* *13*, 607–622.
- Gabel, S. (2001a). *Leaders and Health Care Organizational Change: Art, Politics, and Process* (Springer).
- Gabel, S. (2001b). *Leaders and Health Care Organizational Change: Art, Politics, and Process* (Springer).
- Grbich, C. (2007). *Qualitative Data Analysis* (SAGE).
- Green, P.L. (1998a). Improving Clinical Effectiveness in an Integrated Care Delivery System. *J. Healthc. Qual.* *20*, 4–9.
- Green, P.L. (1998b). Improving Clinical Effectiveness in an Integrated Care Delivery System. *J. Healthc. Qual.* *20*, 4–9.
- Greenhalgh, T., Robert, Glenn, Macfarlane, Fraser, Bate, Paul, and Kyriakidou, Olivia (2004). *Diffusion Of Innovation in Service Organisations: Systematic Review and Recommendations*.
- Greenhalgh, T., Robert, G., Bate, P., Macfarlane, F., and Kyriakidou, O. (2008). *Diffusion of Innovations in Health Service Organisations: A Systematic Literature Review* (John Wiley & Sons).
- Grimshaw, J.M., Eccles, M.P., Lavis, J.N., Hill, S.J., and Squires, J.E. (2012). Knowledge translation of research findings. *Implement. Sci.* *7*, 50.
- Grol, R., Wensing, M., Eccles, M., and Davis, D. (2013). *Improving Patient Care: The Implementation of Change in Health Care* (John Wiley & Sons).
- Gustafson, D.H., Sainfort, F., Eichler, M., Adams, L., Bisognano, M., and Steudel, H. (2003). Developing and testing a model to predict outcomes of organizational change. *Health Serv. Res.* *38*, 751–776.
- Heusinkveld, S. (2009). Reflections on a reflective cycle: Building legitimacy in design knowledge development. *Organ. Stud.*
- Hewitt-Taylor, J. (2013). *Understanding and Managing Change in Healthcare: A Step-By-Step Guide* (Palgrave Macmillan Limited).
- Inozu, B., Chauncey, D., Kamataris, V., Mount, C., and NOVACES, L. (2011). *Performance Improvement for Healthcare: Leading Change with Lean, Six Sigma, and Constraints Management* (McGraw Hill Professional).
- Jabri, M. (2012). *Managing Organizational Change: Process, Social Construction and Dialogue* (Palgrave Macmillan).
- Jick, T. (1993). *Managing change: cases and concepts* (Irwin).
- Jones, J.C. (1970). *Design Methods: Seeds of Human Futures* (Wiley-Interscience).

- Kanter, Stein, and Jick (2003). *Challenge of Organizational Change: How Companies Experience It And Leaders Guide It* (Simon and Schuster).
- Keen, M., Brown, B., Garratt, A., Käckenmeister, B., Khairy, A., O'Mahony, K., Yu, L., and Redbooks, I.B.M. (2011). *Building IBM Business Process Management Solutions Using WebSphere V7 and Business Space* (IBM Redbooks).
- Kirkpatrick, D.L. (2009). *Managing Change Effectively* (Routledge).
- Kitson, A., Harvey, G., and McCormack, B. (1998). Enabling the implementation of evidence based practice: a conceptual framework. *Qual. Health Care QHC* 7, 149–158.
- Klein, S.M. (1996). A management communication strategy for change. *J. Organ. Change Manag.* 9, 32–46.
- Kothari, C.R. (2004). *Research Methodology: Methods and Techniques* (New Age International).
- Kotter, J.P. (1995). Why Transformation Efforts Fail. *Harv. Bus. Rev.*
- Lameire, N., Joffe, P., and Wiedemann, M. (1999). Healthcare systems—an international review: an overview. *Nephrol. Dial. Transplant.* 14, 3–9.
- Leppitt, N. (2006). Challenging the code of change: Part 1. Praxis does not make perfect. *J. Change Manag.* 6, 121–142.
- Lewin, K. (1951). *Field theory in social science: selected theoretical papers* (Edited by Dorwin Cartwright.) (Oxford, England: Harpers).
- Liddell, A. (2007). *Technology in the NHS: transforming the patient's experience of care* (London: King's Fund).
- Light, P. (2005). *The Four Pillars of High Performance: How Robust Organizations Achieve Extraordinary Results* (McGraw Hill Professional).
- Lorenzi, N.M., Novak, L.L., Weiss, J.B., Gadd, C.S., and Unertl, K.M. (2008). Crossing the Implementation Chasm: A Proposal for Bold Action. *J. Am. Med. Inform. Assoc.* 15, 290–296.
- Luecke, R. (2003). *Managing Change and Transition* (Harvard Business Press).
- Martin, L.R., Haskard-Zolnierrek, K.B., and DiMatteo, M.R. (2010). *Health Behavior Change and Treatment Adherence: Evidence-based Guidelines for Improving Healthcare* (Oxford University Press).
- McCormick, L.K., Steckler, A.B., and McLeroy, K.R. (1995). Diffusion of innovations in schools: a study of adoption and implementation of school-based tobacco prevention curricula. *Am. J. Health Promot. AJHP* 9, 210–219.
- Mento, A., Jones, R., and Dirndorfer, W. (2002). A change management process: Grounded in both theory and practice. *J. Change Manag.* 3, 45–59.
- Meyer, A.D., and Goes, J.B. (1988a). Organizational Assimilation of Innovations: A Multilevel Contextual Analysis. *Acad. Manage. J.* 31, 897–923.
- Meyer, A.D., and Goes, J.B. (1988b). Organizational Assimilation of Innovations: A Multilevel Contextual Analysis. *Acad. Manage. J.* 31, 897–923.
- Meyers, P.W., Sivakumar, K., and Nakata, C. (1999). Implementation of Industrial Process Innovations-Factors, Effects, and Marketing Implications.pdf. *J. Prod. Innov. Manag.* 16, 295–311.
- Morrow, R. (2012). *Utilizing the 3Ms of Process Improvement in Healthcare: A Roadmap to High Reliability Using Lean, Six Sigma, and Change Leadership* (CRC Press).

- Nadler, D.A. (1997). *Champions of Change: How CEOs and Their Companies are Mastering the Skills of Radical Change* (Wiley).
- Nadler, D.A., and Tushman, M.L. (1989). Organizational frame bending: principles for managing reorientation. *Acad. Manag. Exec.* 3, 194–204.
- Palmer, I., Dunford, R.W., and Akin, G. (2009). *Managing Organizational Change: A Multiple Perspectives Approach* (McGraw-Hill Higher Education).
- Pendlebury, J., Grouard, B., and Meston, F. (1998). *The Ten Keys to Successful Change Management* (Wiley).
- Plsek, P.E. (1995). Techniques for managing quality. *Hosp. Health Serv. Adm.* 40, 50–79.
- Pourshahid, A., Amyot, D., Chen, P., Weiss, M., and Forster, A.J. (2007). Business process monitoring and alignment: An approach based on the user requirements notation and business intelligence tools. In *Proceedings of the 10th Workshop on Requirements Engineering, WER 2007*, pp. 80–91.
- Proctor, E.K., Powell, B.J., and McMillen, J.C. (2013). Implementation strategies: recommendations for specifying and reporting. *Implement. Sci.* 8, 139.
- Reijers, H., and Limanmansar, S. (2005). Best practices in business process redesign: an overview and qualitative evaluation of successful redesign heuristics. *Omega* 33, 283–306.
- Rogers, E.M. (2010). *Diffusion of Innovations*, 4th Edition (Simon and Schuster).
- Rycroft-Malone, J., Kitson, A., Harvey, G., McCormack, B., Seers, K., Titchen, A., and Estabrooks, C. (2002). Ingredients for change: revisiting a conceptual framework. *Qual. Saf. Health Care* 11, 174–180.
- Schilling, M.A., and Hill, C.W.L. (1998). Managing the new product development process: Strategic imperatives. *Acad. Manag. Exec.* 12, 67–81.
- Sterman, J.D. (2001). *System Dynamics Modeling: TOOLS FOR LEARNING IN A COMPLEX WORLD*. *Calif. Manage. Rev.* 43.
- Van Strien, P.J. (1997). Towards a Methodology of Psychological Practice The Regulative Cycle. *Theory Psychol.* 7, 683–700.
- Sung, N.S., Crowley, W.F., and Genel, M. (2003). Central challenges facing the national clinical research enterprise. *JAMA* 289, 1278–1287.
- Taffinder, P. (1999). *Big Change: A Route-Map for Corporate Transformation* (Wiley).
- Taylor, S.M., Elliott, S., Robinson, K., and Taylor, S. (1998). Community-based Heart Health Promotion-Perceptions of Facilitators and Barriers.pdf. *Rev. Can. Sante Publique* 89, 406–409.
- Van de Ven, A.H., and Poole, M.S. (2005). Alternative approaches for studying organizational change. *Organ. Stud.* 26, 1377–1404.
- Van de Ven, A., Polley, D., and Garud, R. (2008). *The innovation journey* (Oxford University Press).
- Waddell, C. (2001). So much research evidence, so little dissemination and uptake: mixing the useful with the pleasing. *Evid. Based Ment. Health* 4, 3–5.
- Wysocki, R.K. (2010). *Adaptive Project Framework: Managing Complexity in the Face of Uncertainty* (ADDISON WESLEY Publishing Company Incorporated).
- Yetton, P., Sharma, and Southon, G. (1999). Successful IS innovation: the contingent contributions of innovation characteristics and implementation process. *J. Inf. Technol.* 14, 53–68.



- Zaltman, G., Duncan, R., and Holbek, J. (1973). *Innovations & Organizations* (R.E. Krieger Publishing Company).
- Zmud, R.W. (1984). An Examination of "Push-Pull" Theory Applied to Process Innovation in Knowledge Work.pdf. *Manag. Sci.* 30, 727 – 738.

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## 9 LIST OF ABBREVIATIONS

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CCPM	conceptual change process model
RCPM	refined change process model
IIQ	Implementation IQ
Radboud UMC	Radboud University Medical Center
PVI	“Procesverbetering & Innovatie” (Process improvement and innovation )
AACE	Aware, Accept, Change, Embed

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## 10 APPENDIX

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### 10.1 OVERVIEW OF THE LITERATURE USED IN THE ANALYSIS

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#### 10.1.1 PRIMARY SOURCE

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1. Buchanan, David A., Louise Fitzgerald, and Diane Ketley. 2006. *The Sustainability and Spread of Organizational Change: Modernizing Healthcare*. Taylor & Francis.
2. Butler, Greg, and Chip Caldwell. 2008. *What Top-Performing Healthcare Organizations Know: 7 Proven Steps for Accelerating and Achieving Change*. Health Administration Press.
3. Cameron, Esther, and Mike Green. 2012. *Making Sense of Change Management: A Complete Guide to the Models Tools and Techniques of Organizational Change*. Kogan Page Publishers.
4. Cawsey, Tupper F., Gene Deszca, and Cynthia Ingols. 2011. *Organizational Change: An Action-Oriented Toolkit*. SAGE.
5. Gabel, Stewart. 2001. *Leaders and Health Care Organizational Change: Art, Politics, and Process*. Springer.
6. Greenhalgh, Trisha, Glenn Robert, Paul Bate, Fraser Macfarlane, and Olivia Kyriakidou. 2008. *Diffusion of Innovations in Health Service Organisations: A Systematic Literature Review*. John Wiley & Sons.
7. Grol, Richard, Michel Wensing, Martin Eccles, and David Davis. 2013. *Improving Patient Care: The Implementation of Change in Health Care*. John Wiley & Sons.
8. Hewitt-Taylor, Jaqui. 2013. *Understanding and Managing Change in Healthcare: A Step-By-Step Guide*. Palgrave Macmillan Limited.
9. Inozu, Bahadir, Dan Chauncey, Vickie Kamataris, Charles Mount, and LLC NOVACES. 2011. *Performance Improvement for Healthcare: Leading Change with Lean, Six Sigma, and Constraints Management*. McGraw Hill Professional.
10. Jabri, Muayyad. 2012. *Managing Organizational Change: Process, Social Construction and Dialogue*. Palgrave Macmillan.
11. Martin, Leslie R., Kelly B. Haskard-Zolnierrek, and M. Robin DiMatteo. 2010. *Health Behavior Change and Treatment Adherence: Evidence-Based Guidelines for Improving Healthcare*. Oxford University Press.
12. Morrow, Richard. 2012. *Utilizing the 3Ms of Process Improvement in Healthcare: A Roadmap to High Reliability Using Lean, Six Sigma, and Change Leadership*. CRC Press.
13. Palmer, Ian, Richard W. Dunford, and Gib Akin. 2009. *Managing Organizational Change: A Multiple Perspectives Approach*. McGraw-Hill Higher Education.

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#### 10.1.2 SECONDARY SOURCE

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1. Anderson, Dean, and Linda Ackerman Anderson. 2010. *Beyond Change Management: How to Achieve Breakthrough Results Through Conscious Change Leadership*. John Wiley & Sons.
2. Attieh, Randa, Marie-Pierre Gagnon, Carole A. Estabrooks, France Légaré, Mathieu Ouimet, Geneviève Roch, El K. Ghandour, and Jeremy Grimshaw. 2013. "Organizational Readiness for Knowledge Translation in Chronic Care: A Review of Theoretical Components." *Implementation Science* 8 (1): 138. doi:10.1186/1748-5908-8-138.
3. Bullock, R. J., and Donde Batten. 1985. "It's Just a Phase We're Going Through: A Review and Synthesis of OD Phase Analysis." *Group & Organization Management* 10 (4): 383–412. doi:10.1177/105960118501000403.
4. Burke, Wyatt Warner. 2002. *Organization Change: Theory and Practice*. SAGE.
5. Carnall, Colin A. 2007. *Managing Change in Organizations*. Pearson Education.
6. Chambers, David A., Russell E. Glasgow, and Kurt C. Stange. 2013. "The Dynamic

- Sustainability Framework: Addressing the Paradox of Sustainment amid Ongoing Change.” *Implementation Science* 8 (1): 117. doi:10.1186/1748-5908-8-117.
7. Dearing, James W. 2009. “Applying Diffusion of Innovation Theory to Intervention Development.” *Research on Social Work Practice* 19 (5): 503–18. doi:10.1177/1049731509335569.
  8. Dearing, James W., and And Others. 1994. “Portraying the New: Communication between University Innovators and Potential Users.” *Science Communication* 16 (1): 11–42.
  9. Downs, G.W., and L.B. Mohr. 1976. “Conceptual Issues in the Study of Innovation.” *Science Quarterly* 21 (4): 700 – 714.
  10. Edmondson, Amy C., Richard M. Bohmer, and Gary P. Pisano. 2001. “Disrupted Routines: Team Learning and New Technology Implementation in Hospitals.” *Administrative Science Quarterly* 46 (4): 685. doi:10.2307/3094828.
  11. Elliott, S.J., S.M. Taylor, R. Cameron, and R. Schabas. 1998. “Assessing Public Health Capacity to Support Community-Based Heart Health Promotion- the Canadian Heart Health Initiative, Ontario Project (CHHIOP).pdf.” *Health Education Research* 13 (4): 607–22.
  12. Green, Paul L. 1998. “Improving Clinical Effectiveness in an Integrated Care Delivery System.” *Journal for Healthcare Quality* 20 (6): 4–9. doi:10.1111/j.1945-1474.1998.tb00289.x.
  13. Gustafson, David H., Fran\ccois Sainfort, Mary Eichler, Laura Adams, Maureen Bisognano, and Harold Steudel. 2003. “Developing and Testing a Model to Predict Outcomes of Organizational Change.” *Health Services Research* 38 (2): 751–76.
  14. Jick, Todd. 1993. *Managing Change: Cases and Concepts*. Irwin.
  15. Kanter, Stein, and Jick. 2003. *Challenge of Organizational Change: How Companies Experience It And Leaders Guide It*. Simon and Schuster.
  16. Kirkpatrick, Donald L. 2009. *Managing Change Effectively*. Routledge.
  17. Kitson, A., G. Harvey, and B. McCormack. 1998. “Enabling the Implementation of Evidence Based Practice: A Conceptual Framework.” *Quality in Health Care : QHC* 7 (3): 149–58.
  18. Klein, Stuart M. 1996. “A Management Communication Strategy for Change.” *Journal of Organizational Change Management* 9 (2): 32–46. doi:10.1108/09534819610113720.
  19. Kotter, John P. 1995. “Why Transformation Efforts Fail.” *Harvard Business Review*.
  20. Leppitt, Nigel. 2006. “Challenging the Code of Change: Part 1. Praxis Does Not Make Perfect.” *Journal of Change Management* 6 (2): 121–42. doi:10.1080/14697010600683104.
  21. Lewin, Kurt. 1951. *Field Theory in Social Science: Selected Theoretical Papers (Edited by Dorwin Cartwright.)*. Vol. xx. Oxford, England: Harpers.
  22. Light, Paul. 2005. *The Four Pillars of High Performance: How Robust Organizations Achieve Extraordinary Results*. McGraw Hill Professional.
  23. Luecke, Richard. 2003. *Managing Change and Transition*. Harvard Business Press.
  24. McCormick, L K, A B Steckler, and K R McLeroy. 1995. “Diffusion of Innovations in Schools: A Study of Adoption and Implementation of School-Based Tobacco Prevention Curricula.” *American Journal of Health Promotion: AJHP* 9 (3): 210–19.
  25. Mento, Anthony, Raymond Jones, and Walter Dirndorfer. 2002. “A Change Management Process: Grounded in Both Theory and Practice.” *Journal of Change Management* 3 (1): 45–59. doi:10.1080/714042520.
  26. Meyer, Alan D., and James B. Goes. 1988. “Organizational Assimilation of Innovations: A Multilevel Contextual Analysis.” *Academy of Management Journal* 31 (4): 897–923. doi:10.2307/256344.
  27. Nadler, David A. 1997. *Champions of Change: How CEOs and Their Companies Are Mastering the Skills of Radical Change*. Wiley.
  28. Nadler, David A., and Michael L. Tushman. 1989. “Organizational Frame Bending: Principles for Managing Reorientation.” *The Academy of Management Executive* 3 (3): 194–204.

29. Nohria, Nitin, and Rakesh Khurana. 1993. "Executing Change: Three Generic Strategies", August. <http://www.hbs.edu/faculty/Pages/item.aspx?num=16478>.
30. Pendlebury, John, Benoît Grouard, and Francis Meston. 1998. *The Ten Keys to Successful Change Management*. Wiley.
31. Plsek, P E. 1995. "Techniques for Managing Quality." *Hospital & Health Services Administration* 40 (1): 50–79.
32. Rogers, Everett M. 2010. *Diffusion of Innovations, 4th Edition*. Simon and Schuster.
33. Rycroft-Malone, J, A Kitson, G Harvey, B McCormack, K Seers, A Titchen, and C Estabrooks. 2002. "Ingredients for Change: Revisiting a Conceptual Framework." *Quality & Safety in Health Care* 11 (2): 174–80. doi:10.1136/qhc.11.2.174.
34. Schilling, Melissa A., and Charles W. L. Hill. 1998. "Managing the New Product Development Process: Strategic Imperatives." *The Academy of Management Executive* 12 (3): 67–81. doi:10.5465/AME.1998.1109051.
35. Sterman, John D. 2001. "System Dynamics Modeling: TOOLS FOR LEARNING IN A COMPLEX WORLD." *California Management Review* 43 (4). <http://search.ebscohost.com/login.aspx?direct=true&profile=ehost&scope=site&authtype=crawler&jrnl=00081256&AN=5244704&h=3CtFYhB2jYsyRL6oEiWaBtz56dLctjgq9I3t6B4ZGnzZjoSZtGw664JpgaGgCFt8UVof1%2FbvOE1noVcBzAeaiA%3D%3D&crl=c>.
36. Taffinder, Paul. 1999. *Big Change: A Route-Map for Corporate Transformation*. Wiley.
37. Taylor, S.M., S. Elliott, K Robinson, and S. Taylor. 1998. "Community-Based Heart Health Promotion- Perceptions of Facilitators and Barriers.pdf." *Revue Canadienne de Sante Publique* 89 (6): 406–9.
38. Tushman, Michael L., and David A. Nadler. 1978. "Information Processing as an Integrating Concept in Organizational Design." *Academy of Management Review* 3 (3): 613–24. doi:10.5465/AMR.1978.4305791.
39. Van de Ven, Andrew H., and Marshall Scott Poole. 1995. "Explaining Development and Change in Organizations." *Academy of Management Review* 20 (3): 510–40.
40. Van de Ven, Andrew, Douglas Polley, and Raghu Garud. 2008. *The Innovation Journey*. Oxford University Press.
41. Yetton, PHILIP, Sharma, and GRAY Southon. 1999. "Successful IS Innovation: The Contingent Contributions of Innovation Characteristics and Implementation Process." *Journal of Information Technology* 14 (1): 53–68. doi:10.1080/026839699344746.
42. Zaltman, Gerald, Robert Duncan, and Jonny Holbek. 1973. *Innovations & Organizations*. R.E. Krieger Publishing Company.
43. Zmud, R.W. 1984. "An Examination of 'Push-Pull' Theory Applied to Process Innovation in Knowledge Work.pdf." *Management Science* 30 (6): 727 – 738.

## 10.2 MODELS EXTRACTED FROM THE LITERATURE ON INNOVATION IMPLEMENTATION AND CHANGE IN HEALTHCARE

### 1. Model of (Meyer and Goes, 1988)

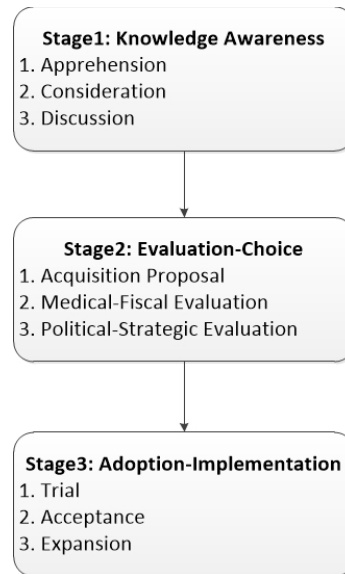


FIGURE 25: DECISION-MAKING STAGES IN THE ASSIMILATION OF MEDICAL INNOVATIONS BY (MEYER AND GOES, 1988)

### 2. Model of (Hewitt-Taylor, 2013)

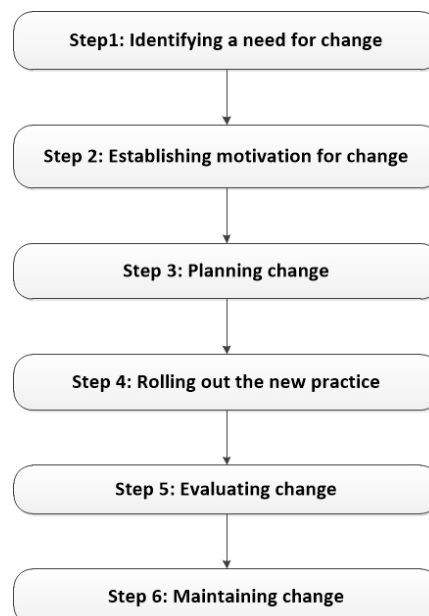


FIGURE 26: THE SUMMARY OF THE STEP-BY-STEP GUIDE PROPOSED BY (HEWITT-TAYLOR, 2013)

## 3. Model of (Inozu et al., 2011)

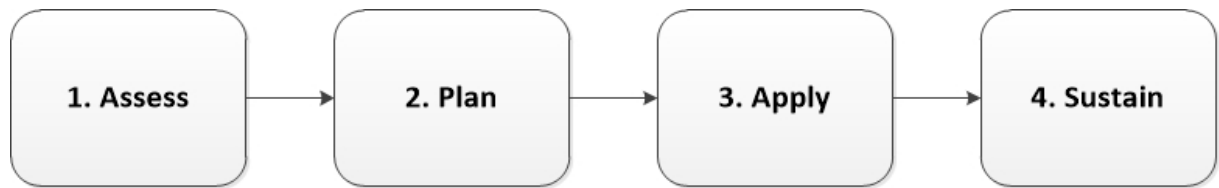


FIGURE 27: FOUR-PHASE IMPROVEMENT APPROACH BY (INOZU ET AL., 2011)

## 4. Model of (Martin et al., 2010)

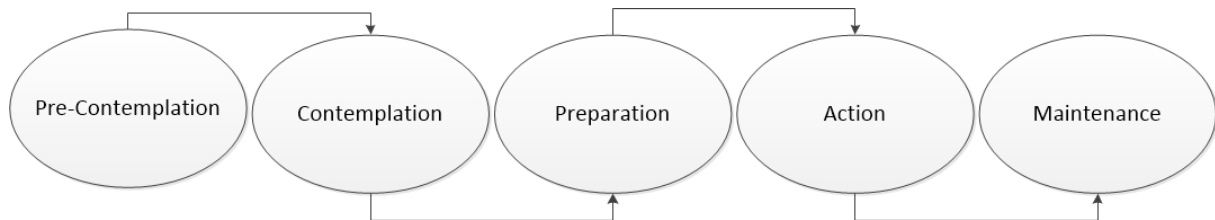


FIGURE 28: THE TRANS-THEORETICAL MODEL OF CHANGE BY (MARTIN ET AL.,2010)

## 5. Model of (Grol et al., 2013)

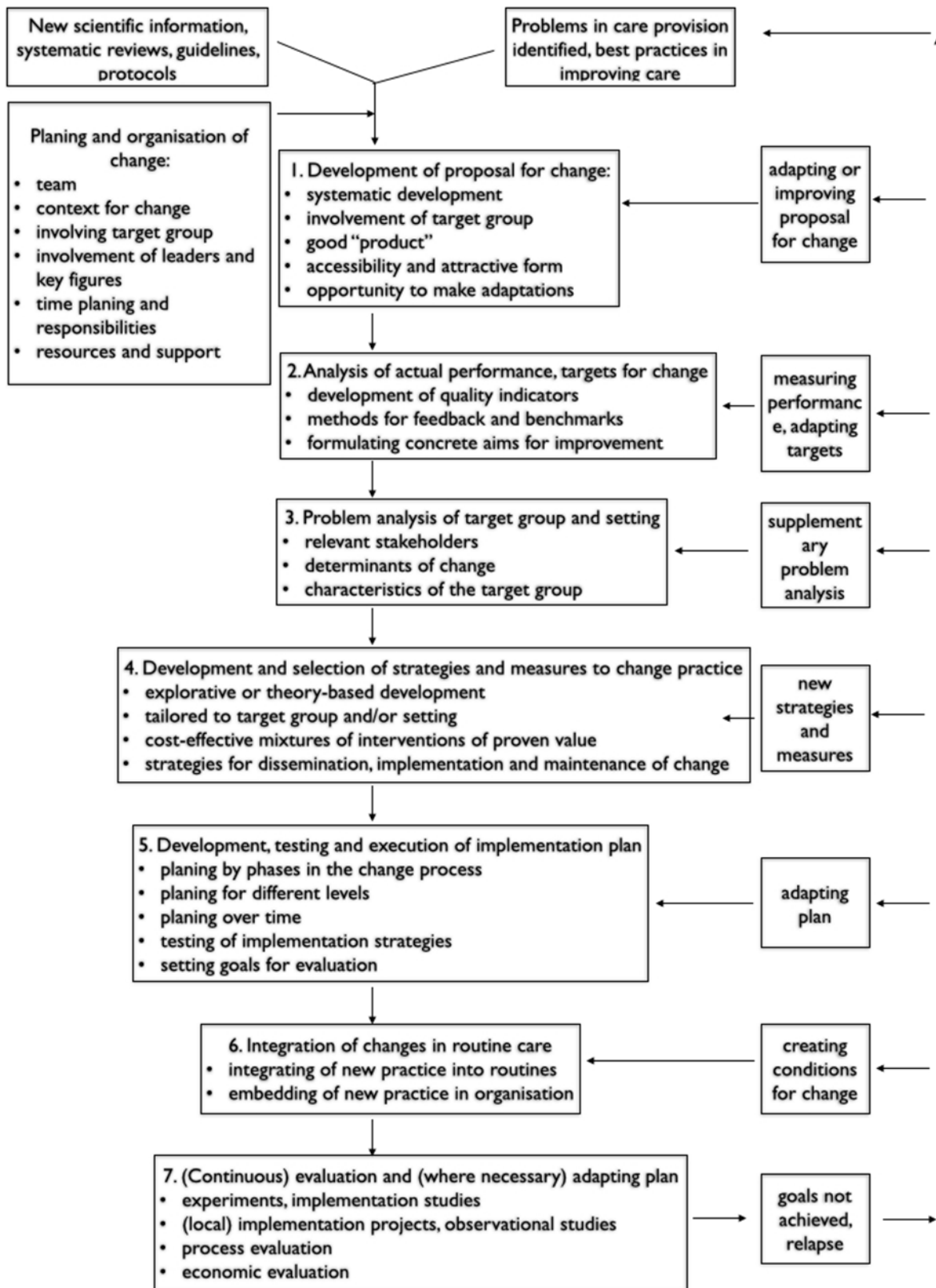


FIGURE 29: THE GROHL AND WENSING IMPLEMENTATION OF CHANGE MODEL (GROL ET AL., 2013)

6. Model of (Elliott et al., 1998)

(Elliott et al., 1998) have developed a three-factor model for complex innovations with multiple contextual elements and confounding variables:

- Predisposition: attitudes, beliefs, knowledge, perception and values that motivate individuals and organisations to implement a particular innovation



- Capacity: the sum of the resources available to the organisation or system for the management and delivery of the implementation process (financial, staff, training, technical assistance, etc)
- Reinforcement: feedback about the innovation’s impact on the target population (if a positive impact is demonstrated that can ensure the sustainability)

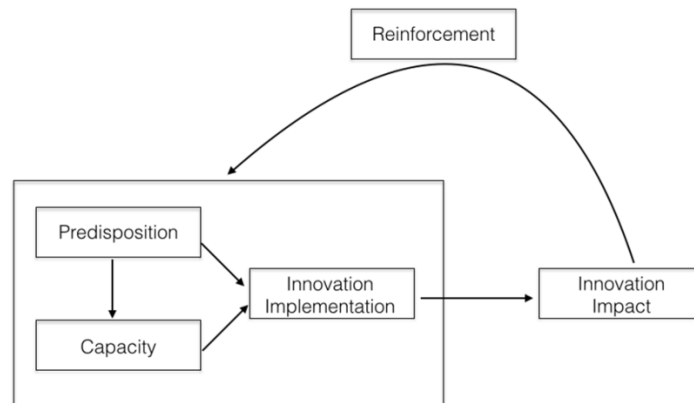


FIGURE 30: ELLIOTT'S THREE FACTOR MODEL (ELLIOTT ET AL., 1998)

7. Model of (Greenhalgh et al., 2008)

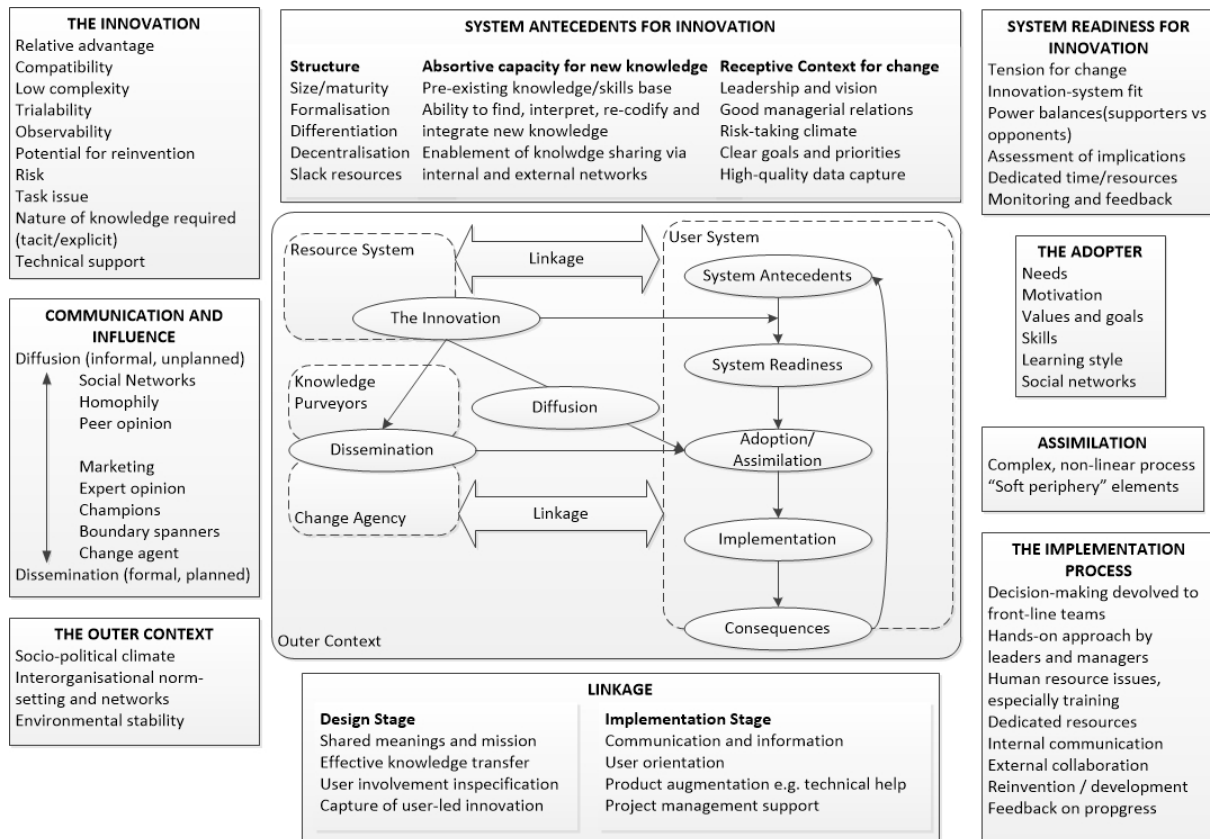


FIGURE 31: A CONCEPTUAL MODEL FOR THE SPREAD AND SUSTAINABILITY OF INNOVATIONS IN SERVICE DELIVERY AND ORGANISATION (GREENHALGH ET AL., 2008)

### 10.3 MODELS EXTRACTED FROM THE LITERATURE ON GENERAL INNOVATION DIFFUSION AND CHANGE MANAGEMENT

#### 8. Model of (Lewin, 1951)

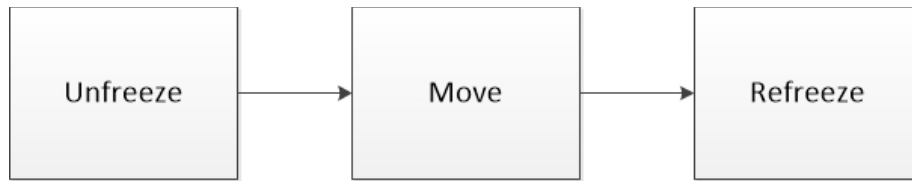


FIGURE 32: LEWIN'S THREE STEP MODEL

#### 9. Model of (Bullock and Batten, 1985)

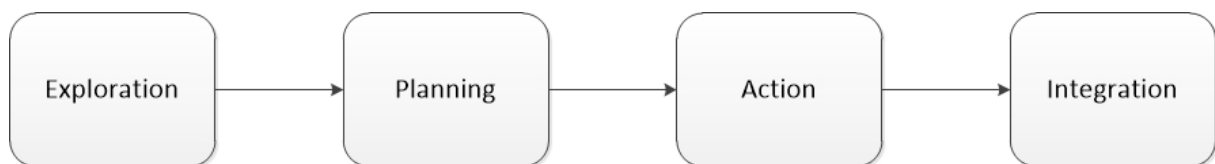


FIGURE 33: CHANGE MODEL (BULLOCK AND BATEN, 1985)

#### 10. Model of (Taffinder, 1999)

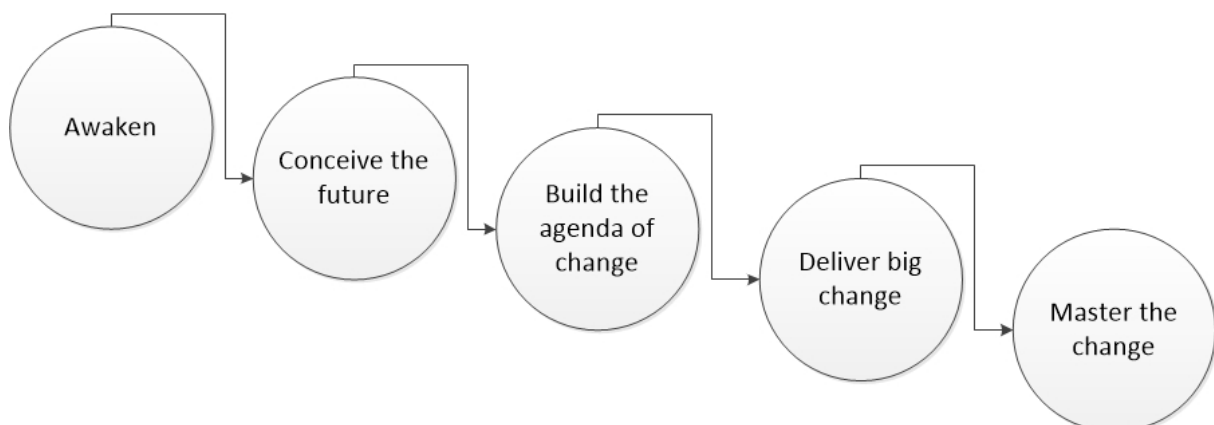


FIGURE 34: TRANSFORMATION TRAJECTORY BY (TAFFINDER, 1999)

#### 11. Model of (Anderson and Anderson, 2010) - The Nine-Phase Change process model

*Phase1:* Prepare to lead the change

*Phase2:* Create organisational vision, commitment and capacity

*Phase3:* Assess the situation to determine the design requirements

*Phase4:* Design the desired state

*Phase5:* Analyse the impact

*Phase6:* Plan and organise for implementation

*Phase7:* Implement the change

*Phase8:* Celebrate and integrate the new state

*Phase9:* Learn and course correct

**12. Model of (Kirkpatrick, 2009) - The Step-by-Step change model**

1. Determine the need or desire for change
2. Prepare tentative plans
3. Analyse probable reactions
4. Make a final decision
5. Establish a time-table
6. Communicate the change
7. Implement the change

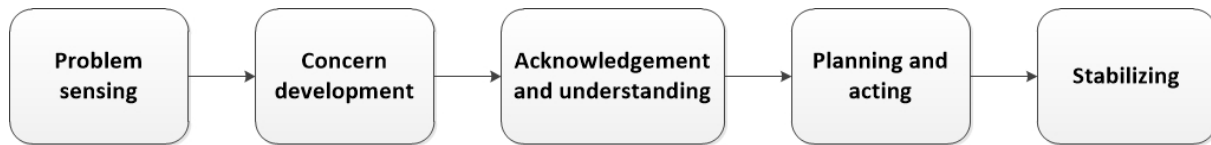
**13. Model of (Palmer et al., 2009)**

FIGURE 35: THE STAGES OF CHANGE (PALMER ET AL.,2009)

**14. Model of (Cawsey et al., 2011a)**

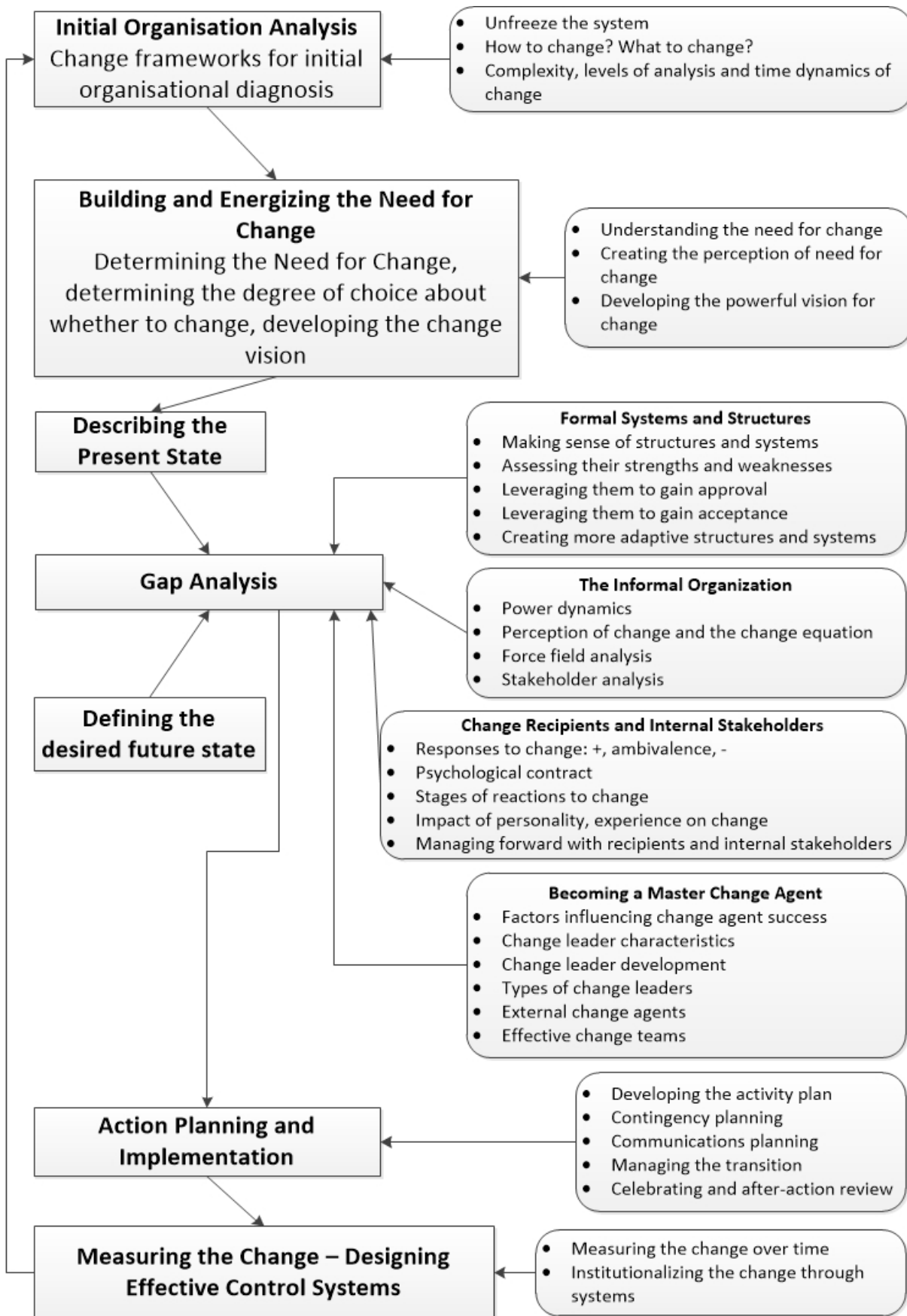


FIGURE 36: MODEL OF ORGANISATIONAL CHANGE (CAWSEY ET AL., 2011)

## 15. Model attributed to Ulrich by (Jabri, 2012) - The 7 step model

1. Lead change
2. Create a shared need
3. Shape a vision
4. Mobilize commitment
5. Change systems and structures monitor progress
6. Monitor progress
7. Make change last

## 16. Model of (Jabri, 2012)

1. Diagnose the current situation. Know your stakeholders – let the customer drive your diagnosis (desired state)
2. Select the highest priority, process or issue; work on creating readiness for change. Consider the requirement in terms of empowerment and participation
3. Keep top management informed & involved to ensure continuation of sponsorship
4. Gather data and system info. Capitalize on information needed; ensure that those who did the research and processed it are involved
5. Consider your strategy on the depth of your intervention
6. Get support
7. Intervene
8. Go for a pilot study; make sure it is through and realistic before moving to full implementation
9. Approach breakdowns of the pilot study positively; transform them into opportunities and breakthroughs
10. Disseminate info and use the pilot study to gain support

## 17. Model of (Luecke, 2003)

1. Mobilize energy, commitment through joint identification of business problems and their solutions
2. Develop a shared vision of how to organise and manage for competitiveness
3. Identify the leadership
4. Focus on results, not activities
5. Start change at the periphery, then let it spread to other units, pushing it from the top
6. Institutionalize success through formal policies, systems and structures
7. Monitor and adjust strategies in response to problems in the change process

## 18. Model of (Kotter, 1995)

1. Establish a sense of urgency
2. Form a powerful guiding coalition
3. Create a vision
4. Communicate the vision
5. Empower others to act on the vision
6. Plan for and create short-term wins
7. Consolidate improvements and produce still more change
8. Institutionalize new approaches

## 19. Model of (Cameron and Green, 2012)

1. Establish the need for change
2. Build the change team
3. Create vision and values
4. Communicate and engage
5. Empower others
6. Notice improvements and energize
7. Consolidate

## 20. Model of (Kanter et al., 2003) - The "Ten commandments"

1. Analyse the need for change
2. Create a shared vision
3. Separate from the past
4. Create a sense of urgency
5. Support a strong leader role
6. Line up political sponsorship
7. Craft an implementation plan
8. Develop enabling structures
9. Communicate and involve people
10. Reinforce and institutionalize change

## 21. Model of (Pendlebury et al., 1998)

- Define the vision
- Mobilize
- Catalyse
- Steer
- Deliver
- Obtain participation
- Handle emotions
- Handle power
- Train and coach
- Actively communicate

## 22. Model of (Nadler, 1997) - The 12 action steps

1. Get support of key power groups
2. Get leaders to model change behaviour
3. Use symbols and language
4. Define areas of stability
5. Surface dissatisfaction with the present conditions
6. Promote participation in change
7. Reward behaviour that supports change
8. Disengage from the old
9. Develop and clearly communicate image of the future
10. Use multiple leverage points
11. Develop transition management arrangements
12. Create feedback

## 23. Model of (Mento et al., 2002) - The 12 step framework

1. Highlight the need for change
2. Define what is the change
3. Evaluate the climate for change
4. Develop a change plan
5. Find and cultivate a sponsor
6. Prepare the recipients of change
7. Create a cultural fit to make the change last
8. Choose and develop a change leader
9. Retain motivation by creating small wins
10. Communicate change constantly and strategically
11. Measure the change process
12. Integrate the lessons learned from the change

## 24. Model of (Light, 2005)

1. Create a sense of urgency
2. Remove the barriers to success
3. Recruit the champions
4. Build internal momentum
5. Prove that change works
6. Keep experimenting

## 25. Model of (Leppitt, 2006) - The Integrated model

1. Understand the context
2. Understand the vision and strategy
3. Create and communicate the urgency for change
4. Build consensus for the change
5. Establish clear leadership
6. Build organisational capacity
7. Plan what resources will be needed
8. Plan the life-cycle of the change
9. Secure needed resources
10. Have a clear change management delivery structure
11. Enable quick wins
12. Establish and monitor change metrics
13. Consolidate and integrate change lessons

## 26. Model of (Nadler and Tushman, 1989)

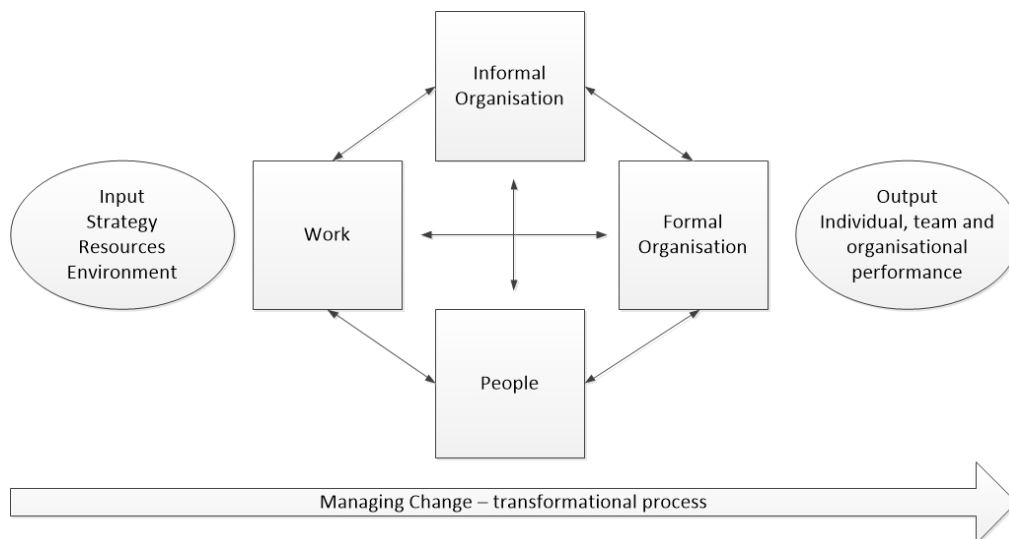


FIGURE 37: CONGRUENCE MODEL FOR CHANGE MANAGEMENT (NADLER AND TUSHMAN, 1989)

27. Model of (Carnall, 2007)



FIGURE 38: CARNALL'S CHANGE MANAGEMENT MODEL (CARNALL, 2007)

28. Model of (Burke, 2002)

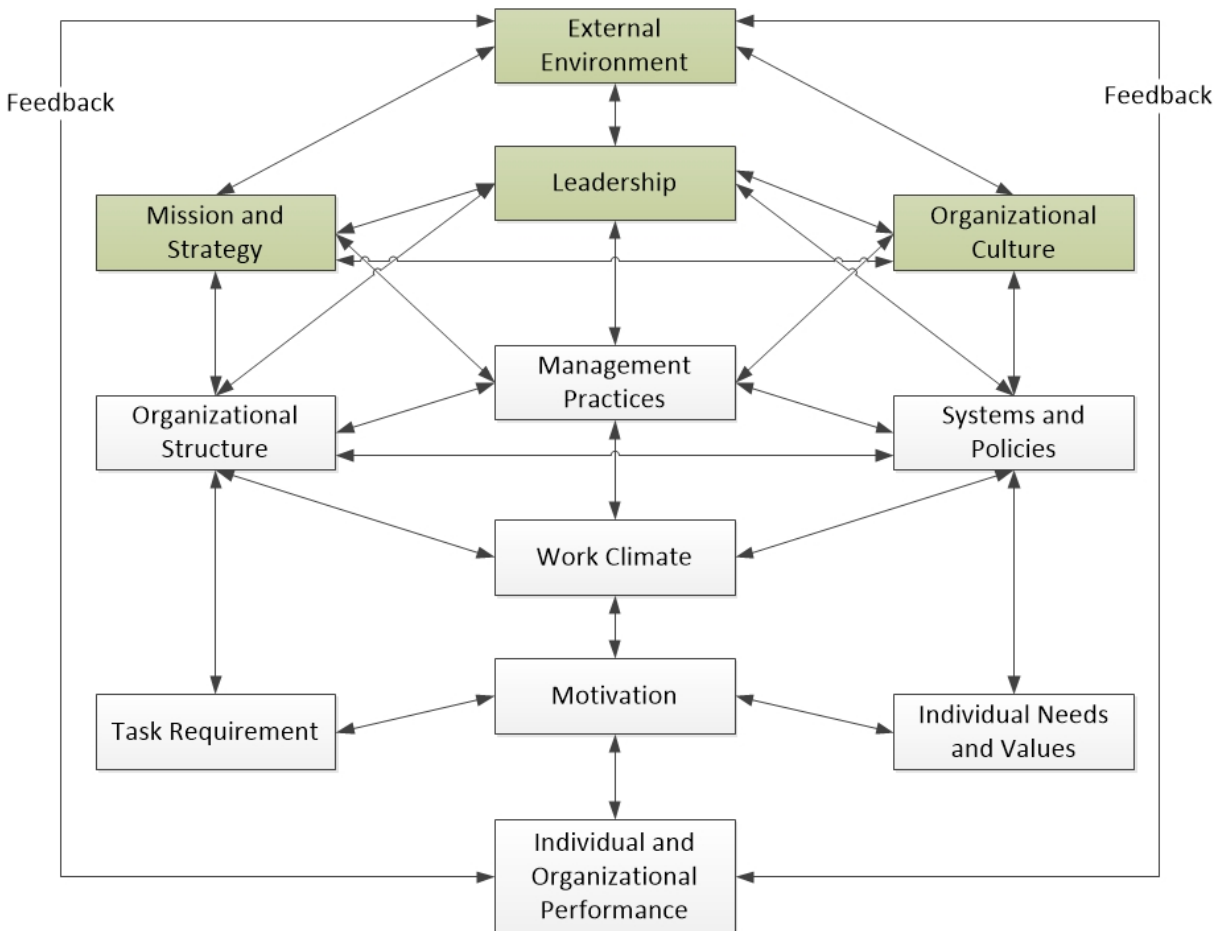


FIGURE 39: TRANSFORMATIONAL AND TRANSACTIONAL FACTORS OF CHANGE DYNAMICS (BURKE, 2002)



29. Model of (Sterman, 2001)

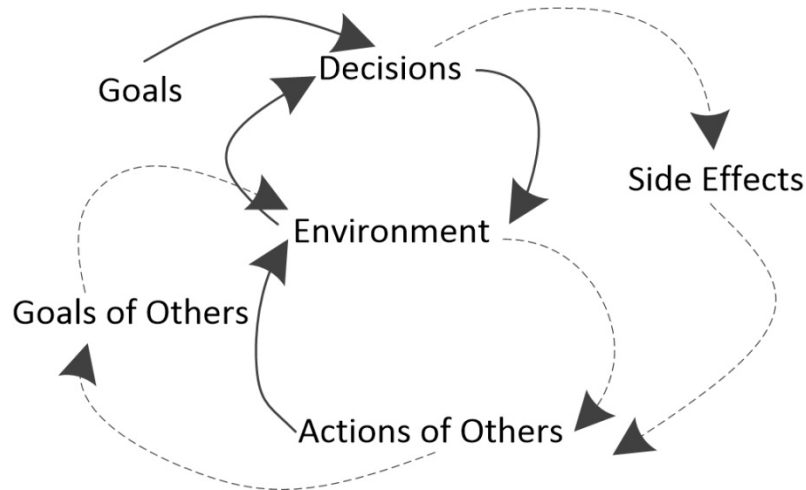


FIGURE 40: SYSTEM DYNAMICS MODEL OF CHANGE (STERMAN, 2001)

30. Model of (Yetton et al., 1999)

“Innovation characteristics theory identifies and explains the impact on performance at the individual level of analysis, whereas implementation process theory identifies and explains the impact on performance at the group level of analysis.”

The findings suggest that managers “need to develop strategies, and allocate resources between the design stage and the implementation stage, contingent upon the implementation context. For low task interdependence innovations, the design of the innovation is critical to implementation success and more attention needs to be paid to the design stage than the implementation stage. Conversely, high task interdependence innovations require a high level of managerial effort during the implementation stage.”

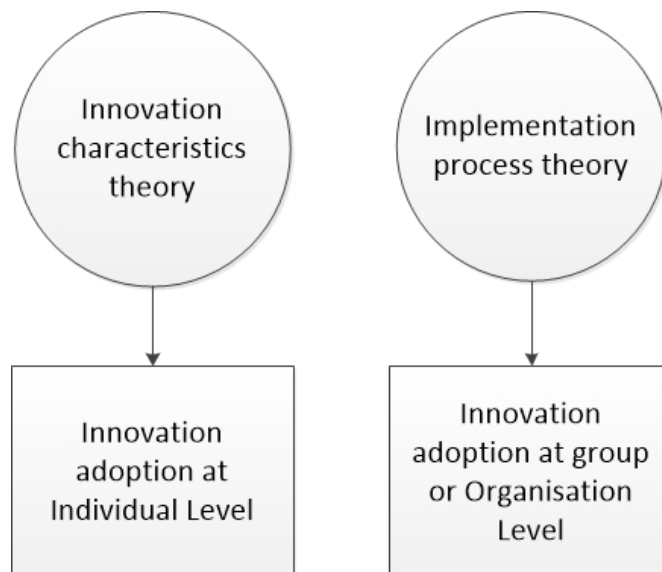


FIGURE 41: THE (YETTON ET AL., 1999) MODEL

31. Model of (Rogers, 2010)

(Rogers, 2010)'s diffusion of innovation model supports the idea that the adoption of innovation by the population follows a predictable pattern portrayed in Figure 42.

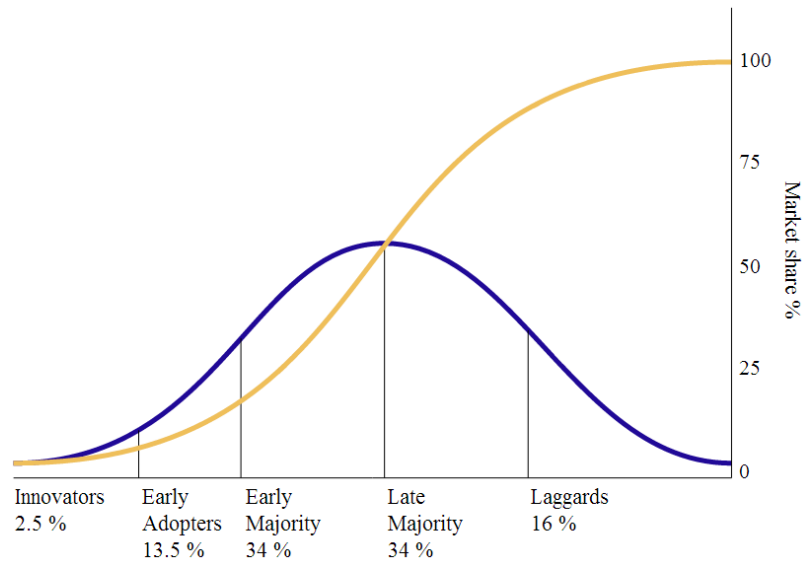


FIGURE 42: THE ADOPTION CURVE WITH THE DISTRIBUTION OF THE POPULATION BY TYPE (ROGERS, 2010)

32. Model of (Van de Ven et al., 2008)

The innovation journey is a nonlinear cycle of divergent and convergent activities that may repeat over time and at different organisational levels if resources are obtained to renew the cycle.

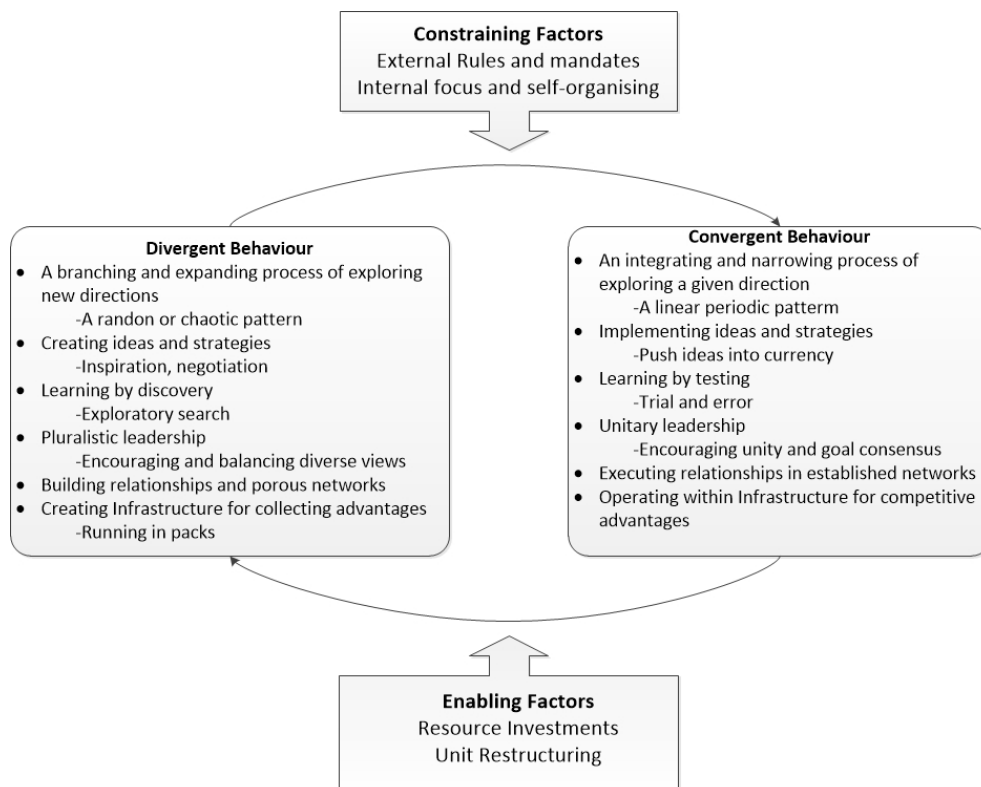


FIGURE 43: CYCLICAL MODEL OF DIVERGENT AND CONVERGENT ACTIVITIES (VAN DE VEN ET AL., 2008)

## 33. Model attributed to Beckhard by (Cameron and Green, 2012) - Beckhard's change formula

$$C = [ABD] > X$$

- C = change
- A = level of dissatisfaction with the status quo
- B = desirability of the proposed change or end state
- D = practicality of the change (minimal risk and disruption)
- X = Cost of changing

## 10.4 SUMMARY OF THE FREE TEXT SYNTHESIS

TABLE 3: INTEGRATIVE SYNTHESIS OF THE FREE TEXT - PRE-EXECUTION STAGE

Pre-Execution Stage		
Step	Action	Source
Awareness creation	<ul style="list-style-type: none"> <li>• Give Description</li> <li>• Explain advantage</li> <li>• Explain impact</li> </ul>	(Meyer and Goes, 1988) (Gustafson et al., 2003) (Taffinder, 1999)
Proposal for change development	<ul style="list-style-type: none"> <li>• Accessibility and attractiveness</li> <li>• Adaptability</li> <li>• Problem formulation (root cause analysis)</li> </ul>	(Grol et al., 2013) (Inozu et al., 2011) (Jabri, 2012) (Anderson and Anderson, 2010) (Taffinder, 1999) (Kirkpatrick, 2009)
Advantage proving	<ul style="list-style-type: none"> <li>• Clear, relevant and important research evidence</li> <li>• Previous implementation evidence</li> </ul>	(Taylor et al., 1998) (Kitson et al., 1998) (Dearing, 2009) (Rycroft-Malone et al., 2002)
Need assessment	<ul style="list-style-type: none"> <li>• Innovation is the solution to the existing need</li> <li>• Problem identification</li> <li>• Problem analysis</li> </ul>	(Gustafson et al., 2003) (Hewitt-Taylor, 2013) (Cawsey et al., 2011) (Klein, 1996) (Palmer et al., 2009) (Mento et al., 2002) (Kanter et al., 2003) (Kirkpatrick, 2009)
Target group analysis	<ul style="list-style-type: none"> <li>• Stakeholder analysis: Overview</li> <li>• Characteristics and determinants of change</li> <li>• Level of resistance/adherence</li> <li>• Buy-in</li> <li>• Barriers tackling</li> <li>• Force field analysis</li> </ul>	(Grol et al., 2013) (Inozu et al., 2011) (Morrow, 2012) (Butler and Caldwell, 2008) (Cawsey et al., 2011a) (Rogers, 2010) (Cameron and Green, 2012) (Zmud, 1984) (Lewin, 1951) (Kirkpatrick, 2009) (Light, 2005)
Innovation match/fit to opportunity/organisation	<ul style="list-style-type: none"> <li>• National/regional/local directives</li> <li>• Community need</li> <li>• Values/mission/vision</li> </ul>	(Zaltman et al., 1973) (Taylor et al., 1998) (Gustafson et al., 2003) (Cawsey et al., 2011) (Palmer et al., 2009) (McCormick et al., 1995)
Implementation project match/fit to resources availability	<ul style="list-style-type: none"> <li>• Financial resources</li> <li>• Staff resources</li> <li>• Time resources</li> <li>• Knowledge and skills</li> </ul>	(Taylor et al., 1998) (Buchanan et al., 2006)
Strategic evaluation	<ul style="list-style-type: none"> <li>• Alignment w goals/objectives</li> <li>• Strategic gap analysis</li> <li>• SWOT analysis</li> </ul>	(Meyer and Goes, 1988) (Inozu et al., 2011) (Van de Ven and Poole, 2005)

Fiscal evaluation	<ul style="list-style-type: none"> <li>• Cost vs benefits analysis</li> </ul>	(Meyer and Goes, 1988) (Zaltman et al., 1973) (Buchanan et al., 2006)
Adoption decision (buy in)	<ul style="list-style-type: none"> <li>• Advantages perception higher than cost/effort</li> </ul>	(Gustafson et al., 2003) (Green, 1998a) (Anderson and Anderson, 2010) (Kirkpatrick, 2009)
Current performance analysis	<ul style="list-style-type: none"> <li>• Measurement of performance indicators</li> <li>• Gap analysis</li> </ul>	(Grol et al., 2013) (Inozu et al., 2011) (Morrow, 2012) (Cameron and Green, 2012) (Jabri, 2012) (Anderson and Anderson, 2010)
Change readiness assessment	<ul style="list-style-type: none"> <li>• Communication, culture, leadership, organisation and skill assessment</li> </ul>	(Inozu et al., 2011) (Cawsey et al., 2011) (Cameron and Green, 2012) (Jabri, 2012) (Gabel, 2001b)
Team establishment	<ul style="list-style-type: none"> <li>• Role definition</li> <li>• Cooperation among units/departments</li> <li>• Type: multidisciplinary / interdisciplinary / trans-disciplinary</li> <li>• Manageable size</li> </ul>	(Taylor et al., 1998) (Meyers et al., 1999) (Hewitt-Taylor, 2013) (Grol et al., 2013) (Buchanan et al., 2006) (Cawsey et al., 2011) (Cameron and Green, 2012) (Palmer et al., 2009) (Rycroft-Malone et al., 2002) (Schilling and Hill, 1998)
Leadership definition	<ul style="list-style-type: none"> <li>• Leader appointment</li> <li>• Coordination</li> <li>• Leader involvement and support (including emotional)</li> </ul>	(Taylor et al., 1998) (Gustafson et al., 2003) (Green, 1998a) (Buchanan et al., 2006) (Cameron and Green, 2012) (Gabel, 2001) (Mento et al., 2002) (Anderson and Anderson, 2010) (Kanter et al., 2003) (Leppitt, 2006) (Luecke, 2003)
Motivation for change	<ul style="list-style-type: none"> <li>• Clear and SMART aims and objectives</li> <li>• Organisational and personal priorities</li> </ul>	(Hewitt-Taylor, 2013) (Cawsey et al., 2011) (Cameron and Green, 2012)
Team development	<ul style="list-style-type: none"> <li>• Shared meaning</li> <li>• Reflective practice</li> <li>• Joint decision making</li> <li>• Mutual support &amp; collaboration</li> <li>• Open communication and dialogue</li> </ul>	(Edmondson et al., 2001) (Buchanan et al., 2006) (Cameron and Green, 2012) (Gabel, 2001) (Kanter et al., 2003) (Nadler, 1997) (Schilling and Hill, 1998) (Green, 1998)
Work set-up definition	<ul style="list-style-type: none"> <li>• Structure, roles, leadership, incentive system definition, changes and added value</li> <li>• Outcome focused working</li> </ul>	(Gustafson et al., 2003) (Green, 1998) (Cawsey et al., 2011)
Value definition	<ul style="list-style-type: none"> <li>• Professional work-process value</li> </ul>	(Green, 1998) (Mento et al., 2002) (Zmud, 1984)

Capacity creation (leads to psychological safety)	<ul style="list-style-type: none"> <li>• Resource allocation</li> <li>• Knowledge creation and transfer</li> <li>• Skill development for the use of the innovation/technology</li> <li>• Education and training</li> <li>• Preparatory sessions</li> <li>• Team-building activities</li> <li>• Change agency</li> </ul>	(Elliott et al., 1998) (Taylor et al., 1998) (Meyers et al., 1999) (Edmondson et al., 2001) (Inozu et al., 2011) (Cawsey et al., 2011) (Jick, 1993) (Cameron and Green, 2012) (Jabri, 2012) (Leppitt, 2006) (McCormick et al., 1995)
Execution plan development	<ul style="list-style-type: none"> <li>• How?-pilot/parallel/big-bang/trial PDCA</li> <li>• Action plan creation:</li> <li>• Aim formulation</li> <li>• Breakdown of execution in phases – what and how to change</li> <li>• Deployment metrics definition</li> <li>• Resource distribution and responsibility assignment</li> <li>• Duration definition</li> <li>• Cost definition – cost effectiveness</li> <li>• Outcome definition for each sub-stage and milestones</li> <li>• Flexibility/buffer</li> <li>• Document plan and process</li> <li>• Inclusion of all relevant disciplines and levels (+champions)</li> <li>• Communication plan (who, what, when,...)</li> <li>• Contingencies for set-backs</li> </ul>	(Hewitt-Taylor, 2013) (Grol et al., 2013) (Inozu et al., 2011) (Cawsey et al., 2011) (Palmer et al., 2009) (Jabri, 2012) (Mento et al., 2002) (Anderson and Anderson, 2010) (Taffinder, 1999) (Kanter et al., 2003) (Leppitt, 2006) (Kirkpatrick, 2009) (Burke, 2002) (Yetton et al., 1999) (Plsek, 1995) (Meyer and Goes, 1988) (Butler and Caldwell, 2008) (Buchanan et al., 2006)
Predisposition creation	<ul style="list-style-type: none"> <li>• Commitment &amp; involvement of staff</li> <li>• Staff enthusiasm</li> <li>• Top management support</li> </ul>	(Elliott et al., 1998) (Meyers et al., 1999) (Hewitt-Taylor, 2013) (Palmer et al., 2009) (Jabri, 2012) (Mento et al., 2002)

TABLE 4: INTEGRATIVE SYNTHESIS OF THE FREE TEXT - EXECUTION STAGE

Execution Stage		
Step	Action	Source
Monitoring	<ul style="list-style-type: none"> <li>• Measuring KPIs</li> </ul>	(Gustafson et al., 2003) (Cawsey et al., 2011a) (Cameron and Green, 2012) (Mento et al., 2002) (Leppitt, 2006) (Luecke, 2003)
Data collection		(Green, 1998a) (Plsek, 1995)
Feedback		(Gustafson et al., 2003) (Klein, 1996) (Nadler, 1997)
Motivation maintenance	<ul style="list-style-type: none"> <li>• Appreciate/reward efforts</li> <li>• Show own engagement</li> </ul>	(Cawsey et al., 2011) (Hewitt-Taylor, 2013) (Mento et al., 2002) (Cameron and Green, 2012) (Nadler, 1997) (Pendlebury et al., 1998)

Communication maintenance	<ul style="list-style-type: none"> <li>• Regular updates</li> <li>• Reaction to deviations</li> <li>• Aim reminder</li> <li>• Integrity and ethics</li> </ul>	(Hewitt-Taylor, 2013) (Cawsey et al., 2011)
Provide support	<ul style="list-style-type: none"> <li>• Psychological support for staff</li> </ul>	(Cawsey et al., 2011) (Cameron and Green, 2012) (Gabel, 2001)
Problem management	<ul style="list-style-type: none"> <li>• Deal with people's concerns</li> <li>• Managing the transition</li> </ul>	(Cawsey et al., 2011) (Gabel, 2001)
Complexity mitigation		(Gustafson et al., 2003)
Focus on operational issues		(Green, 1998)

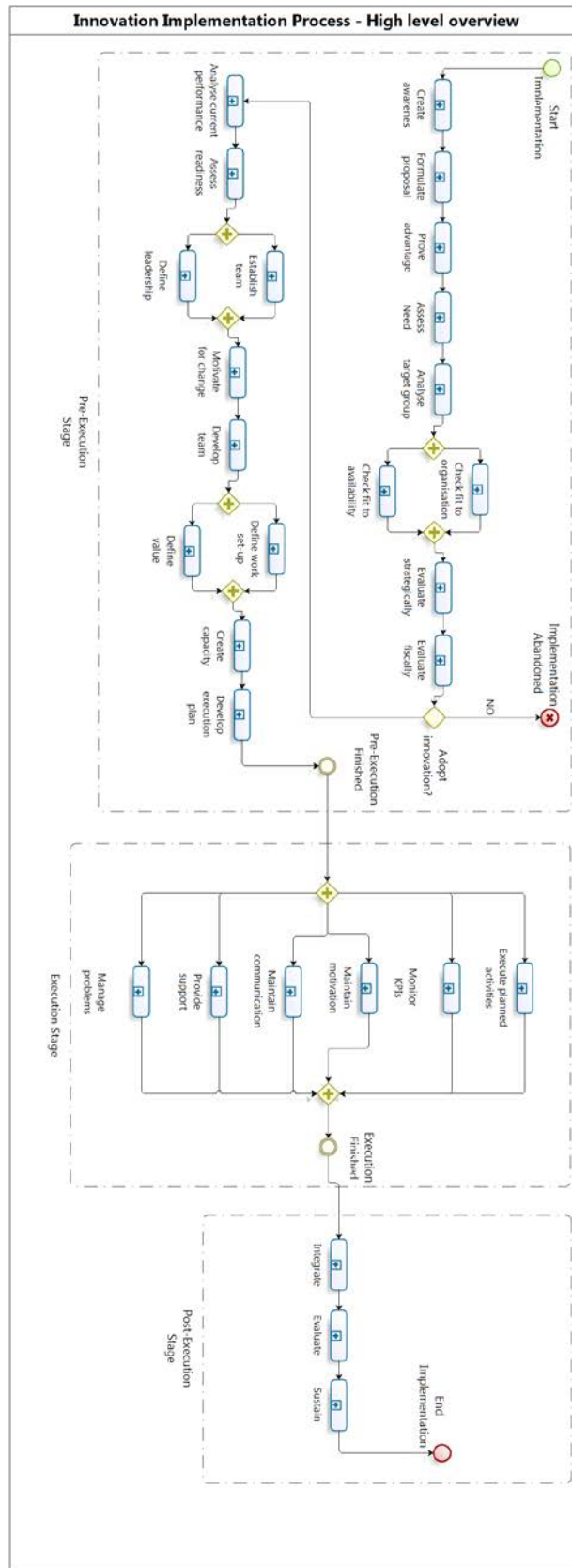
TABLE 5: INTEGRATIVE SYNTHESIS OF THE FREE TEXT - POST-EXECUTION STAGE

<b>Post-Execution Stage</b>		
<b>Step</b>	<b>Action</b>	<b>Source</b>
Integration	<ul style="list-style-type: none"> <li>• Ensure needed resources</li> <li>• Maintain communication</li> <li>• Show results</li> </ul>	(Zaltman et al., 1973) (Meyer and Goes, 1988) (Hewitt-Taylor, 2013) (Grol et al., 2013) (Buchanan et al., 2006) (Palmer et al., 2009) (Mento et al., 2002) (Anderson and Anderson, 2010) (Kanter et al., 2003) (Leppitt, 2006) (Bullock and Batten, 1985) (Butler and Caldwell, 2008) (Luecke, 2003) (Cameron and Green, 2012) (Taffinder, 1999) (Jabri, 2012)
Evaluation	<ul style="list-style-type: none"> <li>• Fulfilment of aims and objectives</li> <li>• Process evaluation</li> <li>• Financial evaluation</li> </ul>	(Gustafson et al., 2003) (Morrow, 2012) (Hewitt-Taylor, 2013) (Grol et al., 2013) (Klein, 1996) (Buchanan et al., 2006) (Cameron and Green, 2012) (Butler and Caldwell, 2008) (Anderson and Anderson, 2010) (Cawsey et al., 2011) (Mento et al., 2002) (Palmer et al., 2009) (Nadler, 1997) (Plsek, 1995) (Light, 2005) (Kotter, 1995)
Sustainment	<ul style="list-style-type: none"> <li>• Financial validation</li> <li>• Reward and recognition</li> <li>• Mentoring of new staff</li> <li>• Define the factors that affect sustainability and address them</li> <li>• Leverage of lessons learned</li> </ul>	(Inozu et al., 2011) (Hewitt-Taylor, 2013) (Buchanan et al., 2006) (Cawsey et al., 2011) (Cameron and Green, 2012) (Palmer et al., 2009) (Taffinder, 1999) (Luecke, 2003) (Jabri, 2012) (Morrow, 2012) (McCormick et al., 1995) (Edmondson et al., 2001) (Kirkpatrick, 2009) (Burke, 2002)

10.5 CONCEPTUAL DESIGN OF THE CHANGE PROCESS MODEL

10.5.1 DESIGN ITERATION 1 – HIGH LEVEL PROCESS

FIGURE 44: RESULT OF CONCEPTUAL DESIGN ITERATION 1 - HIGH LEVEL PROCESS





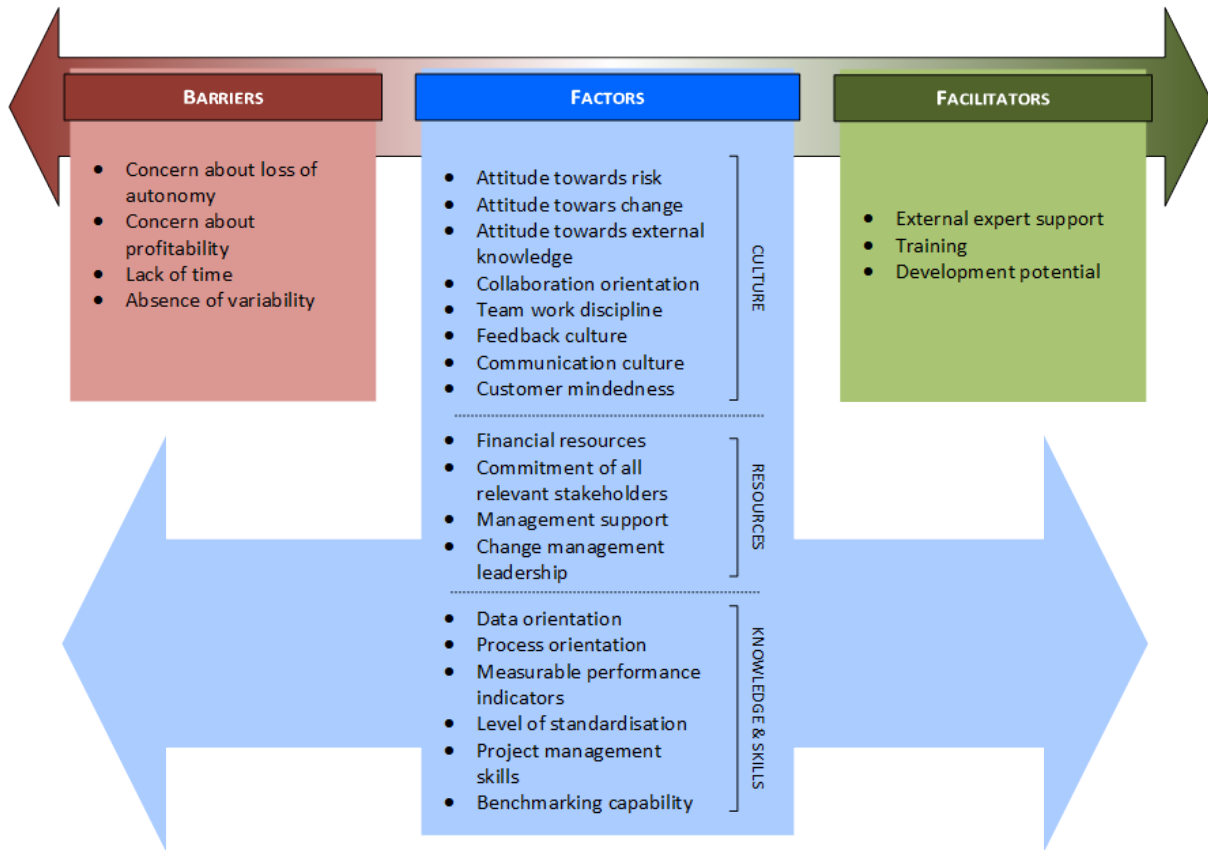
## 10.5.2 DESIGN ITERATION 3 – LOW LEVEL PROCESS VERSION 2

TABLE 6: SYSTEMIC INTEGRATION OF THE RESULTS FROM THE G<sub>22</sub> GROUP OF MODELS WITH A GUIDELINE APPROACH INTO THE CONCEPTUAL DESIGN

	Factor/Guideline		Existing		New	
		Cluster	Action	Cluster	Action	
Pre-execution stage	Strong need for change	Asses need				
	Sense of urgency	Motivation for change	Define priorities			
	Strong, shared vision	Motivation for change				Communicate vision
	Strong values	Define value				Identify value related to innovation Communicate and discuss value
	Provide supporting evidence	Prove advantage				
	Climate for change	Assess readiness	Assess cultural readiness Assess organisational readiness			
	Powerful coalition	Analyse target group	Establish buy-in level			
	Political sponsorship			Communicate political sponsorship		
	Support of key power groups	Establish team				Identify key advocates and power groups
	Dedicated change team	Establish team				
	Strong leader role	Define leadership				
	Build capacity	Create capacity				
	Implementation plan Resources Timeline Clear delivery structure	Develop execution plan				Establish time-line Attribute resources Communicate execution plan
	Pilot/small-scale	Develop execution plan	Decide type of roll-out			
	Focus on results	Develop execution plan				Decide implementation deliverables
	Use symbols					
	Enabling structures	Create capacity				
	Training, coaching	Create capacity				
	Communication			Communicate political sponsorship		
		Motivate for change				Communicate vision
	Develop team	Establish communication & dialogue				

	Define value		Communicate and discuss value
	Develop execution plan		Communicate execution plan
Handle emotions	Develop team		
Empowerment	Develop team	Build joint decision making	
	Create capacity		
Reward pro-change behaviour	Define work set-up	Outline incentive system	
Tackle barriers	Manage problems		
Measure change process metrics	Monitor implementation performance		
Short term wins	Maintain motivation		Communicate positive intermediate results
Keep energy level	Maintain motivation		
Feedback	Manage problems		Collect feedback Act upon feedback
Focus on results	Maintain motivation		Communicate positive intermediate results
	Maintain communication	Provide updates	
Enabling structures	Provide support		
Handle emotions	Provide support		
	Manage problems		
	Maintain communication	Deal with concerns	
Reward pro-change behaviour	Maintain motivation	Reward positive behaviour	
Communication	Maintain communication		
Consolidation	Sustain		
Institutionalization	Integrate		
Leverage lessons learned	Sustain	Leverage lessons learned	
Reward pro-change behaviour	Sustain	Reward results	
Communication	Evaluate	Communicate results	
	Integrate	Maintain communication	

FIGURE 45: SUMMARY OF THE RESULTS OF THE LITERATURE REVIEW ON "FACILITATOR AND BARRIERS OF BUSINESS PROCESS (RE)DESIGN IN HEALTHCARE"

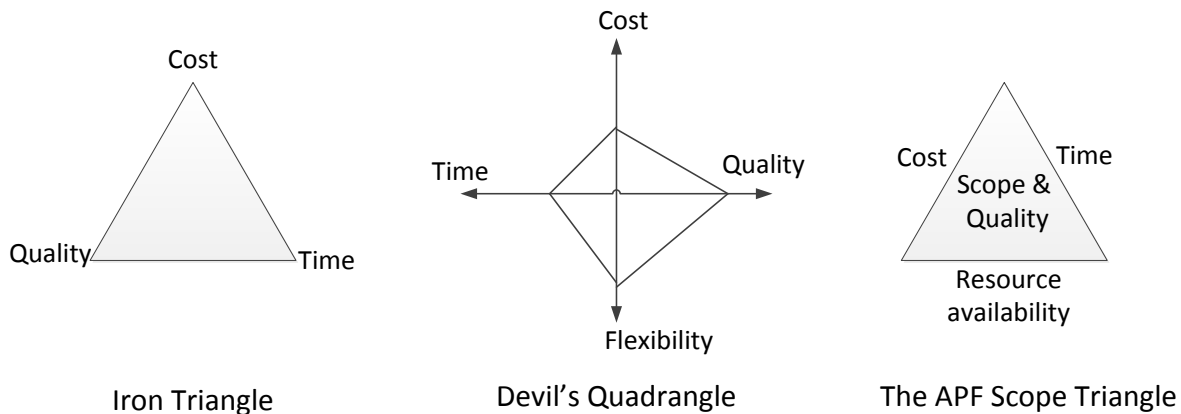


10.6 SUMMARY OF THE INVESTIGATION CONDUCTED INTO IMPLEMENTATION-RELATED KPIS

Although the selected body of literature for the analysis phase cannot be claimed to be exhaustive, it has been chosen as a representative sample for the investigated areas of healthcare, general innovation diffusion and change management. The absolute lack of implementation KPIs in this literature sample is thus surprising and intriguing. This matter was subjected to further, more focused investigation in a secondary literature search specifically on KPIs which is detailed in the following section, Appendix 10.7. Out of the search results, only seven articles presented an abstract relevant to the question at hand and only four were of actual interest. (Bai and Sarkis, 2013) discusses the evaluation of business processes and (Botta-Genoulaz and Millet, 2006) is one of the many articles on ERP implementation with the distinction that it approaches specifically the healthcare context. Both articles conclude a set of critical success factors, which are not quantifiable and the authors make no attempt to define accompanying KPIs. (Bryde, 2005) investigates influences on methods to manage project KPI sets, but does not name specifically any given set of KPIs, other than *the iron triangle* of cost, time and quality. Again from the business process management field, (Pourshahid et al., 2007) and (Reijers and Limanmansar, 2005) advocate *the devil's quadrangle* of cost, time, quality and flexibility as the dimensions of indicators by which a process can be monitored and evaluated.

Because the combination between the nature of the desired innovation implementation process and the single organisation setting is similar to a classical project implementation, an investigation into project management literature revealed a somewhat similar KPI constellation, the *scope triangle* defined by (Wysocki, 2010) in his book about adaptive project framework. The scope triangle consists of cost, time, resource availability and scope & quality.

FIGURE 46: KPI SETS EXTRACTED FROM LITERATURE



The KPI sets extracted from literature and summarised in Figure 46, all support the notion of KPI interdependence: one KPI dimension influences the others and the variation of a certain KPI dimension brings variation in another. Although these KPI constellations do not define the exact dependency between the dimensions, they all employ examples such as: higher quality can be achieved with a higher cost or/and a longer duration.

For the practical usability of the implementation process model, suitable performance indicators are of great interest. The measure or value of these indicators should portray a certain level of performance and, implicitly, of success of the implementation project.

As it has been pointed out in the literature review already (Bujor, 2013), there is a lack of agreement and consistency in the way in which project success is defined in healthcare. (Berg, 2001) proposes the following dimensions as definition of success for the implementation of new information systems in healthcare: *effectiveness, efficiency, organisational attitudes and commitment, worker satisfaction and patient satisfaction*. These dimensions are, however, in this form, not measurable. Thus, the measurable indicators behind these dimensions need to be found.

Although no implementation process or project indicators are formulated in the reviewed literature of the analysis phase, performance indicators can be deduced by analysing and interpreting the concerns and decision factors which are described in literature.

By combining the findings from the specific literature on KPIs with the deduction of performance indicators from the synthesized literature, a set of KPIs can be established to particularly characterize the innovation implementation process in a healthcare organisation. The free text synthesis was the source for the identification of concerns, from which the performance indicators could be deduced. In the following sections references are made to Table 3, Table 4 and Table 5 in Appendix 10.4.

### **Cost**

Implicitly, all the literature investigated in the analysis step acknowledges cost to be a key performance indicator for the implementation of a new product or work practice in a healthcare organisation. Whether referred to directly as the amount of money spent for the acquisition and implementation of the innovation, as described by (Meyer and Goes, 1988) or referred to in indirect terms such as effort, cost is a major concern when an organisation is contemplating the adoption of an innovation (Proctor et al., 2013).

The *Fiscal evaluation* and *Adoption decision* steps identified for the Pre-Execution stage clearly indicate that cost is a key factor in the implementation project. The rule defined by these steps is that the advantage of the innovation should be higher than the cost of acquiring it. The lower the cost of the implementation, the lower the overall cost of the acquisition and thus the more advantageous the endeavour becomes. The *Execution plan development* step also emphasizes the importance of cost by exposing the necessity of defining the cost of the execution and of showing that the execution is cost-effective.

Other steps also point to cost as an important factor, although they don't explicitly contain the word cost. The issue of resources and resource availability is recurring in several steps, such as *Implementation project match/fit to resources availability, Capacity creation* and *Execution plan development*. In the scope triangle, this aspect represents a separate KPI dimension, but resources can easily translate into cost, although they

may not be of the financial type. For the particular context at hand, the energy and time that the staff has to invest for the implementation of the innovation is a cost for the organisation. Whether that translates into overtime or lost income through time re-allocation from cure and care to implementation, the financial impact of that can be measured or at least approximated.

Besides being a component of the iron triangle and of the devil's quadrangle, cost can be one of the performance indicators behind (Berg, 2001)'s dimensions *effectiveness* and *efficiency*. *Effectiveness* is translated into adequate return in relation to cost and *efficiency* is translated into the good use of the resources for the intended purpose.

### **Lapse time**

Time is a component of all KPI sets presented in Figure 46. Time is also a characteristic of efficiency and can, alongside cost, be the materialisation of (Berg, 2001)'s *efficiency* dimension.

It can be found as a concern in the *Implementation project match/fit to resources availability*, *Capacity creation* and *Execution plan development* steps. The name of lapse-time has been chosen because in the context of the implementation process the relevant time is the duration between the decision of adopting the innovation and the moment of benefiting from its results. The shorter the lapse-time, the sooner the benefits of the innovation come into effect, thus the higher the advantage. In the cases of high necessity, in which the innovation solves a pressing problem, the duration becomes even more salient.

### **Integration**

Integration or sustainment is a step in its own during the Post-Execution stage, which shows the importance of this aspect. The very purpose of the implementation process is to bring a certain innovation to use in a healthcare organisation. The failure to embed, to achieve a long term, sustained use of the innovation represents the failure of the implementation project. That is because the benefits brought by the use of an innovation depend on its actual use in practice.

To make this clearer an exemplification with a fictitious innovation is provided. A new, innovative surgical instrument promises a higher precision. The implementation process results in the surgical instrument being acquired by the healthcare organisation, being physically available in stock and having the surgeons trained and fully capable to use the surgical instrument. However if, for whatever reason, the surgical tool remains in storage and does not make it into the actual surgical kit that is handed to the surgeon during interventions, the higher precision benefit of the innovation will be lost and the implementation process will have failed.

The implementation process has to ensure that the innovation becomes common practice, part of the standard procedure and ideally, so well established, that it is no longer regarded as something new.

(Berg, 2001) expresses this dimension as *organisational attitude and commitment*. The integration depends on several requirements being fulfilled, like in the case of the example above, the surgical instrument becoming part of the surgical kit. While the implementation process can entail actions for this kind of "technical" requirements, for the issue of attitude and commitment it is more difficult to devise actions. If the staff does not want to use the innovation or are not committed to its use and stop using it after a while, the benefits will not manifest. The issue of attitude and commitment are most often quoted as reason for failed projects and new initiatives.

From the perspective of the KPI sets of Figure 46, the integration can be the materialisation of the quality dimension. Although there is no obvious link between the two, integration is, in the case of the implementation process, the measure of quality. The implementation process has the purpose of bringing an already existent innovation to use in a healthcare organisation. The characteristics of the innovation are not dependent on the implementation process. The inner quality of the innovation is dependent on the developer of the innovation and the promised benefits will manifest if the innovation is used in the intended or prescribed manner. The implementation process needs to ensure this proper use of the already established innovation. Thus the quality of the implementation process lies with its ability to ensure this prescribed usage to a maximum extent. For the example used before, this would mean that every surgical kit in the given organisation would contain the innovative surgical tool and that every surgeon would use this innovative surgical tool in all cases for which it is appropriate to use it. This would represent a 100% fulfilment of the goal of the implementation process.

The integration is an essential performance indicator, and a low score for this KPI can alone represent the failure of the implementation process.

### **Emotional impact**

Many of the analysed publications draw attention towards the emotional and psychological aspect of change. The innovation implementation process' purpose is to introduce a new, innovative product or service into the work practice of a healthcare organisation. This process of change is disruptive to the stakeholders involved, especially to the ones whose work is directly influenced by the implementation, usually the medical staff. Almost all publications analysed advocate the notion of support. The support is either emotional or its existence leads to psychological safety.

(Gabel, 2001) presents in his book the dramatic transition process that change represents for people and emphasizes the intense emotional response that staff can have when faced with the implementation of an innovation. He describes that people go through emotional stages such as loss, grief and mourning when faced with changing their practice. He points out that the emotional aspect can be of a great influence to the success of the implementation and advocates an elaborate support system, which relies mainly on the leader of the change.

There is a consensus throughout the analysed literature that change is likely to be met with an opposing attitude because of the anxiety and emotional impact that the prospect of change has on the staff. *Awareness creation, Advantage proving, Motivation for change, Predisposition creation, Capacity creation, Leadership definition* and *Value definition* are all steps that include actions aimed at the emotional impact. These actions are meant to reduce the anxiety and to restore the psychological safety. The execution phase includes an entire step dedicated to support.

(Berg, 2001) proposes *worker and patient satisfaction* as one of his dimensions for success. Most of the authors of the publications analysed support this concept by acknowledging the importance of the attitude of the stakeholders for the success of the implementation. Without a positive emotional impact or satisfaction, the innovation implementation will not be (fully) successful.

## 10.7 KEY PERFORMANCE INDICATORS FOR A CHANGE/IMPLEMENTATION PROCESS MODEL – LITERATURE SEARCH TERMS AND RESULTS

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Due to the unexpected and dramatic lack of KPI coverage in the literature sample selected in the analysis phase, a focused literature search was performed to uncover literature treating KPIs for the implementation or change process or project.

First, only healthcare related journals and search engines, such as Implementation Science<sup>12</sup>, were scanned using the following search terms and targeting the title, abstract and key words:

- “key performance indicators”
- “change performance indicators”
- “project performance indicators”
- “implementation performance indicators”

This first search has not returned any relevant results. While Implementation Science returned no results at all, other literature search engines, such as Scopus<sup>13</sup>, Science Direct<sup>14</sup>, Web of Science<sup>15</sup> returned only papers on clinical KPIs, similar to the literature of the analysis phase.

Secondly, a more general search was performed on the same search engines, targeting *change management, organisational science* and *business process management* literature. The search terms and results of the second search are summarised in the Table 7 below.

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<sup>12</sup> [www.implementationscience.com](http://www.implementationscience.com)

<sup>13</sup> [www.scopus.com](http://www.scopus.com)

<sup>14</sup> [www.sciencedirect.com](http://www.sciencedirect.com)

<sup>15</sup>

[http://apps.webofknowledge.com/UA\\_GeneralSearch\\_input.do?product=UA&search\\_mode=GeneralSearch&SID=X2JN3gT4zatSjN7PWqZ&preferencesSaved=](http://apps.webofknowledge.com/UA_GeneralSearch_input.do?product=UA&search_mode=GeneralSearch&SID=X2JN3gT4zatSjN7PWqZ&preferencesSaved=)

Most of the returned results are papers on ERP, software and IT implementation projects with industrial or manufacturing setting or applications. Only four articles have been judged relevant by the abstract, the fifth being a duplicate.

TABLE 7: SEARCH TERMS AND RESULTS FOR THE KPI GENERAL SEARCH

Term	Search Engine							
	Science Direct		Scopus		Web of Science		Implement. Science	
	Hits	Relevant results	Hits	Relevant results	Hits	Relevant results	Hits	Relevant results
(Key performance indicators change process) AND healthcare	2	0	25	1	0	0	0	0
"implementation process key performance indicators"	0	0	1	0	0	0	0	0
"implementation key performance indicators"	0	0	6	0	0	0	0	0
"project key performance indicators"	2	0	19	1	3	1 (as Scopus)	0	0
"implementation project" AND "key performance indicators"	38	2	7	0	3	0	0	0
"change project" AND "key performance indicators"	20	0	2	0	1	0	0	0
"change process performance indicators" AND healthcare	0	0	0	0	0	0	0	0
"change process performance" AND healthcare	1	0	0	0	0	0	0	0
"implementation process performance indicators"	0	0	1	0	0	0	0	0
"implementation process performance"	2	0	27	0	2	0	0	0
"implementation performance indicators"	2	0	4	1	2	0	0	0
"implementation performance" AND healthcare	17	0	3	1	2	0	0	0
"project performance indicators"	35	0	43	1	0	0	0	0
"implementation project" AND " performance indicators"	16	0	9	0	5	0	0	0
"change project" AND " performance indicators"	10	0	4	0	1	0	0	0

## 10.8 THE IMPLEMENTATION ANALYSER – IMPLEMENTATION IQ'S ANALYSIS TOOL

The Analysis phase is the first step that Implementation IQ takes towards the widespread implementation of innovation in healthcare. For the execution of this step, Implementation IQ has developed a software tool called the Implementation Analyser. As the analysis also portrays the Implementation IQ work methodology and the results of the analysis represent the input for the Implementation Process Design context of the Master Thesis research, this sub-chapter details the functioning manner of the Implementation Analyser.

The methodology of the Implementation Analyser is based on a mix between literature research that Implementation IQ has done in the field of innovation diffusion, innovation adoption and innovation implementation in healthcare, and hands-on field experience. Both sources suggest a strong link between implementation success and the stakeholder perception of the innovative product or service. More specifically the way in which the innovation rises up to satisfy the stakeholders' wishes and demands and the amount of effort that the stakeholders have to invest for the adoption of the innovation in practice.

The data required for the tool to perform the analysis is entered by the innovator, with support from the Implementation IQ experts if necessary.

The analysis starts with a description of the innovation, in which the innovator can explain the purpose of the product or service, the advantages it brings, the problems it solves and the possible drawbacks it poses.

The next step of the analysis requires the identification of the stakeholders of the innovation together with their type of interaction with the product or service. From a dropdown menu the user can select pre-defined stakeholder profiles or can create new ones. The interaction levels are defined as follows: *core user*, *directly operationally involved*, *indirectly operationally involved*, *directly setting conditions for use*, *internal and external conditional agents and influencers of widespread implementation*. The stakeholder definition is exemplified in Figure 47.

FIGURE 47: IMPLEMENTATION ANALYSER STAKEHOLDER DEFINITION

Overview Summary Stakeholders Overview wishes and demands Healthcare improvement embracing level

1

- 1 Core user
  - 1 Health Professional
  - 1 Patient thuiswonend
- 2 Directly operationally involved
  - 1 Caregiver
- 3 Indirectly operationally involved
  - 1 Help Desk
- 4 Directly setting conditions for use
  - 1 Application Developer
  - 1 Care groups
  - 1 IT Manager of care institution
- 5 Internal and external conditional agents
  - 1 Financial Manager
  - 1 Manager bedrijfsvoering
  - 1 Zorgverzekeraar Algemeen
- 6 Influencers of wide implementation
  - 1 E-health community/providers
  - 1 Government
  - 1 Investeerder zorgvernieuwing Algemeen
  - 1 Patient Organisations

**Involvements with healthcare innovation**

- Core user
- Directly operationally involved
- Indirectly operationally involved
- Directly setting conditions for use
- Internal and external conditional agents
- Influencers of wide implementation

Add stakeholder

For each of the stakeholder profile, the user then provides a *detailed description*, completes a *list of the respective wishes and demands* and their importance, and describes the *change* that the innovation imposes on the stakeholder.

The description is meant to detail the interest that the stakeholder has in the innovation. The wishes and demands of a certain stakeholder are also predefined for the already existent profiles. In order to cater to the different particularities of each innovation, this predefined collection permits removing or adding new wishes and demands from a comprehensive list. Also an importance weight is attributed to a certain wish or demand, which can be *crucial*, *important* or *relevant*. Figure 48 illustrates the list of wishes and demands of an example stakeholder. For the change dimension, the user fills in a description of the current situation, the future situation generated by the implementation of the innovation and a description of the change necessary for the implementation. The user also attributes a score that varies from “none” to “very much” on a five-point Likert Scale to the level of *required information*, *required instruction* and *required process change* that the stakeholder has to undergo for the implementation.



FIGURE 48: WISHES AND DEMANDS OF AN EXAMPLE STAKEHOLDER

Overview **Wishes and demands** Change

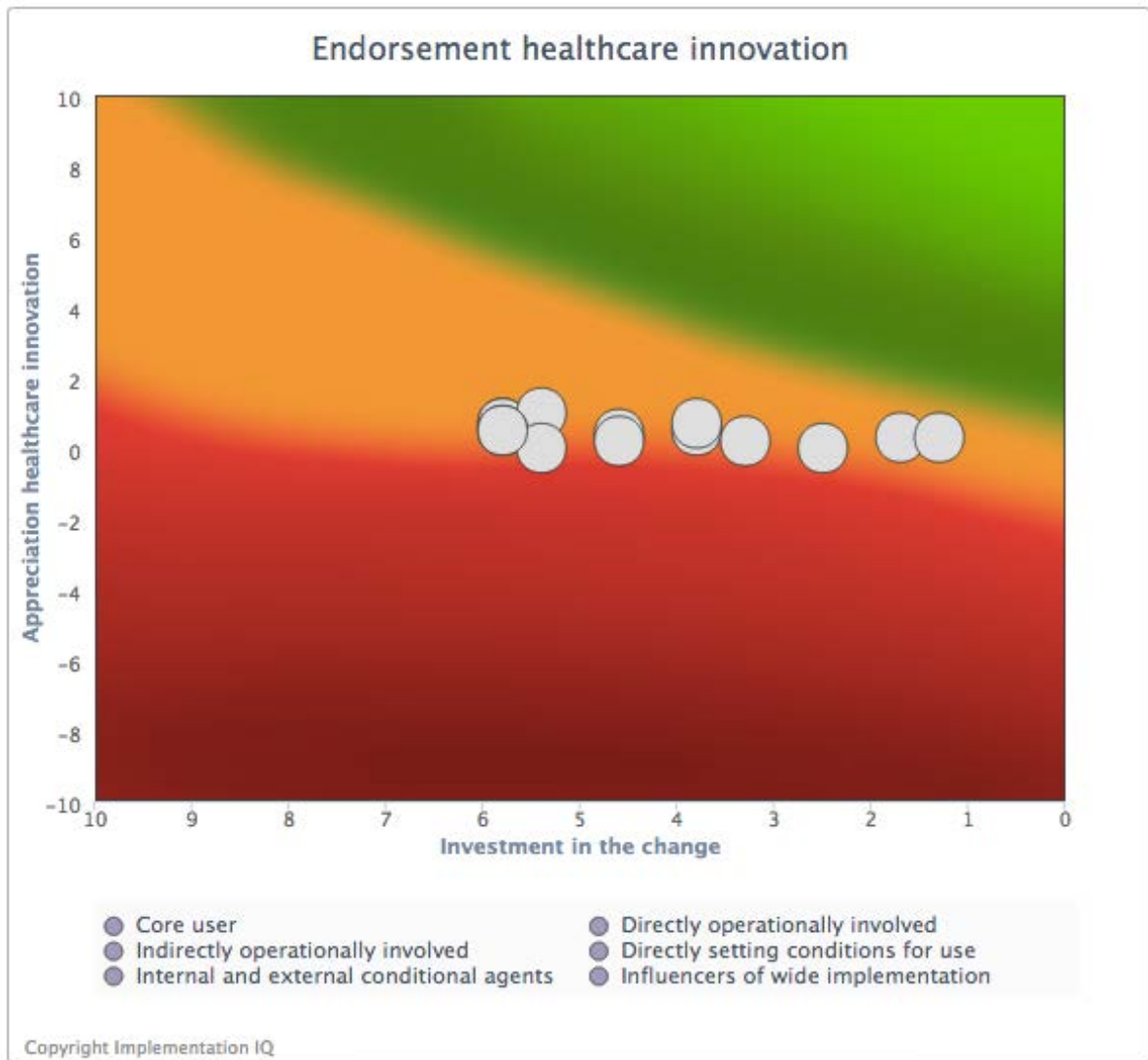
All **Selected** Not selected

1 Complexity of use	Crucial	!!!	✓
1 Disruptive effects	Crucial	!!!	✓
1 Medical advantage	Crucial	!!!	✓
1 Necessary changes from current practice	Crucial	!!!	✓
1 Practical applicability	Crucial	!!!	✓
1 Professional autonomy	Crucial	!!!	✓
1 Quality perception of the healthcare improvement	Crucial	!!!	✓
1 Availability of clinical partners for validation of improvement	Important	!!	✓
1 Comfort of the care provider	Important	!!	✓
1 Development status of the healthcare improvement	Important	!!	✓
1 Liability of the healthcare professional	Important	!!	✓
1 Perception of personal risk	Important	!!	✓
1 Professional standards and guidelines	Important	!!	✓
1 Support from management / board	Important	!!	✓
1 Support from patients	Important	!!	✓
1 Support from the vertical network of stakeholders	Important	!!	✓
1 Support of the horizontal network of stakeholders	Important	!!	✓
1 Adoption by similar organizations	Relevant	!	✓
1 Clarity of funding	Relevant	!	✓
1 Compatibility with the norms and values of the stakeholders	Relevant	!	✓
1 Knowledge transfer	Relevant	!	✓

After the completion of this step an automatic overview is created, which compiles all wishes and demands of all the stakeholders and lists them in a ranking based on the number of stakeholders that have that particular wish or demand and the importance attributed to it. Thus the wishes and demands that are exhibited by more stakeholders or have a crucial importance will be listed higher in the ranking. For each of the wishes and demands of this ranking, the user describes the compliance of the innovation, so to what extent does the product satisfy that wish or demand. This evaluation is done by attributing a score from -10 to +10 to the compliance level and a score from “none” to “scientific” on a 5 point Likert scale to the substantiation of the compliance.

The data provided in these steps is then translated by an internal algorithm into an overall evaluation, portrayed in Figure 49. Each stakeholder is placed in the bi-dimensional space that expresses the “embracement level”. The x-axis represents the effort that a stakeholder has to invest for the adoption of the innovation and the y-axis represents the appreciation or value that that stakeholder attributes to the innovation.

FIGURE 50: GRAPHICAL REPRESENTATION OF THE ENDORSMENT OF THE INNOVATION



Each stakeholder has an (x, y) set of coordinates by which it is placed in the embracement space. The x and y values are the results of two functions that have as input the variables listed below. The values of the variables are the scores that the user introduces as explained above. The expression of the two functions represents the intellectual property of Implementation IQ and is not to be disclosed.

**x** = change investment

**y** = valuation of innovation

$x = f_1(\text{inf}, \text{ins}, c)$

$y = f_2(\text{compl}, \text{subs})$

**inf** = amount of information required to adopt the innovation

**ins** = amount of instruction required to adopt the innovation

**c** = amount of change in the work process required to adopt the innovation

**compl** = level of compliance of the innovation to a certain wish or demand

**subs** = level of substantiation of the stated compliance

The Analysis provides thus an embracement overview, which indicates the readiness of the innovative product or service to be widely implemented in the healthcare field. The graphical view portrayed in Figure 49 gives a quick and easy characterization of the overall readiness and of the readiness per stakeholder group. Ideally, all stakeholders should be placed in the green area of the plot, the upper right corner, to indicate a sufficient level of embracement to proceed with the implementation. This area indicates the optimal *balance between effort and value*. The stakeholder considers that the benefit from using the innovation is high enough to justify the effort invested in adopting it. If the result of the analysis is not a sufficient embracement, so not in the green area, the

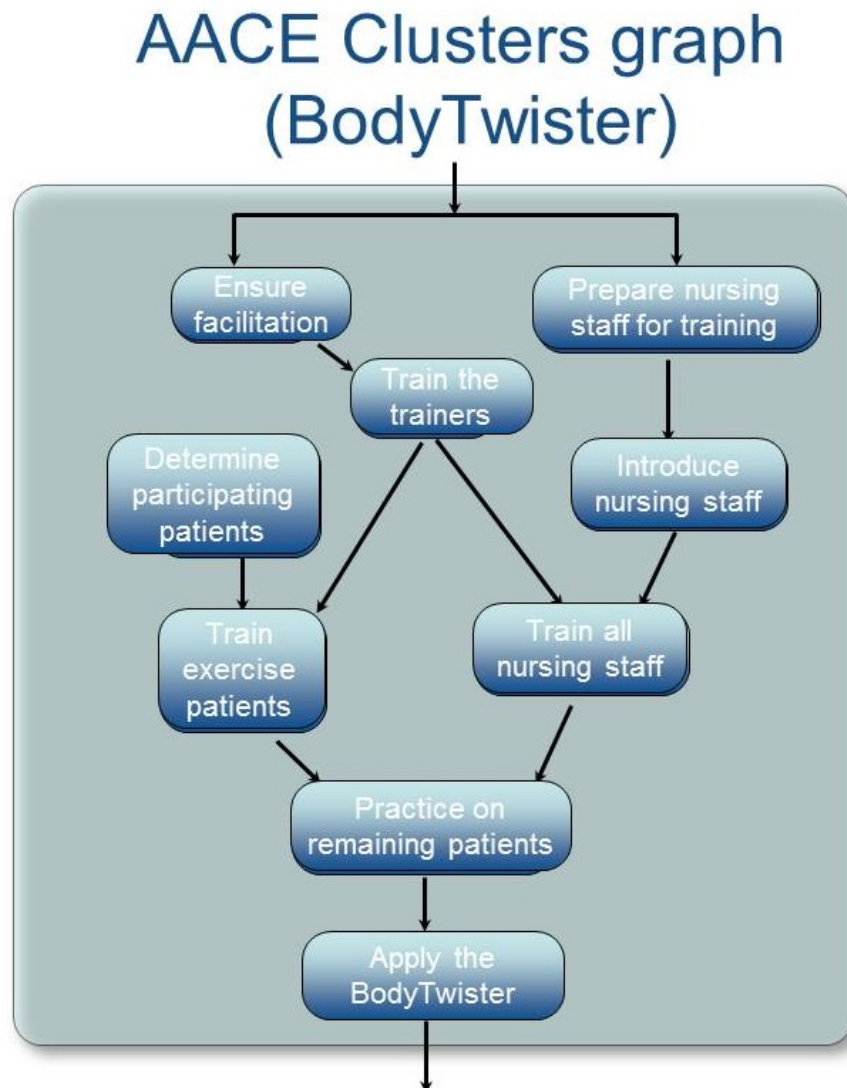
points for improvement can be extracted. The issues are tackled and the analysis step is revisited until all stakeholder groups are placed in the green area.

The data gathered in this Analysis step is vital for the detailed development of the implementation process design of a certain innovative product or service.

### 10.9 EXAMPLE OF THE CONTENT OF AN AACE CLUSTERS GRAPH

The Content of the AACE Clusters Graph presented below is based on the BodyTwister innovation, which is one of the innovations in Implementation IQ's portfolio.

FIGURE 51: EXAMPLE OF AN AACE CLUSTERS GRAPH FOR THE BODYTWISTER INNOVATION



10.10 COMPARISON OF THE CCPM WITH THE IMPLEMENTATION IQ GENERAL MODEL FOR INNOVATION IMPLEMENTATION IN HEALTHCARE

TABLE 8: COMPARISON BETWEEN THE IMPLEMENTATION IQ GENERAL CHANGE PROCESS MODEL WITH THE CCPM

Implementation IQ model		CCPM		
Aggregation level	Element	Action	Cluster	Stage
Implementation Project	Adoption			Pre-Execution
	Operational integration			Execution
	Normalization			Post-Execution
Operational Integration	Initiation			Pre-Execution
	Execution			Execution
Adoption	Invention fit analysis		Create Awareness	Pre-Execution stage
			Assess Need	
			Formulate Proposal	
Return on implementation analysis		Evaluate		
	Implementation project analysis		Check Fit to Availability	
Initiation	Announcement	Communicate adoption decision and management support	Show Political Sponsorship	
	Project team formation		Establish Team	
			Define Leadership	
	Project adaptation			
	Project planning		Develop Execution Plan	
			Develop Post Execution Plan	
	Resource allocation	Attribute resources	Develop Execution Plan	
	Communication	Communicate adoption decision and management support		Show Political Sponsorship
			Communicate vision	Motivate for Change
			Communicate and discuss values	Define Value
	Communicate execution plan	Develop Execution Plan		
Monitoring and issue handling				

Execution	Announcement	Communicate Execution Plan	Develop Execution Plan		
	AACE clusters graph		Execute Planned Activities	Execution stage	
			Create Capacity	Pre-Execution	
			Develop Team		
	Communication		Maintain Communication	Execution stage	
Monitoring and issue handling		Monitor Implementation Performance			
		Manage Problems			
Normalization	Announcement			Post-Implementation stage	
	Innovation evaluation	Assess innovation KPIs	Evaluate		
	Organisation integration		Integrate		
	Project closure				
	Implementation evaluation	Assess implementation KPIs	Evaluate		
	Communication	Evaluate and communicate results			Evaluate
		Maintain Communication			Integrate
Monitoring and issue handling					
Implementation Analyser	Prove Advantage			Pre-Execution stage	
	Analyse Target Group				
	Check Fit to Organisation				
	Analyse Current Performance				
	Assess Readiness				
	Define Work Set-Up				
	Define Value				

10.11 COMPARISON OF THE CCPM WITH THE COMMUNITIES INNOVATION  
IMPLEMENTATION PROCESS AT RADBOUD UNIVERSITY MEDICAL CENTER

TABLE 9: COMPARISON BETWEEN THE COMMUNITIES INNOVATION IMPLEMENTATION PROCESS AND  
THE CCPM

Communities Innovation Implementation Process			CCPM			
Phase	Cluster	Activity	Activity	Cluster	Stage	
Pre-Execution Phase		Identify Need	Identify Need	Assess Need	Pre-Execution Stage	
		Set Innovation Scope				
		Choose Technical Developer				
	Define Innovation Project	Define Budget	Perform financial evaluation	Evaluate		
			Decide implementation KPIs	Develop Execution Plan		
	Define Work Division and Task Set-Up		Decide structure and roles	Establish Team		
			Define new work structure	Define Work Set-Up		
			Define new responsibilities			
	Decide Timeline and Deadlines		Establish Timeline	Develop Execution Plan		
			Decide Prerequisites			
	Define Approach	Inform Department about Innovation	Communicate adoption decision and management support	Show Political Sponsorship		
			Receive Applications from Departments			
			Execute Intake Session			
			Decide Community Recipients			
	Develop Execution Plan	Develop Supporting Materials	Attribute Resources	Develop Execution Plan		
Attribute Resources			Develop Execution Plan			
Develop Communication Plan						
Develop Plan for Integration and Sustainment			Develop Post-Execution Plan			
Form Change Teams			Establish Team			

Execution Phase	Hold Kick-Off Meeting for Department Staff	Communicate Execution Plan	Develop Execution Plan	Execution Stage
	Hold Kick-Off Meeting for Change Teams	Communicate Execution Plan	Develop Execution Plan	
	Hold Workshops for Knowledge and Experience Sharing		Create Capacity	
	Provide Support	Provide external support & resources	Create Capacity	
			Provide Support	Execution Stage
	Facilitate Communication		Maintain Communication	
	Monitor and Update		Monitor Implementation Performance	
	Get Input and/or Involvement from Management			
	Obtain User Input and Feedback			
	Maintain Information		Maintain Communication	
Obtain Technical and Practical Support from Innovator		Provide Support		
Post-Execution	Execute Integration and Sustainment Actions	Execute Integration Action Plan	Integrate	Post-Execution Stage
		Execute Sustainment Action Plan	Sustain	
	Advise about Integration and Sustainment			
	Provide Support for Achieving Sustainment			
	Maintain Communication and Information	Maintain Communication	Integrate	

## 10.12 THEORETICAL EVALUATION USING THE GREENHALGH ET. AL. MODEL

TABLE 10: COMPARISON BETWEEN THE ELEMENTS OF THE GREENHALGH ET. AL. MODEL AND THE ELEMENTS OF THE CCPM

(Greenhalgh et al., 2004) model		CCPM	
Group	Element	Action	Cluster
Communication and Influence	Social Networks		Create Awareness
	Homophily	Decide team composition	Establish Team
		Build shared understanding	Develop Team
	Peer opinion	Identify key advocates and power groups	Establish Team
	Marketing		Create Awareness
	Expert opinion	Explain research evidence	Prove Advantage
	Champions	Appoint leader	Define Leadership
	Boundary spanners		Ex. Create Awareness
	Change agent		Ex: Create capacity
The Outer Context	Socio-political climate	Check fit to local/regional/national directives	Check Fit to Organisation
			Show Political Sponsorship
	Inter-organisational norm-setting and networks		
System Antecedents for Innovation	Size/maturity	Assess organisational readiness	Assess Readiness
		Provide external support and resources	Create Capacity
	Formalisation	Assess organisational readiness	Assess Readiness
		Provide external support and resources	Create Capacity
	Differentiation	Assess organisational readiness	Assess Readiness
		Provide external support and resources	Create Capacity
	Decentralization	Assess organisational readiness	Assess Readiness
		Provide external support and resources	Create Capacity
	Slack resources		Check Fit to Availability
	Absorptive capacity	Pre-existent knowledge/skill base	Assess readiness
Ability to find, interpret, recodify and integrate new		Assess readiness	Assess Readiness



	knowledge	Develop Skills	Create Capacity
	Enablement of knowledge sharing via internal and external networks	Transfer knowledge	Create Capacity
Receptive context for change	Leadership and vision		Define Leadership
		Communicate vision	Motivate for Change
	Good managerial relations	Define role and relation to team	Define Leadership
		Demonstrate leader and management engagement	Maintain Motivation
			Manage Problems
		Demonstrate management engagement	Sustain
	Risk-taking climate	Assess cultural readiness	Assess Readiness
	Clear goals and priorities	Formulate goals and objectives	Motivate for Change
		Define priorities	
	High-quality data capture	Measure innovation-related KPIs	Analyse Current Performance
Collect implementation KPI data		Monitor Implementation Performance	
System Readiness for Innovation	Tension for change		Assess Need
	Innovation system fit	Match need to innovation	Formulate Proposal
	Power balance (supporters vs opponents)		Analyse Target Group
	Assessment of implications		Evaluate
	Dedicated time/resources		Check Fit to Availability
			Create Capacity
			Develop Execution Plan
	Monitoring and feedback		Monitor Implementation Performance
		Manage problems	
The Adopter	Needs		Assess Need
	Motivation		Motivate for Change
			Maintain Motivation
		Maintain Motivation	Integrate
	Values and goals		Create Awareness
			Evaluate
			Define Value
		Formulate goals and objectives	Motivate for Change
	Skills	Check knowledge and skills	Check Fit to Availability
		Assess capability readiness	Assess Readiness

		Develop Skills	Create Capacity	
	Learning style			
	Social networks			
	Complex non-linear process		Create Awareness	
Assimilation			Assess Need	
			Formulate Proposal	
			Prove Advantage	
	Soft periphery elements	Assess organisational readiness	Assess Readiness	
The Implementation Process	Decision-making devolved to front-line teams	Build joint decision making	Develop Team	
	Hands-on approach by leaders and managers	Demonstrate leader and management engagement	Maintain Motivation Sustain	
	Human resource issues, especially training		Create Capacity	
	Dedicated resources		Establish Team	
			Define Leadership	
			Create Capacity	
			Develop Execution Plan	
			Execute Planned Activities	
	Internal communication		Ex. Maintain Communication	
	External collaboration		Ex. Create capacity	
	Reinvention/development			
Feedback on progress		Monitor Implementation Performance		
Linkage	Design stage	Shared meaning and mission	Communicate vision	Motivate for Change
			Build shared understanding	Develop Team
		Effective knowledge transfer	Transfer knowledge	Create Capacity
		User involvement in specification		
		Capture of user-led innovation		
	Implementation stage	Communication and information		Maintain Communication
		User orientation		Ex. Provide Support
		Product augmentation		
		Project management support		Ex. Develop Execution Plan
where				
		Elements not covered by the CCPM or covered only partially		

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### 10.13 PRACTICAL EVALUATION USING EXPERT INTERVIEWS

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All interviews followed a semi-structured protocol. The CCPM was presented and explained in detail. The following questions were asked throughout the interview:

1. Are the general model and the individual elements clear?
2. Are there any elements missing from the model?
3. Does the model have additional elements that you have not encountered in practice?
4. What is your impression of the process flow and what observations, suggestions or improvements do you have about it?
5. What is your general impression of the model?
6. Do you find the model useful?
7. What would increase the usability and usefulness of the CCPM?

Each interview summary presented below has the same structure. First the profile of the interviewed expert(s) is presented, then the day and duration of the interview. The summary comprises modification recommendations, which are suggestions for changes in the CCPM, and general comments, which are opinions and comments regarding the change process model that do not imply change.

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#### 10.13.1 INTERVIEW NO 1

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Expert no 1 - Communication and Coaching Director at Implementation IQ

Expert no 2 - Implementation advisor at Implementation IQ

14th of May 2014, 12:00 – 14:45

Modifications recommendations:

- They propose the sequence: *Assess Need* then *Formulate Proposal* then *Create Awareness*
- *Prove Advantage* should be in parallel with the sequence *Assess Need, Formulate proposal, Create Awareness* because it is part of the *Describe innovation and advantage*
- *Portray use of innovation* should be part of *Describe innovation and advantage*
- *Analyse Target Group* should include the *Define Value* and *Define Work Set-Up* clusters and should have a decision point after it
- *Check fit to mission/vision/goals* belongs with the *Check Fit to Availability* cluster, which should be named *Check Fit to Organisation* and *Check fit to local/regional/national directives* should be separate because it is not linked to the organisation per se
- *Evaluate* cluster should be called *Evaluate Added Value* and should include a human resource evaluation as well besides strategic and financial
- *Show Political Sponsorship* should include the obtaining/organisation of staff support and should be called *Obtain organisational support*
- *Analyse Current Performance* should be after *Establish Team*
- *Assess readiness* should have a decision point after it and could be part of the *Analyse Target Group* cluster
- The *Provide Support* cluster can be merged with the *Maintain Motivation* cluster
- In the *Evaluate* cluster the integration action plan should be revised and adjusted based on the evaluation findings
- In the *Integrate* cluster the sustainment action plan should be revised and adjusted based on the *Integrate* experience
- In the *Integrate* cluster there should be an action of *Demonstrate management and leader support* again

General comments:

- *Develop Post-Execution Plan* is a blind spot for many organisations, but it is very important for the success of the implementation
- The two experts see the change process model as a useful checklist for fundamental things to consider

- Testing in practice would make the model more trustworthy and would provide more prescription authority

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### 10.13.2 INTERVIEW NO 2

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Expert no 3 - Process improvement and innovation advisor at Radboud REshape & Innovation Center

14th of May 2014, 15:00 to 16:20

Modifications recommendations:

- There is a difference between the innovation push and pull, so the *Create Awareness* and *Assess Need* clusters alternate in sequence according to that.
- *Check fit to mission vision and goals* action could come before *Analyse Target Group* cluster, because this gives a good indication that can save the effort of performing a target group analysis. This can be maybe be followed by a decision point.
- The *Check Fit to Availability* can have decision points inside it, with financial check being the most important one, followed by human, time, knowledge and skills. The expert usually makes first a cost and time pre-evaluation by which the ok is received, a request for more info or a no go.
- *Perform financial evaluation* could be carried out earlier in the process. Many business minded healthcare managers wish to see the financial evaluation/cost effectiveness potential before the *Analyse Target Group*.
- *Assess Readiness* cluster could be at an earlier point in the model and could result in a decision point. Readiness assessment is done sometimes already in the target group analysis, especially organisational and capability, but not that much cultural. The cluster could be broken, leave cultural readiness assessment here and move the other two in the Target group analysis.
- *Establish Team* and *Develop Team* could be closer to each other.
- Missing the point where the vision is defined. Key advocates and power groups might be dependent on the vision creation. It could be close after the *Show Political Sponsorship*.
- *Analyse Current Performance* would fit better after the team is established and developed.
- *Define Value* cluster is hard to understand, so maybe the name is ambiguous. Identification activity could come earlier in the model, while the communication of the value is at the right spot.
- *Maintain Motivation* cluster- it is unfair to only communicate the positive results, you have to find a way to communicate the negative ones as well, without demotivating people. The *Manage Problems* cluster is a good place to have that.
- *Manage Problems*, after *Collect feedback*, there could be two possibilities, to communicate the good one and to act upon the negative one. *Collect feedback* could be a separate action.
- It would be useful to document and make widely available the lessons learned throughout the organisation.
- In the *Sustain* cluster, missing reviewing the innovation KPIs. So a measurement of the innovation KPIs could be part of the *Sustain* cluster.

General comments:

- In practice many times innovation-related and implementation-related KPIs are mixed and a clear distinction is not made in practice.
- The Execution and especially Post-Execution stages are neglected in practice compared to Pre-Execution.
- *Provide updates* is of crucial importance.
- *Maintain Communication* is a cluster of special importance, especially when the change team is or contains external people, that are not staff of the organisation.
- There is nothing (else) missing from the model.

- The Execution stage is very well detailed and he agrees that not much is known about what should be done other than execute what was planned.
- The expert is looking forward to the refined version and to using the model in practice.

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### 10.13.3 INTERVIEW NO 3

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Expert no 4 - Process improvement and innovation advisor at Radboud REshape & Innovation Center

16th of May 2014, 15:30 to 16:45

Modifications recommendations:

- *Create Awareness* and *Assess Need* in parallel, but *Formulate Proposal* should come after these two
- *Check Fit to Organisation* can be part of the *Analyse Target Group* and if they are properly performed, a better decision can be made after that
- *Analyse Current Performance* can happen better after *Establish Team*, but it can also be before, especially if you choose not to have a t0 measurement (the innovation is very much needed or has to happen)
- *Communicate positive intermediate results* could be part of *Maintain Communication*
- The support can also be financial or it can be a sign of work recognition like a free day, a day out, a dinner, a celebration, but in the end it is meant to have a psychological and motivational purpose
- It can be useful to revise the integration action plan
- *Demonstrate leader and management engagement* should also be present in the Integrate and Sustain clusters

General comments:

- *Analyse Target Group* can come before *Prove Advantage* in practice, but the present flow makes more sense like it is
- *Check Fit to Availability*, all 4 activities belong together in one cluster and they can all be critical, but it cannot be decided which one is more important, it depends on the case
- *Evaluate* cluster is of great importance and many times it is forgotten or shallowly performed in practice, with wrong estimations; managers think they already tackled this earlier, but they often don't have all the needed details to do it properly early
- *Show Political Sponsorship* is crucial and the impression made at that point can have serious consequences on the further implementation; special attention and extra effort is needed for this step
- Sceptical people should/could also be part of the change team because they can raise pertinent questions and take the side of the people with a higher degree of opposition
- In practice, innovation and implementation KPIs are mixed a lot. They use qualitative measures – questionnaires that assess at the end whether the implementation was successful, important and if there are improvement points
- Implementation KPIs are sometimes decided by management, especially when a maximum budget is attributed – everything is done to fit that budget
- In *Maintain Motivation* the demonstrate leader and management engagement is crucial
- How does one deal with the negative intermediate results
- In practice the Integrate and *Sustain* clusters are very often neglected and people do go back to their old way of working; in this expert's opinion that happens because at that stage the expert is no longer involved, due to costs
- There is a high focus on execution and little on people in terms of motivation, psychological support although these "soft" aspects can have big (negative) consequences
- The expert finds the model very useful and will use it in practice
- What could make the model even more useful is to attribute weights to the clusters and the actions in terms of contribution to success; so that the user, if needed and if

pressured, can choose the clusters and actions that are more important for the success of the implementation

#### 10.14 SUMMARY OF THE REFINEMENT CHANGES APPLIED TO THE CCPM

TABLE 11: SUMMARY OF THE REFINEMENT CHANGES TO THE CCPM

	<b>Change/Alteration</b>	<b>Location in the CCPM</b>	<b>Based on</b>
1	Change in flow	<i>Create Awareness</i> and <i>Prove Advantage</i> in parallel and this parallel formation in parallel with <i>Assess Need</i>	Expert interviews evaluation
2	Element addition	<i>Provide expert opinion</i> as a new action in the <i>Prove Advantage</i> cluster	Greenhalgh model evaluation
3	Element addition	<i>Customise description to target audience</i> as a new action in the <i>Create Awareness</i> cluster	Greenhalgh model evaluation
4	Cluster name change and relocation	<i>Check Fit to Organisation</i> becomes <i>Check Fit to Organisation &amp; Environment</i> and is moved before <i>Analyse Target Group</i>	Expert Interviews evaluation
5	Element name change	<i>Identify value related to innovation</i> is renamed to <i>Identify innovation value for each stakeholder</i>	Expert Interviews evaluation
6	Element name change	The <i>Evaluate</i> cluster is renamed <i>Evaluate the Adoption Decision</i>	Expert Interviews evaluation
7	Change in flow	<i>Analyse Current Performance</i> is moved after <i>Establish Team</i> .	Expert Interviews evaluation
8	Change in flow	<i>Develop Team</i> is moved right after <i>Establish Team</i>	Expert Interviews evaluation
9	Element addition	<i>Develop change vision</i> after the adoption decision	Expert Interviews evaluation
10	Element relocation	<i>Identify innovation value for each stakeholder</i> is moved to the cluster <i>Analyse Target Group</i>	Expert Interviews evaluation
11	Element transformation	<i>Define Value</i> is replaced by one action, <i>Communicate innovation value for each stakeholder</i>	Expert Interviews evaluation
12	Element relocation	<i>Decide implementation KPIs</i> removed from the <i>Develop Execution Plan</i> cluster and moved after <i>Develop Change Vision</i>	Implementation IQ change process model application
13	Element addition	<i>Monitor Implementation KPIs</i> in parallel with the last 11 clusters of the Pre-Execution stage	Implementation IQ change process model application
14	Element addition	<i>Set innovation implementation scope</i> in parallel with <i>Decide Implementation KPIs</i>	The Communities innovation application
15	Element addition	<i>Announce start of execution to stakeholders</i> in the beginning of	The Communities innovation application

		the Execution stage	Implementation IQ change process model application
16	Element addition	<i>Provide innovation-dependent support</i> in the <i>Provide Support</i> cluster	The Communities innovation application
17	Element addition	<i>Provide technical support from innovator</i> in the <i>Provide Support</i> cluster	The Communities innovation application
18	Element relocation and name change	<i>Collect feedback</i> is moved to the <i>Monitor Implementation Performance</i> cluster and renamed <i>Collect feedback from stakeholders</i>	Expert Interviews evaluation
19	Element name change	Act upon feedback in the <i>Manage problems</i> cluster becomes <i>Manage negative feedback</i>	Expert Interviews evaluation
20	Element addition	<i>Communicate and manage negative intermediate results</i> in the <i>Manage Problems</i> cluster	Expert Interviews evaluation
21	Element addition	<i>Involve Stakeholders</i> cluster in the Execution stage	The Communities innovation application Greenhalgh model evaluation
22	Element addition	<i>Collect input and involve management in execution</i> action in the <i>Involve Stakeholders</i> cluster	The Communities innovation application
23	Element addition	<i>Collect input and involve end-users in execution</i> action in the <i>Involve Stakeholders</i> cluster	The Communities innovation application Greenhalgh model evaluation
24	Element addition	<i>Collect innovation KPIs</i> in the <i>Evaluate</i> cluster	
25	Element name change	<i>Evaluate</i> becomes <i>Evaluate Innovation Performance</i>	Implementation IQ change process model application Expert Interviews evaluation
26	Element addition	<i>Announce end of execution to stakeholders</i> as the first action of the Post-Execution stage	Implementation IQ change process model application
27	Element addition	<i>Monitor implementation KPIs</i> in parallel with <i>Evaluate Innovation Performance</i> and <i>Integrate</i>	Implementation IQ change process model application
28	Element addition	<i>Document evaluation results</i> in the <i>Evaluate Innovation Performance</i> cluster	Expert Interviews evaluation
29	Element addition	Evaluate implementation performance	Implementation IQ change process model application
30	Element addition	<i>Close project and announce closure</i> after the <i>Integrate</i> cluster	Implementation IQ change process model application

31	Element addition	<i>Document integration best-practices in the Integrate cluster</i>	Expert Interviews evaluation
32	Element name change	<i>Leverage lessons learned in the Sustain cluster becomes Use integration best practices</i>	Expert Interviews evaluation
33	Element addition	<i>Demonstrate leader and management engagement in the Integrate cluster</i>	Expert Interviews evaluation
34	Element addition	<i>Measure and assess innovation KPIs in the Sustain cluster</i>	Expert Interviews evaluation

### 10.15 OVERVIEW OF THE COMPLETE CCPM AND RCPM

FIGURE 52: COMPLETE CCPM

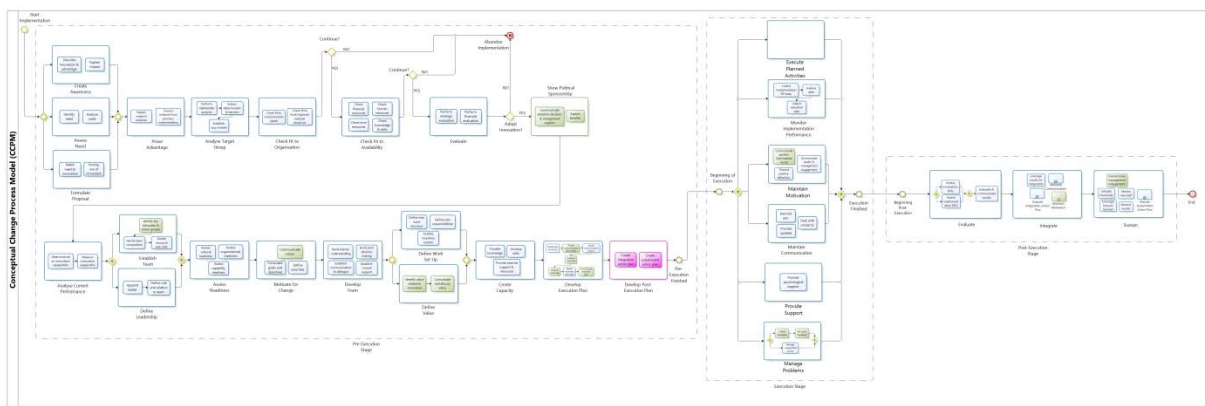


FIGURE 53: COMPLETE RCPM

