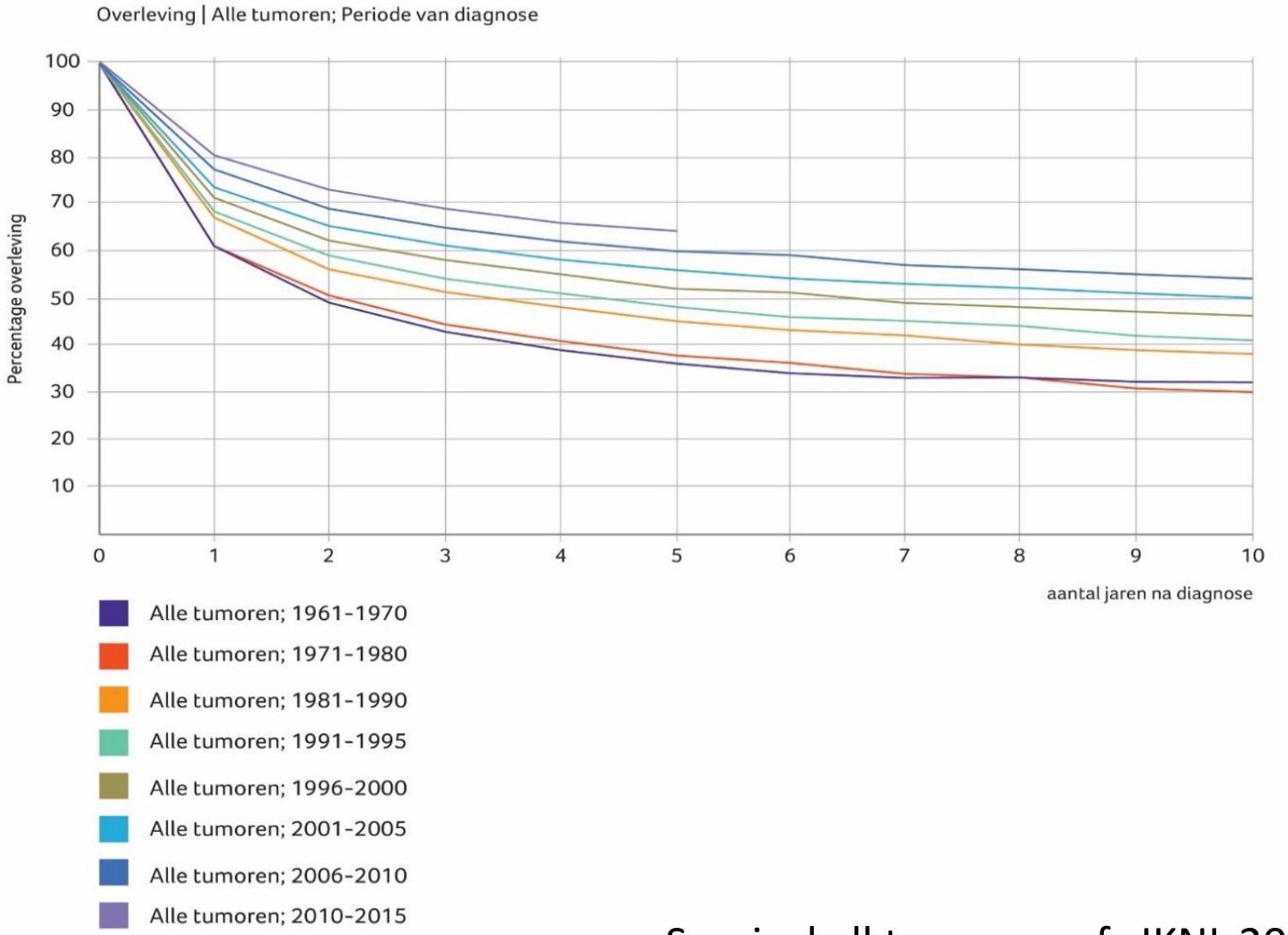
Maastro
in the best of hands

# Diffusion of promising innovations: quite a challenge

*Prof. dr. Maria Jacobs*

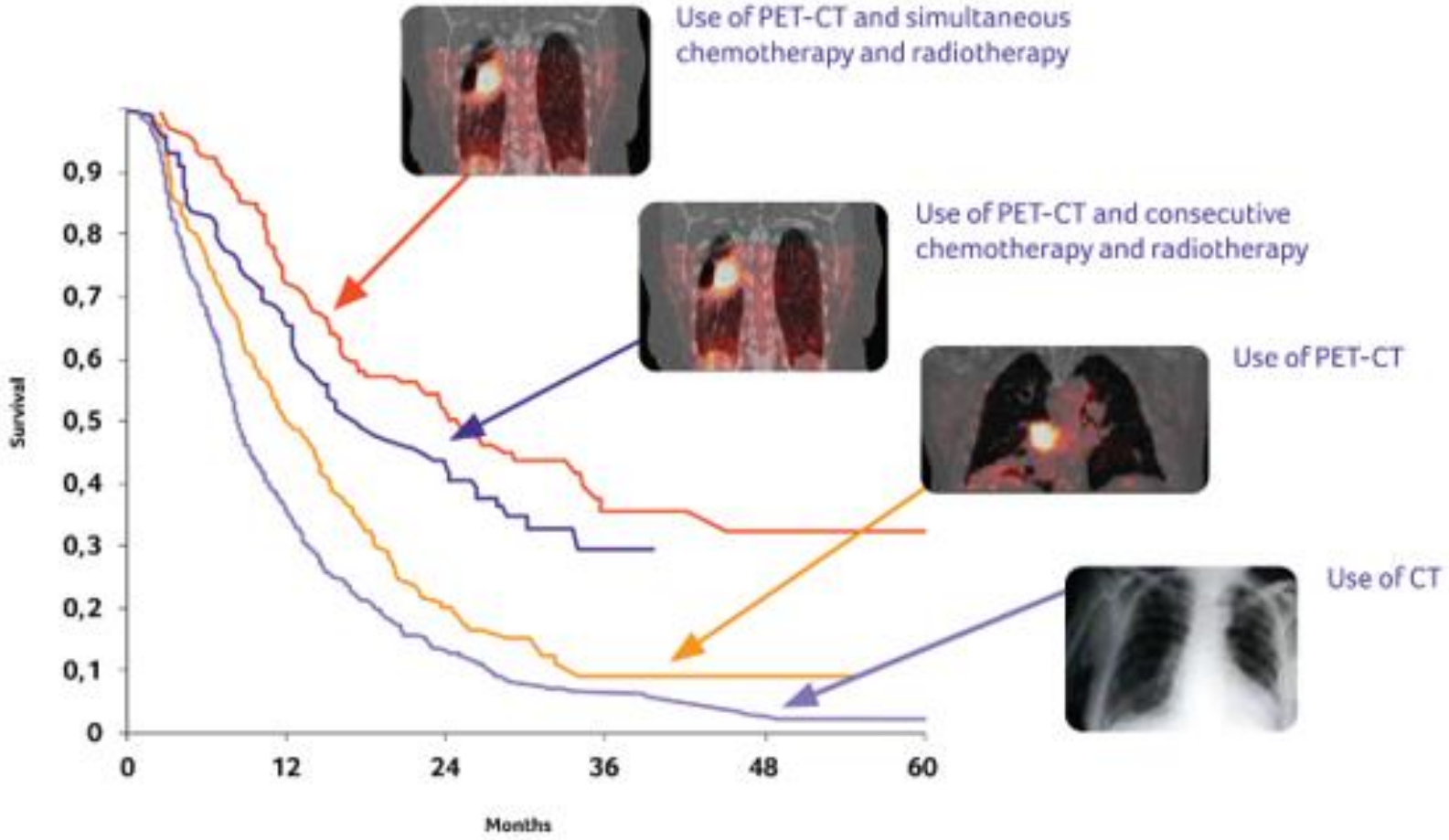
# Improved outcome through innovation





Survival all tumors ref. IKNL 2020

# outcome (2)

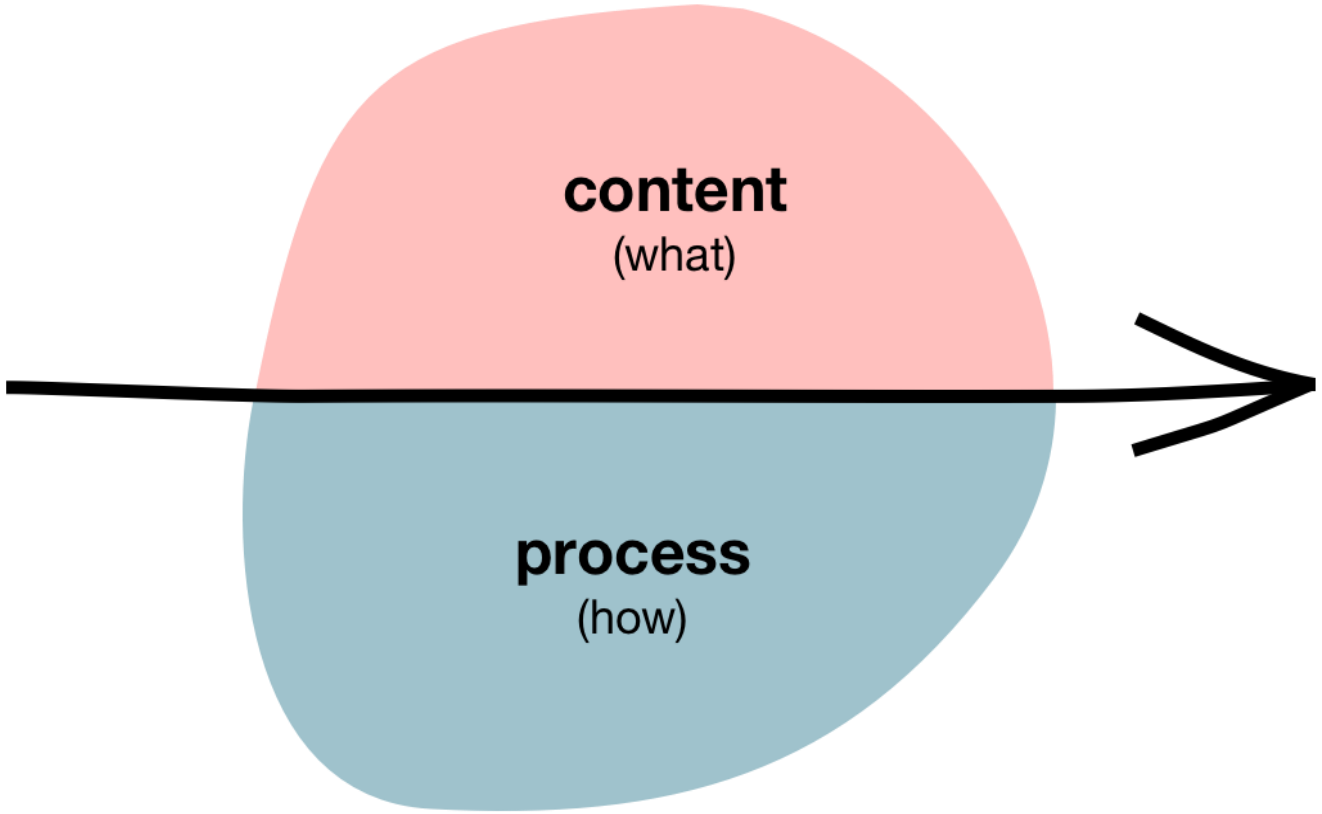

*Improved survival after innovations for certain types of lung cancer (source: de Ruysscher et al, 2012)*

# Why should we pay attention to innovation implementation?

- Study AVL, Maastro, LUMC, RTgroep, ZRTI:
  258 innovation projects:

- ± 45 % projects had a  delay of more than a half year or failed

# High level research-based innovations deserve a validated scientific-based implementation approach



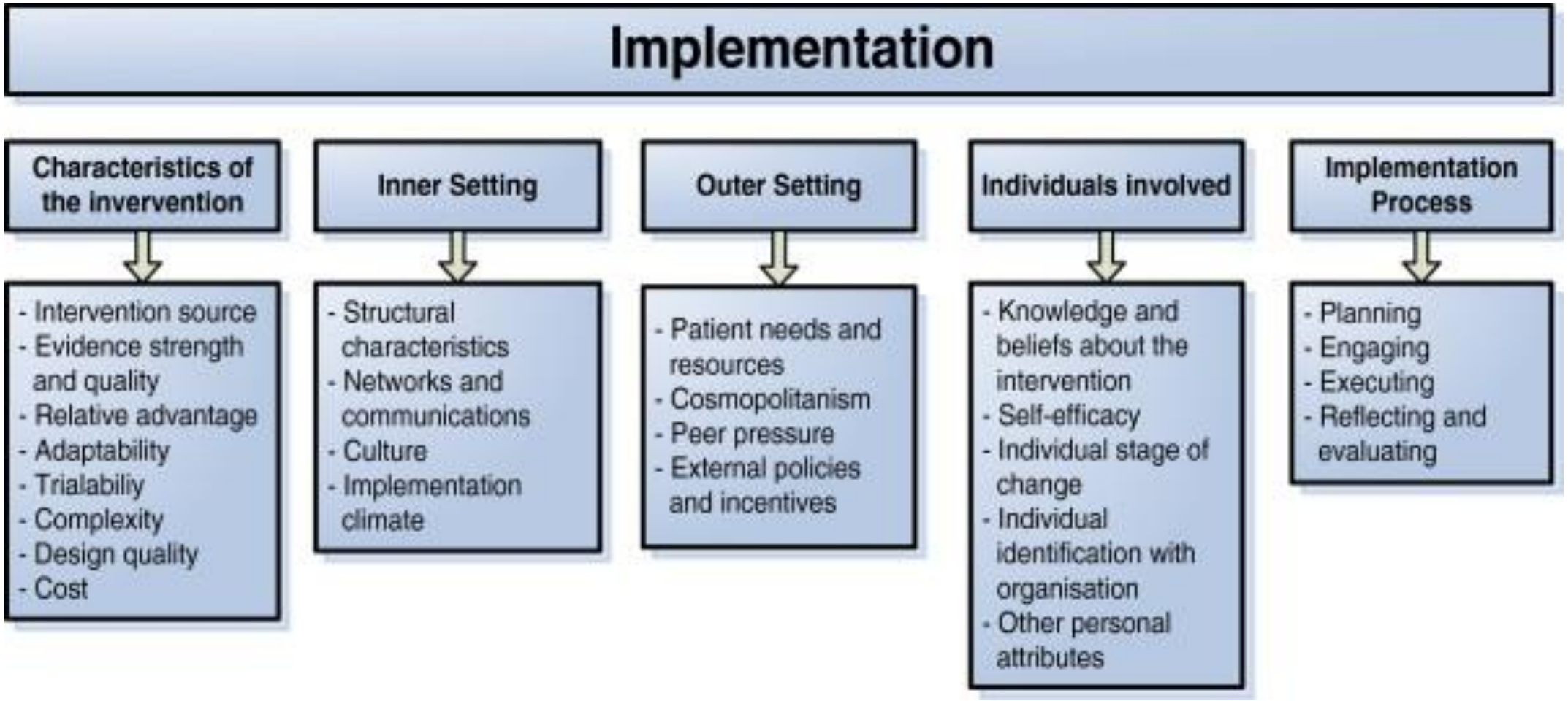
# Implementation and dissemination: complex endeavor

Implementation is more complex than the programs, technologies etc. that are the subject of implementation efforts, due to a variety of aspects, affecting each other:

- Process
- Behavior/beliefs
- Technology
- Organizational context

Fixen et all, 2005

# Factors affecting implementation success




CFIR, Damschroder

# Aim of our innovation implementation research


To develop  research-based implementation strategies

# What are we talking about?
# Definition of innovation

| Product innovation | Technological innovation | Market innovation | Organisational innovation |
|---|---|---|---|
| *during the past three years* | *during the past three years* | *during the past three years* | *during the past three years* |
| 1. **Number of introductions of new or significantly improved treatments**<br>• New to radiotherapy<br>• New to your clinic | 1. **Frequency of implementation of new medical devices** | 1. **Percentage of patients from outside the market area** | 1. **New practices for organising procedures** *(e.g. management of the total care chain, redesigning treatment process, knowledge management, lean production, quality management)* |
| 2. **Number of new positioning devices for patient treatment** *(e.g. a new fixation product)* | 2. **Number of products** *(e.g. hardware, software)* **for which royalties have been obtained or which have been sold to the industry** | 2. **Number and percentage of new general hospitals that refer the desired patient population** | 2. **New methods of organising work responsibilities and decision making** *(e.g. first use of a new system of employee responsibilities, teamwork, decentralisation, integration or decentralising departments, education/ training systems)* |
| 3. **Number of approved patents** *(available from a public database)* | 3. **Number of CE** *(Conformité Européenne)* **marked products** *(e.g. hardware, software)* **that have been produced by the department** | | 3. **New methods of organising external relationships with other organisations or public institutions** *(e.g. first use alliances, partnerships, outsourcing or sub-contracting)* |
| 4. **Percentage of patients in phase III randomised trials approved by an IRB** *(Institutional Review Board)* | | | |
| 5. **Percentage of patients in phase I-II trials approved by an IRB** *(Institutional Review Board)* | | | |

Innovation indicators radiotherapy after Delphi research (source: Jacobs et al, 2015)

# Predicting factors for success are manageable

1. Sufficient and competent employees
2. The project goals are completely clear for all project members
3. All project-members find the project feasible and desirable
4. Complexity: integration of functionalities, equipment and professionals

Swart et al, 2020

# SOP prediction success innovation implementation

- SOP internally validated with data NKI-AVL and MAASTRO
- External validation with data from LUMC, ZRTI and RTG ready
- Extension to e-health

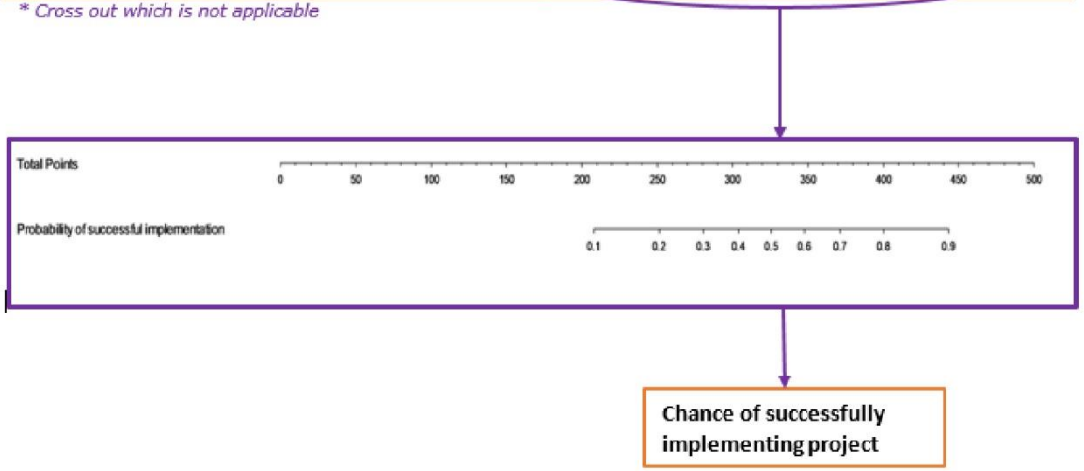
**STANDARD OPERATING PROCEDURE (SOP): Preparing for project start**

1. New idea for project/innovation
2. Propose a new project plan
3. Predict the chance of successful innovation implementation
   a. All project members score the project/innovation following appendix 1. Consult the nomogram to define the chance of successful innovation implementation.
4. Projects having a certain percentage or more chance of success, to be determined by each organization themselves, can start (for example 70%). Projects that do not reach the 70% must first take actions that will raise the score on the manageable success factors in order to still achieve the 70% and be able to start.

*Appendix 1 to guideline*

| **Success Factors**<br>Do the following points apply to the project? | **Project member X**<br>**Yes / No** |
|---|---|
| Is the project an organisational innovation? | 38 / 0* |
| Is the project a treatment innovation? | 0 / 38* |
| Sufficient and competent employees to perform this project? | 100 / 0* |
| Good understanding and awareness of the project goals and process? | 85 / 0* |
| Good feasibility & desirability? | 90 / 0* |
| Is it a complex (integration of many functionalities and devices / many professionals) project? | 0 / 93* |
| Total points | X |
| Average points | sum of total points/total amount of project members |

* *Cross out which is not applicable*



# Prediction model = only knowing the starting situation

Study ongoing about workshops as method for implementation.

Goal: Sharing ideas about perceived hurdles and possible solutions.

Investigate whether this helps in:

- Getting a collective picture
- Joint ownership solution
- Implementation success

Example: brachy. Predicted success increased significantly

# Treatment innovation implementation

In-depth study to find out why treatment innovations are 4 times less likely to be implemented.

Key determinants:

Concerns about safety and insufficient patient engagement -->

Make a plan on both topics before implementation & include the patient journey in the care-path

# What organizational context suits best?

- Agile vs. Waterfall
- Project-based
- Ambidexterity
- Job satisfaction

Study: work in progress

# Innovation dissemination and adoption (1)

Difficulties adoption PT and MRL in centers not having that device:

mixed-methods study.

1. Patient selection
2. Logistics (for example in combination with chemo)
3. Travelling  (for patients)
4. Additional work for the referring physicians
5. Uncertainty concerning the knowledge about the treatment

# Innovation dissemination and adoption (2)

In-depth studies to find clues to improve understanding of facilitators for innovation dissemination and adoption.

Workshops based on Design Thinking Methodology with physicians from other centers not having the specific innovation (in order to adopt the innovation and refer eligible patients)

# DESIGN THINKING

## A FRAMEWORK FOR INNOVATION

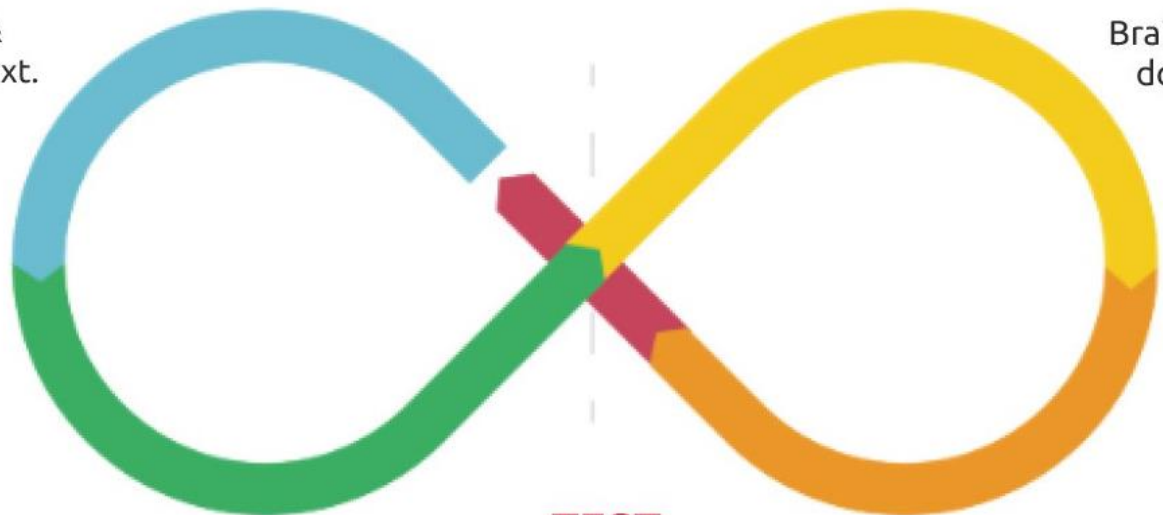
### EMPATHISE

**What Is the problem?**
Define the challenge & explore the human context.

### IDEATE

**How do we solve It?**
Brainstorm ideas good & bad, don´t stop at the obvious.

CONTEXT



FORM

### DEFINE

**Why Is It important?**
Research, observe, understand & create a point of view.

### TEST

**Does It work?**
Implement the product, show & don´t tell, start to refine the product.

### PROTOTYPE

**How do we create It?**
Start creating, experiment, fail cheap & fast.

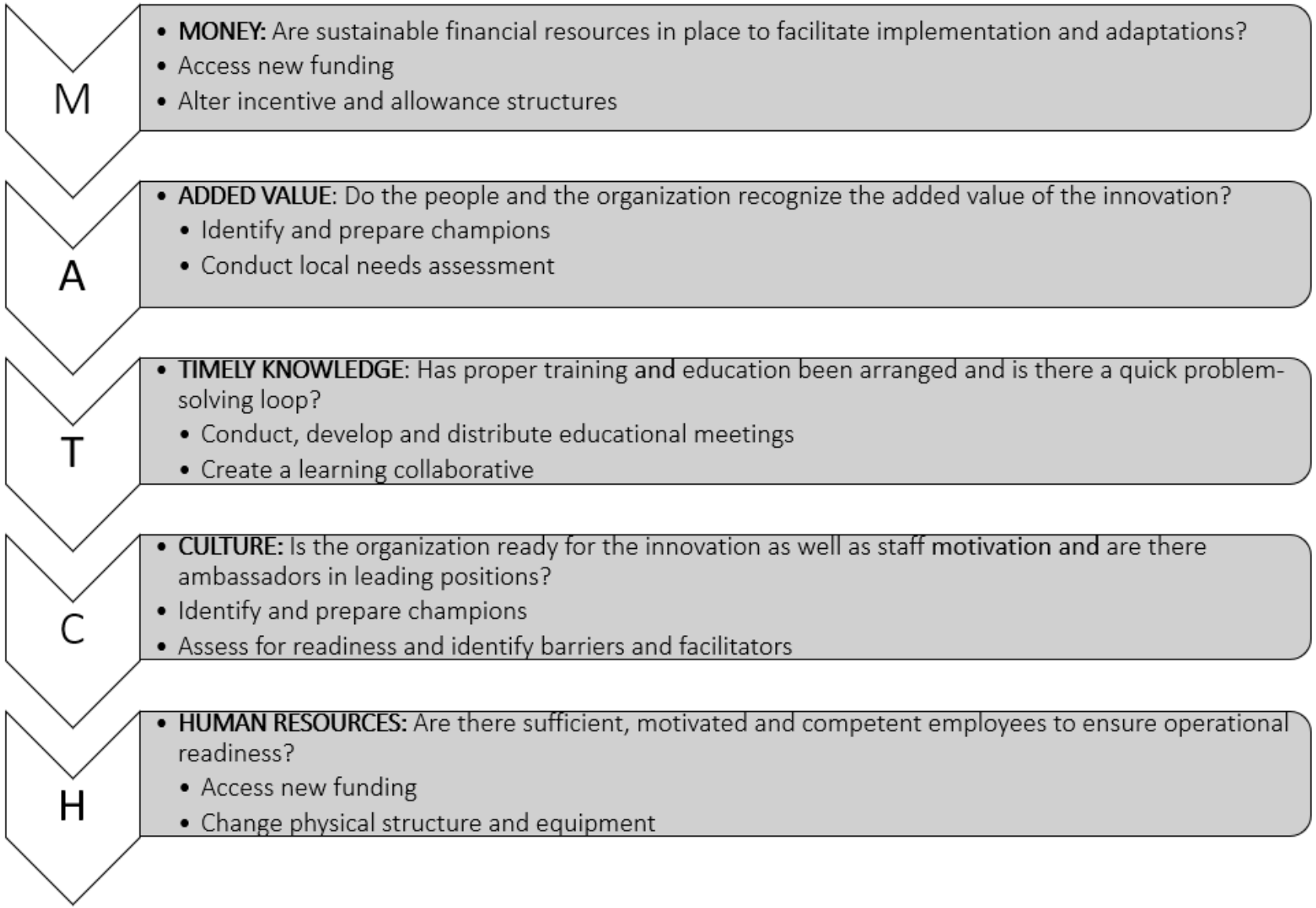
# Crucial in DT : ownership, mutual understanding of the situation and solutions designed together

Example adoption Proton Therapy by referrers

- Agreement on additive aids for patient selection;
- Innovative approaches to solve delay and logistic issues in referrals;
- A multi-disciplinary approach, especially in case of concurrent chemotherapy (not only focus on RT in case of referrals).

# The MATCH checklist for the implementation of radical innovations into secondary healthcare

Review, Thijsen et al, 2021



# Quantitative study impact RI on BaU, case study Maastro – under review (10 reviewers ☺)

RI can **have a larger impact than one would anticipate**—especially on variables not taken into account beforehand—on operations associated with the RI as well as on BaU operations.

With significantly more RI incidents and an increase in some BaU incidents, the organizational process is affected, machine inactivity may lead to crises with all its consequences for the patient**. Extensive preparation and planning can minimize these effects.**

# Taskforce innovation-implementation Radiotherapy The Netherlands


Stichting Kwaliteitsgelden Medisch Specialisten

# Top 4 implementation hurdles 18 RT-centers in The Netherlands

- Shortage of time from personnel (n=9 centers);
- Prioritization of projects (n=8 centers);
- Collaboration with external parties (n=6 centers);
- Resistance to or acceptance of the innovation.

# Implementation of Shared Decision Making

Important for prostate cancer patients: they need to be informed about the different options

Use specific SDM implementation framework based on research findings e.g. Joseph Williams et al, 2020

# Most important lessons learned implementation MRL and PT

1. Involve relevant **patient advocacy organizations** from the beginning. They can help with approaching/informing patients in an effective way.
2. Establish a **collaboration network** with the referring centers and organize the 3 C's: cohesion, connectedness and conciseness in a network plan.
3. Conduct studies in a collaboration network with referring centers and include **cost-effectiveness studies.**
4. A plan is required for increasing **awareness-knowledge**, **how-to-knowledge and principles knowledge** of physicians and physicists of referring centers.

# Most important lessons learned implementation MRL and PT

5. Management should be aware that the implementation of radical innovations, requires an **adjusted management style**. Also, significant attention must be paid to what is necessary for employees to feel safe.
6. The business plan should take the necessary **flexibility of resources** into account. Otherwise, the center will definitely face major changes.
7. It is important to organize as much as possible **training** in advance of the clinical start of a specific tumor treatment because during clinical operations a lot of time is necessary to find answers for unforeseen events.

# Most important lessons learned implementation MRL and PT

8. It is important to be **open for all opinions** of radiation oncologists, physicists, management and referrers have towards PT and MRL to enable a constructive, open dialogue about beliefs and doubts.
9. **Ownership** of the implementation process must be organized for the doctors, physicists and other key players in the organization in an early stage.
10. **Reflection sessions** should be scheduled on a regular base. It is important not to only evaluate in the case that something went wrong.

# Implementation plan

Make an implementation plan using a validated implementation framework to improve implementation

(CFIR, ENT, RE-AIM …….)

**https://cfirguide.org/**

# Main recommendations

- Implement important innovations research-based and make an implementation plan according to recommendations in scientific research;

- If applicable, develop (as part of the implementation plan) a patient engagement plan, a networkplan, a plan for training, or a stakeholder plan and use  validated frameworks;

- Organize ownership for everyone that can make the innovation work.

# Building knowledge on innovation implementation

Thank you !