



White paper

Smartly adopting smart technology



SAMEN Field Lab
Smart Maintenance Enabled
Business

Knowledge Product 19/20



Index

| | |
|-----------------------------------|----|
| Introduction: SAMEN | 4 |
| Smartly adopting smart technology | 6 |
| Quick Scan | 10 |
| Assessment | 12 |
| Discussion and validation | 18 |
| Roadmap | 19 |
| Partners | 20 |
| Appendix | 22 |

Introduction: SAMEN

This white paper describes Knowledge product “Implementing and learning to work with new smart technology”, developed in 2021 for the World Class Maintenance SAMEN Field Lab.

World Class Maintenance

The World Class Maintenance Foundation (WCM) has a radical goal: towards 100% predictable maintenance in the Dutch industry. To this end, WCM develops smart maintenance knowledge that is disseminated within the Dutch business community. WCM sees smart maintenance as an important step towards a guaranteed quality of life in the future.

To achieve the objective, WCM is, among other things, the initiator of several Smart Industry field labs, such as SAMEN.

Smart Maintenance Enabled Business

The SAMEN field lab is all about strengthening the Smart Maintenance innovation system, based on the conviction that 100% predictable maintenance in the manufacturing and process industry will only be achieved with new revenue and organizational models. 75% of innovation success depends on social innovation, against 25% on technological innovation (Volberda, 2007). That is why the focus of SAMEN is on social innovation. The SAMEN Field Lab alleviates the struggle of companies in operationalizing and commercializing developed Smart Maintenance technologies.

SAMEN distinguishes three main activities for developing, validating, safeguarding and disseminating knowledge, in which asset owners,

OEMs, service providers and SMEs work together:

- Community of Practice
- Pilots
- WCM Vector.

In the **Community of Practice**, solutions in the form of knowledge products are developed on the basis of shared knowledge and experience. These knowledge products are validated in **pilots** that take place in Living Labs. The validated knowledge products are secured and distributed via **WCM Vector**.

Knowledge products

The knowledge products of the SAMEN Field Lab have been developed on four themes, namely:

- Smart Data
- Smart Business
- Smart Work
- Smart People.

Smart Data

This concerns the more technical side of the issue. From determining what to measure to the architecture for secure data sharing. The following knowledge products have been defined:

1. Business Trust Architecture
2. Open IT Eco System *(on the basis of exploration, it turned out that this had already been developed elsewhere)*
3. Roadmap Predictive Maintenance
4. Guidance in determining what to measure
5. Approach from raw data to actionable data..

Smart Business

This relates to tools to determine the business case up to the simulation of new business models in the chain. The following knowledge products have been developed within this theme:

6. Smart Maintenance value calculator
7. Yield simulation model
8. Value Tracking method
9. Cookbook with scale-up scenarios Smart Maintenance.

Smart Work

This concerns the impact of smart maintenance on various workflows and the smarter organization of work. The following knowledge products have been developed within this theme:

10. Contract framework
11. Tool for objective decision-making
12. Business Case Smart Maintenance
13. Stakeholder analysis tool
14. Logbook available data
15. Intuitive planning / tracking system
16. 4 day training ‘Learning to see what can be done smarter’
17. Integral implementation method.

Smart People

This relates to the development of knowledge and competencies of employees. The following thresholds apply:

- Fragmented landscape in terms of information
- No insight into adoption capacity
- Conservative industry
- Non-generic and obsolete machines/ systems
- Lack of examples
- Training is not a profession in itself.

The following knowledge products have been defined within this theme:

18. SKind of ‘Google Engine’ *(was not feasible within project timelines)*
19. Scan for insight into the adoption capacity and learning needs of employees
20. Implementation scenarios Smart Learning
21. Smart plateau planning VR/AR.

The knowledge products 19 and 20 have been merged into “Implementing and learning to work with new smart technology”.

Living Labs

Eleven larger organizations have opened up their environment to serve as Living Labs for the validation of the knowledge products. In addition, an SME Living Lab has been set up to validate the knowledge products at a number of SMEs.

WCM Vector

The validated knowledge products are made available to the Dutch business community via WCM Vector, WCM’s knowledge platform. WCM Vector is a permanent result of Field Lab SAMEN.

Whitepaper

This whitepaper relates to Knowledge Product 19/20 “**Implementing and learning how to work with new smart technology**” (in short: Smartly adopting smart technology).

The document is mainly aimed at project and line managers who (have to) implement smart maintenance more widely in their organization.

The knowledge product is available through WCM Vector.

Smartly adopting smart technology

Knowledge product 19/20 falls within the theme “Smart People”. Within this theme we see the following developments.

- Loss of knowledge due to aging of the workforce (retirement).
- Young people are staying with one employer for shorter periods of time.
- People are increasingly conforming to protocols.
- Shift from manual work (execution) to office work (administration).
- Young people are used to new digital applications and expect them from their employer.
- People have to be trained ever faster in order to still have an effect.

We also see that new smart technology is not being used or is being used too slowly. This has several causes:

- The IT infrastructure has not yet been (completely) set up, which means that it is very difficult or impossible for people to adopt the smart technology.
- People, neither management nor executives, trust that technology sufficiently.
- People do not see what the advantage is for the company, what it brings.
- The ‘old’ way and ‘old’ processes are still possible.
- People are not trained correctly or at the right time, or are not trained at all in working with the new technology.

Combination of two knowledge products

The aim of Knowledge Product 19/20 is to gain more insight into the adoption of innovation and the preferred learning styles. The knowledge product is the combination of two knowledge products:

19. Scan for insight into the adoption capacity of employees
20. Implementation scenarios Smart Learning.

Below we summarize the backgrounds of these knowledge products.

19. Scan for insight into the adoption capacity of employees

The scan/monitor focused on the following questions: if we start working with more new smart technology, how much can organizations and their employees handle, and how do we offer this to employees: in class, 1-on-1, via a book, digitally? or else? Do we do this directive (push) or through more social learning and on demand (pull)?

When choosing the right way forward, a scan or monitor that provides insight into the adoption capacity of organizations and their employees, plus how they learn and how they want to be managed, would be of great help.

20. Implementation scenarios Smart Learning

People are often the delaying factor in the introduction of innovations, such as the integration



of new smart technology. If, based on the results of the scan (19), we could choose the most appropriate implementation scenario for Smart Learning from a predetermined set of scenarios, we could increase the acceptance rate and speed of adoption.

Two tools, two next steps

Knowledge product “**Implementing and learning how to work with new smart technology**”

includes two tools, followed by two steps:

- Quicksan (as PDF file)
- Assessment (as Excel file)
- Discussion and validation
- Roadmap.

These components are explained in more detail in the following chapters, see also the diagram below.

Theoretical models

The knowledge product is partly based on theoretical models. The following theoretical models provide insights into the processes involved in **adoption and change**.

- AMO Model
- ADKAR Model for Change
- Lewin Change Management Model
- Kotter Change Model
- Bridges Transition Model
- Kübler-Ross Change Curve
- Satir Change Management Model
- Maurer 3 Levels of Resistance and Change Model
- Rogers and Moore Adoption Curves
- Zahra & George Absorption Capacity Model.

During the development of the Assessment tool, the main focus was on the AMO model.

A description of all models mentioned is included in the appendix. There we also describe some models for **talent development** in combination with **performance improvement of the organization**:

- ATD Human Performance Improvement Model
- Rummler-Brache Nine Boxes Model
- Quirke Communication Escalator.

Getting started

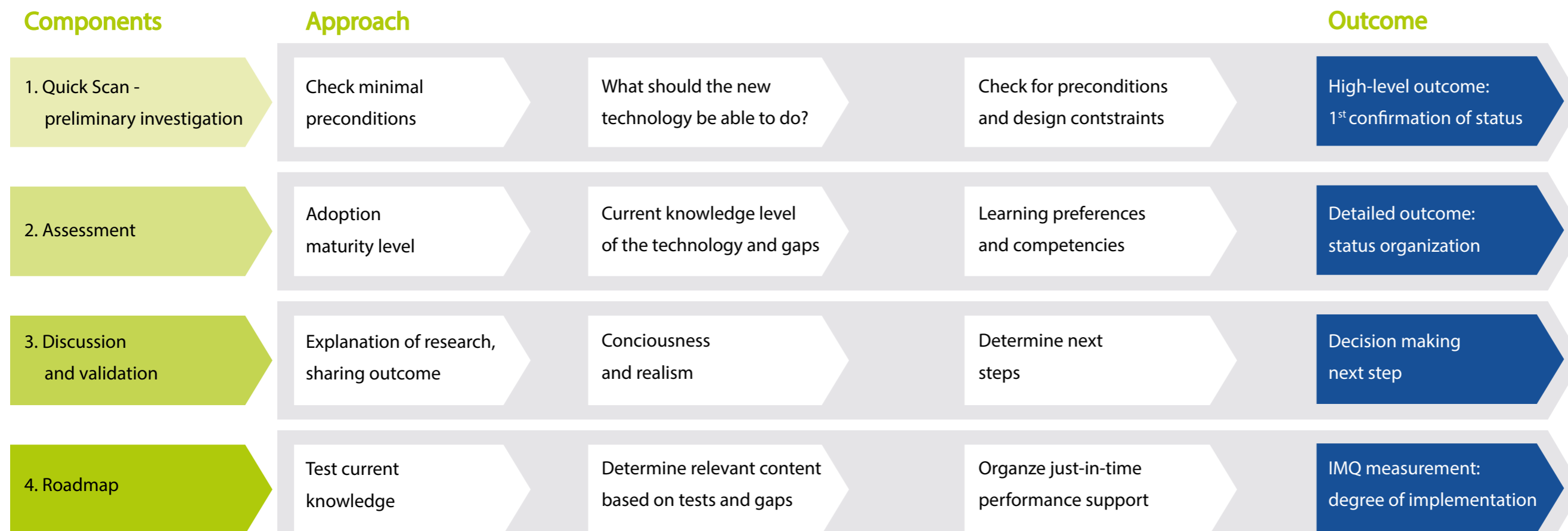
Companies that want to use knowledge product within a SAMEN Living Lab or separately to make a start with new smart technology can use the tools that have been developed for this via **WCM Vector**.

Based on the experiences of all companies, this knowledge product will be continuously validated and improved.

The ultimate goal is to arrive at validated knowledge products that support making a good start with the use of new smart technologies for maintenance.

Expert support

The knowledge product was developed by the companies presented under “Partners”: Cargill, Fontys, PDM, Tata Steel and Vanderlande. For help with its application, WCM Vector can provide support from the initiator and expert of this knowledge product, PDM.



Roadmap Adoption capacity and implementation scenarios

Quick Scan

The **Quickscan** is a (qualitative) preliminary investigation into the effects of new smart technology on employees, the minimum requirements for working with that technology.

Requirements

The following requirements are relevant to the introduction of new smart technology and must be present if it is to be adopted successfully.

- Clear motivation for the change
- Commitment from management and employees
- Leadership
- Shared core values and behavior
- Clear sense of urgency
- Clearly described “what’s in it for me” for those involved
- Required capacity (competence, processes, tools, data) available
- Resources (FTE, time) available
- Supported implementation plan
- Fit-for-purpose change strategy.

The Quick Scan can be performed using a PDF file that contains these requirements; the file is in Dutch.

Results Quick Scan

The result of the Quick Scan is a high-level determination of the situation the company in question is in at that moment. This leads to awareness of the management of the issues involved in introducing new smart technology. Greater depth is achieved on that point with the Assessment tool (see next chapter).

The introduction of new smart technology often goes wrong when the following situations occur:

- You start too late
- You have poor planning
- You announce the renewal with much fanfare
- You communicate badly with those directly involved
- You have insufficient awareness of the urgency and importance
- The IT infrastructure is not designed for the new technology
- The old way of working is still possible in addition to the new way of working
- Those involved are not or poorly trained.



Assessment

The **Assessment** tool determines the maturity level of the adoption capacity of the employees and of the organization as a whole. It provides clarity in the current level of knowledge of the technology and the gaps that exist therein.

The result of the Assessment is a detailed status of the employees and the company concerned. It shows which delaying factors play a role in the introduction of new smart technology.

The Assessment is carried out using an Excel tool, in which an assessment of the maturity is recorded; the file is in Dutch. This is done on the basis of 34 propositions, divided into four themes (see image on the right):

- Strategy
- Ability
- Motivation
- Opportunity.

It is therefore about five verbs, what someone (or an organization) "he knows, can, wants, becomes and is"; see the description of the AMO model by Appelbaum et al. in the appendix. The statements partly relate to the individual employee, partly to the organization as a whole.

CMM levels

The assessment is based on the **five maturity levels** of the Capability Maturity Model, the CMM levels:

0. Not applicable
1. Initial (or chaotic)
2. Repeatable
3. Defined
4. Managed
5. Optimizing.

At the **Initial** level, problems are not solved until they arise. This is the level that any organization can handle.

Repeatable is the level at which the organization has been professionalized to such an extent that knowledge that has been acquired is used in the development process. Decisions are thus made on the basis of experience.

Defined is the level at which the most important processes are standardized.

Managed is the level at which the quality of the development process is measured so that it can be adjusted.

Optimizing is the level at which the development process runs like a well-oiled machine and there is only refinement (the finishing touch).

The CMM model is mainly used for software development. Most organizations do not go above CMM level 2, because a higher level can entail large investments.



Assessment Adoption capacity of employees and organizations

Strategy

Six propositions have been formulated for the **Strategy** theme with regard to strategy as such, vision and objectives.

Strategy:

- Based on new technology (or new business model), our company has made clear choices about which competencies it wants to have in-house.
- The ability to effectively manage and adopt technology is seen as a critical factor within the company.

Vision:

- A vision and strategy has been defined about the development of the company to become more digital and autonomous.
- Our employees know our vision and strategy with regard to digitization and autonomy.
- Our employees support the vision of our company.

Objectives

- Clear goals and milestones have been set regarding the use of smart technologies within our company.



Ability

For the Ability theme, thirteen propositions have been formulated with regard to organizational culture, partnership management, organizational structure, competencies, resources, smart people management and systems and processes.

Organizational culture

- The management of our company has embraced the application of smart technologies and actively propagates this.
- Employees are included in the idea of why smart technologies add value to the company and how they can contribute to this.

Partnership management

- Seeking connection and win-win with other companies to promote technology adoption is part of our corporate culture.

Organizational structure

- A manager is responsible for the adoption of new technology, including the deployment of relevant resources.

Resources

- The tools, resources, systems to effectively implement the new technology are available.

Smart people management

- Our employees can practically apply new knowledge in their work.

Competencies

- Our company has strong project managers.
- The disciplines involved have received training in the field of the new technology / changes.
- Employees master the basic skills to use new technology.
- Our employees successfully link existing knowledge to new insights.
- Our company has the ability to operate more effectively by adopting new technologies.

Partnership management / Smart people management

- Our company has a good understanding of risks related to technology adoption.

Systems and processes

- The processes and systems that have been set up support the new way of working that is expected of the employees.

Motivation

Eight statements have been formulated for the **Motivation** theme regarding what the employee wants, what she/he is offered and what she/he needs with regard to adoption.

What does the employee want

- The ambitions of the employees are known. Careful consideration has been given to how these ambitions can best fit in with (the implementation of) new technologies.
- Our employee wants to broaden his knowledge in order to professionalize his functioning in the organization.



What is offered to the employee

- Our employees are offered sufficient work-related training
- Our employees are satisfied with the quality of the training and development programs available.
- Employees are enabled to actively participate and organize knowledge sessions (with the theme of smart technology) themselves.
- Our employees have the opportunity to structure and use the acquired knowledge.

What does the employee need regarding adoption

- Employees are encouraged to learn by activating them and by organizing an official kick-off for everyone in the organization.
- Our employees are able to recognize which internal knowledge may be relevant for other organizations.

Opportunity

For the **Opportunity** theme, seven propositions have been formulated with regard to support, conditions, KPIs and training and the learning organization.

Support and conditions; tools, KPIs and training

- Employees understand what is expected of them and also see the added value of this.
- A knowledge and skills matrix is available. It is clear what skills are needed and what training needs to be followed.
- The necessary process and production intelligence software is in house and used (e.g., data collection, storage, analysis, reporting software) to adopt new technology.

Learning organization

- Our employees have sufficient decision-making authority to act and make decisions within their position.
- Our company has a process to evaluate new technology and the implementation process on a regular basis.
- In our company there is a rapid flow of information, for example if a business unit obtains important information, that unit immediately communicates this information to all other business units or departments.
- Our employees are used to acquiring new knowledge.

Use of the Assessment tool

The Assessment tool is in Dutch and is managed by PDM.

The application of the CMM levels in the tool requires experience in order to correctly interpret the situation. Partly for this reason, it is recommended that the Assessment be carried out under the supervision of a PDM expert.

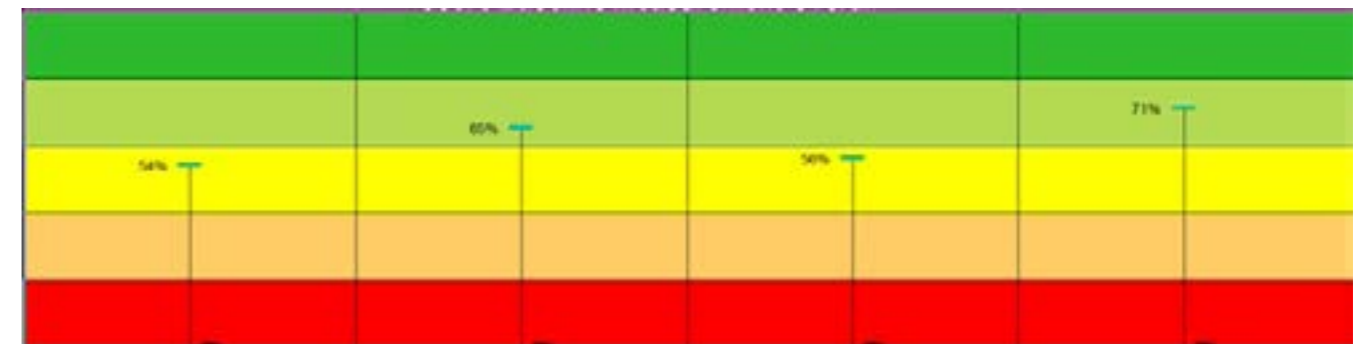
Calculations

The overall maturity level is determined per theme by adding up the assessments, with CMM level 1 earning zero points and CMM level 5 four points.

Results Assessment

The results of the Assessment tool are presented graphically. The power of the tool lies in the benchmark. Provided that the Assessment (via WCM Vector) has been carried out by PDM, a comparison with other companies is possible. This comparison is more powerful as more companies have completed the Assessment.

In that context, we appeal to companies that perform the Assessment independently (i.e. without support from PDM) to provide the results (via WCM Vector) to enrich the benchmark database.



Graphical presentation results Assessment

Literature: Capability Maturity Model, version 1.1 door M.C. Paulk e.a. (IEEE Software, 1993).

Wikipedia: https://nl.wikipedia.org/wiki/Capability_Maturity_Model.

Discussion and validation

The **discussion** and **validation** of the results of the Quick Scan and Assessment should lead to awareness and a sense of reality regarding the introduction of new smart technology in the organization.

Result discussion and validation

The result of this step is a decision on the next

steps to be taken. This implies that it is not always and unconditionally advisable to actually introduce new technology at a certain point in time.

In this step of the process, a well-founded decision is made about the implementation of new smart technology.



Roadmap

Ultimately, the Quick Scan, the Assessment and the discussion/validation lead to an appropriate implementation scenario, i.e. a **roadmap** that is preferably followed to successfully implement the new smart technology.

Defining such an implementation scenario starts with a review of current knowledge. These are ways to reduce the factors that delay the introduction of new technology. Based on tests and gaps, the relevant content of interventions is determined to increase adoption rate and speed. The right support is organized around this. Think of just-in-time support if necessary, second-line support if

(digital) 'monitoring' is sufficient and extra support via digital Communities of Practice. Take the AMO model into account (see appendix).

Result roadmap

While following the roadmap – according to the developed scenario – the IMQ method can be used. This is a change management tool for objectively measuring changes in employee behavior during the implementation of a change in an organization. In relation to our knowledge product, it measures the degree of implementation of a new technology or approach. This method is applied by PDM.

Partners

The SAMEN Field Lab is a project of entrepreneurs and knowledge institutions, with the WCM Foundation as secretary; it is subsidized by the European Union, OPZuid, the Dutch Ministry of Economic Affairs and Climate and the province of North Brabant.

The following parties were involved in the knowledge product.

Cargill

Cargill provides food, agricultural, financial and industrial products and services around the world.

The company has 155,000 employees in 70 countries. For SAMEN, the Bergen op Zoom location is relevant.

Fontys University of Applied Sciences

Fontys is an institution that offers education in almost all sectors. In addition to this, practice-oriented research within

Fontys is important to realize its ambitions. Fontys is involved in SAMEN through the Industrial Engineering and Entrepreneurship lectureship.

Tata Steel

Tata Steel is one of the world's most geographically diversified steel producers with operations in 26 countries and commercial offices in more than 35 countries. The Oosterhout production location is relevant to SAMEN.

Vanderlande

Vanderlande in Veghel is a leading global partner for future-proof automation of logistics processes in warehousing, airports and parcel handling.

PDM

PDM is an expertise bureau that innovates and optimizes products and production environments. PDM is a product, design and industrialization partner for the high-tech industry. In addition, maintenance, turnarounds, production and operations, and performance optimization are the most important areas of knowledge and experience in the process industry.





Bijlage: Theoretische modellen

This appendix describes theoretical models for adoption, change and absorption capacity and some models for talent development in combination with organizational performance improvement.

Adoption and change

| | |
|--|----|
| AMO Model | 25 |
| ADKAR Model for Change | 26 |
| Lewin Change Management Model | 28 |
| Kotter Change Model | 29 |
| Bridges Transition Model | 30 |
| Kübler-Ross Change Curve | 31 |
| Satir Change Management Model | 32 |
| Maurer 3 Levels of Resistance and Change Model | 33 |
| Rogers and Moore Adoption Curves | 34 |
| Zahra & George Absorption Capacity Model | 36 |

Talent development in combination with performance improvement

Organizations must take concrete actions to ensure that new smart technology is actually adopted and that the necessary changes are made. It revolves around talent development, i.e. processes and competencies to enable Smart People to realize the digital transformation.

To organize this in practice, we introduce:

| | |
|---|----|
| ATD Human Performance Improvement Model | 38 |
| Rummler-Brache Nine Boxes Model | 40 |
| Quirke Communication Escalator | 42 |

Sources

Where possible, the original source of the models and concepts is mentioned. A Wikipedia or other relevant internet page has been added for a further reading.

Literature: <https://www.ciopages.com/change-management-models/>.

AMO Model

During the development of our knowledge product, the **AMO Model** was particularly looked at. This model was developed by Appelbaum et al. and they distinguish the following aspects that are important to improve the performance of employees in an organization:

- **Ability:** what is an employee capable of (knowledge and skills) – **he knows**
- **Motivation:** what does an employee want (motivation and drivers) – **he wants**
- **Opportunity:** what support and conditions are needed for this (opportunities to participate) – **he can.**

The knowledge and skills of employees can be improved through training, education

and experience. Motivation and drivers are influenced by knowledge sharing, rewards, career development and job security.

Opportunities to participate are created by transparent communication, independence, responsibility and being part of a team.

The three aspects are equally important; they are fully expressed only when the employee, as a result of HRM policy, shows extra commitment and effort beyond what is required for his or her position (extra-role behavior). We have added this as a fourth aspect to our knowledge product under the heading **Strategy – he becomes and is.**



Improvement of employee performance

AMO: Ability – Motivation – Opportunity

Literature: E. Appelbaum, E. Bailey, P. Berg. & L. Kalleberg. Manufacturing Advantage: Why High Performance Work Systems Pay Off (2000).

$$\tilde{U}(\tau, \omega) = \frac{1}{\Lambda(\tau, \omega)} \exp \left[i \int_0^\tau \left(\frac{\omega}{\omega_h} \right)^{q(\tau')} - 1 \right] \omega d\tau' \right]$$

$$\beta(\tau, \omega) = \exp \left[- \int_0^\tau \frac{\omega}{2q(\tau')} \left(\frac{\omega}{\omega_h} \right)^{q(\tau')} d\tau' \right]$$

$$\Lambda(\tau, \omega) = \frac{\beta(\tau, \omega) + \sigma^2}{(\beta(\tau, \omega))^2 + \sigma^2}$$

ADKAR Model of Change

The **ADKAR Model of Change** was developed by the American consultancy firm Prosci as an aid to change processes.

On the one hand, the model emphasizes change at the individual level: changes in teams and organizations start with the change of persons. On the other hand, the model highlights the project-based side of change.

Change at individual level

ADKAR distinguishes five stages that an individual must go through successively for a successful change.

- A** – Awareness
- D** – Desire
- K** – Knowledge
- A** – Ability
- R** – Reinforcement.

Change projects

The ADKAR model also highlights the following phases of an organization's change project.

- Business need
- Concept & design
- Implementation
- Post-implementation.

These stages run parallel with the stages of change at the individual level (ADKAR).



ADKAR: Awareness – Desire – Knowledge – Ability – Reinforcement

ADKAR stages in more detail

Awareness

People know why which change needs to take place and what the consequences are if that change does not take place.

Awareness is the result of communication.

- What does work and what does not work in my organization
- What are my options
- Communicate that there is a problem
- Focus on the main reasons for change.

Desire

Any resistance to the change has been removed and people feel involved in the change.

Desire is the result of individual coaching.

- Communicate the advantages
- Identify the associated risks
- Create momentum
- Don't ignore fears.

Knowledge

They know how to make the change happen.

Knowledge is the result of education and training.

- Learn new technical skills
- Share information
- Set reasonable targets.

Ability

People are actually able to implement the change.

Ability is the result of additional training and practical experience.

- Set up an appropriate management structure
- Provide proper training
- Start small
- Don't do it secretly.

Reinforcement

We ensure that the change is sustainable.

Reinforcement is the result of positive assessment of new behavior.

- Designate champions
- Share experiences
- Learn from your mistakes.

Literature: <https://www.prosci.com/methodology/adkar>.

Wikipedia: https://en.wikipedia.org/wiki/Change_management.

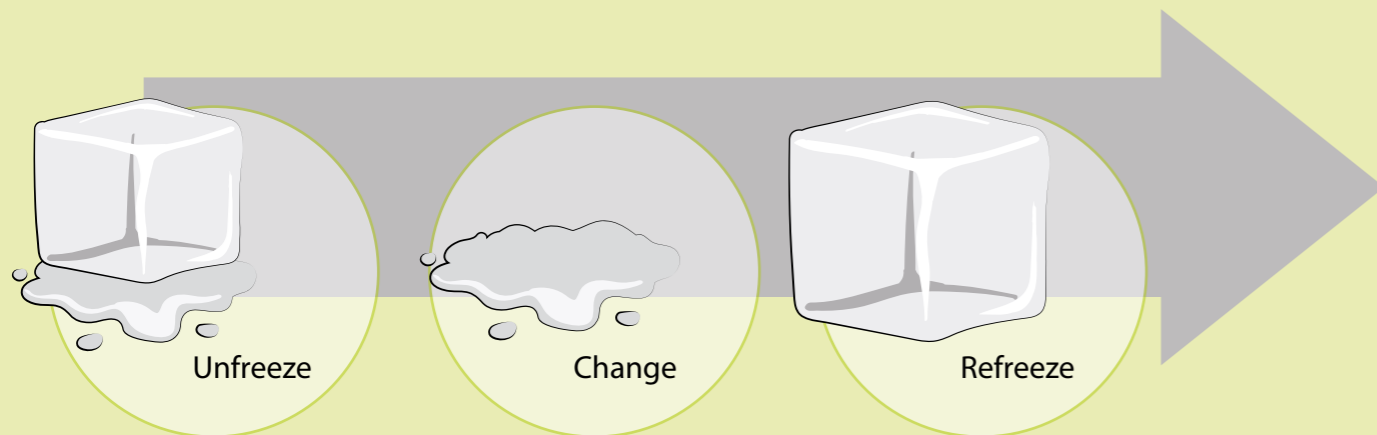
Lewin Change Management Model

Kurt Lewin identifies **three basic stages** of behavior change:

- **Phase 1 – Unfreeze:** people need to become aware and get rid of unwanted habits. This is thawing the current performance level.
- **Phase 2 – Moving:** people need to acquire the required knowledge, attitudes and skills. This is the change to the new (desired) performance level.
- **Phase 3 – Freeze:** the desired behavior should not be performed once, but should become and remain a permanent part of daily activities. This is freezing the new performance level.

In phase 1, the aim is for a transition from unconsciously acting incorrectly to consciously acting incorrectly; in phase 2, the aim is for a transition from consciously acting incorrectly to consciously acting correctly; and in phase 3, the aim is for a transition from consciously acting correctly to unconsciously acting correctly.

In all phases, willingness to change and resistance to change form opposing forces that determine how quickly the change takes place. The disadvantage of this model is that change is treated as an exception, while according to generally accepted insights, organizations must adapt continuously.



Lewin's Change Management Model

Literature: K. Lewin, Resolving Social Conflicts: Field Theory in Social Science (1947).
 Wikipedia: https://nl.wikipedia.org/wiki/Kurt_Lewin.

Kotter's Change Theory

John Paul Kotter distinguishes **eight steps** to transform an organization:

1. **Create a sense of urgency:** tangible, making the necessity visible.
2. **Build a guiding coalition:** establishing a strong steering group with sufficient resources to lead the necessary change.
3. **Form a strategic vision and initiatives:** develop a guiding vision annex strategies to realize that vision.
4. **Enlist a volunteer army:** communicate the new vision.
5. **Enable action by removing barriers:** encourage and enable them to act in accordance with the new vision.
6. **Generate short-term wins:** ensure visible short-term successes.
7. **Sustain acceleration:** consolidate improvements and continue to implement changes.
8. **Institute change:** embedding changes in the corporate culture

For a successful change, all steps must be followed, first creating a climate for change, then involving the entire organization in the process and equipping it for the change. Finally, it comes down to implementing and sustaining the change. The disadvantage of this model is that some steps are quite vague.



Kotter Change Model

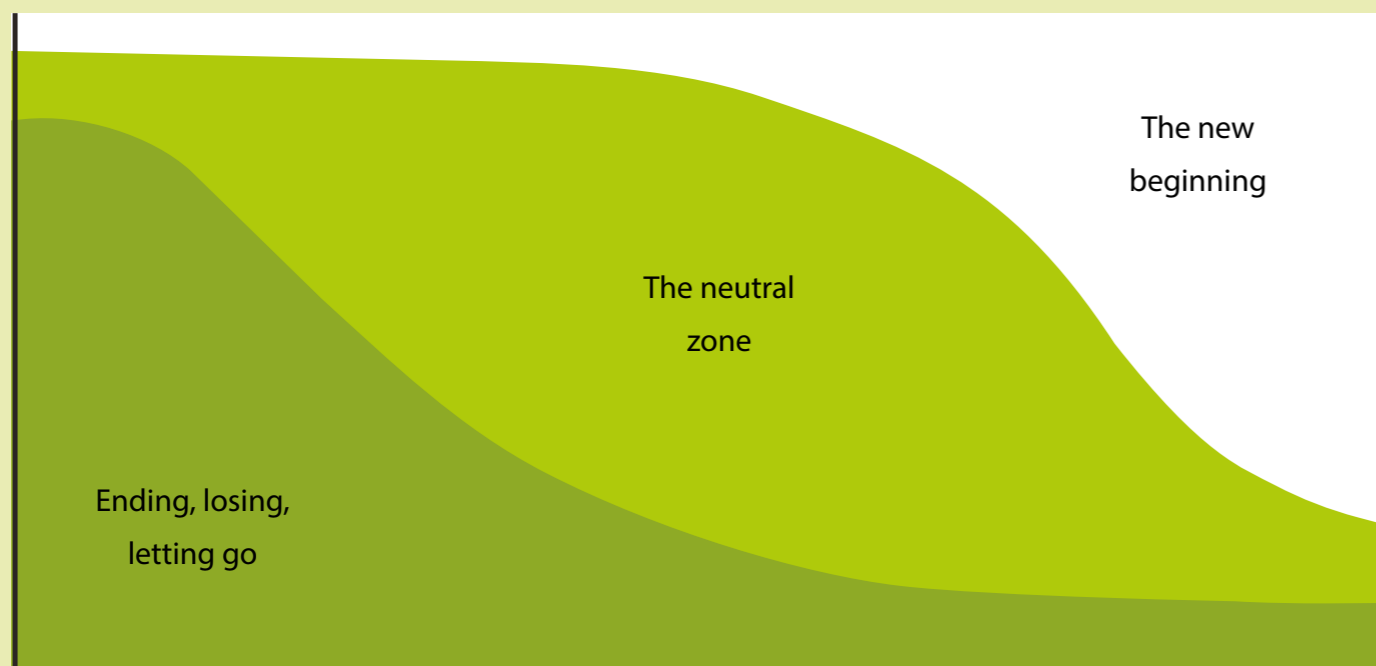
Literature: J.P. Kotter. Leading Change: Why Transformation Efforts Fail (1995).
 Wikipedia: https://nl.wikipedia.org/wiki/John_Kotter.

William Bridges Transition Model

William Bridges' **Transition Model** distinguishes **three phases**:

- **Phase 1 – Ending, Losing, Letting Go:** people identify what ends, what they lose and how to let go of those losses.
- **Phase 2 – The Neutral Zone:** this phase, in which the old has disappeared, but the new is not yet fully operational, acts as a 'breeding ground' where new beginnings can grow.
- **Phase 3 – The New Beginning:** new insights, values and attitudes are adopted. The people involved have new roles and understand how they contribute to the goals of the organization.

The disadvantage of this model is that it places too one-sided emphasis on the transition of persons, while other factors also play a role in bringing about change.



Bridges Transition Model

Literature: W. Bridges. *Managing Transitions: Making The Most Of Change* (1991).

Further reading: <https://wmbridges.com/about/what-is-transition/>.

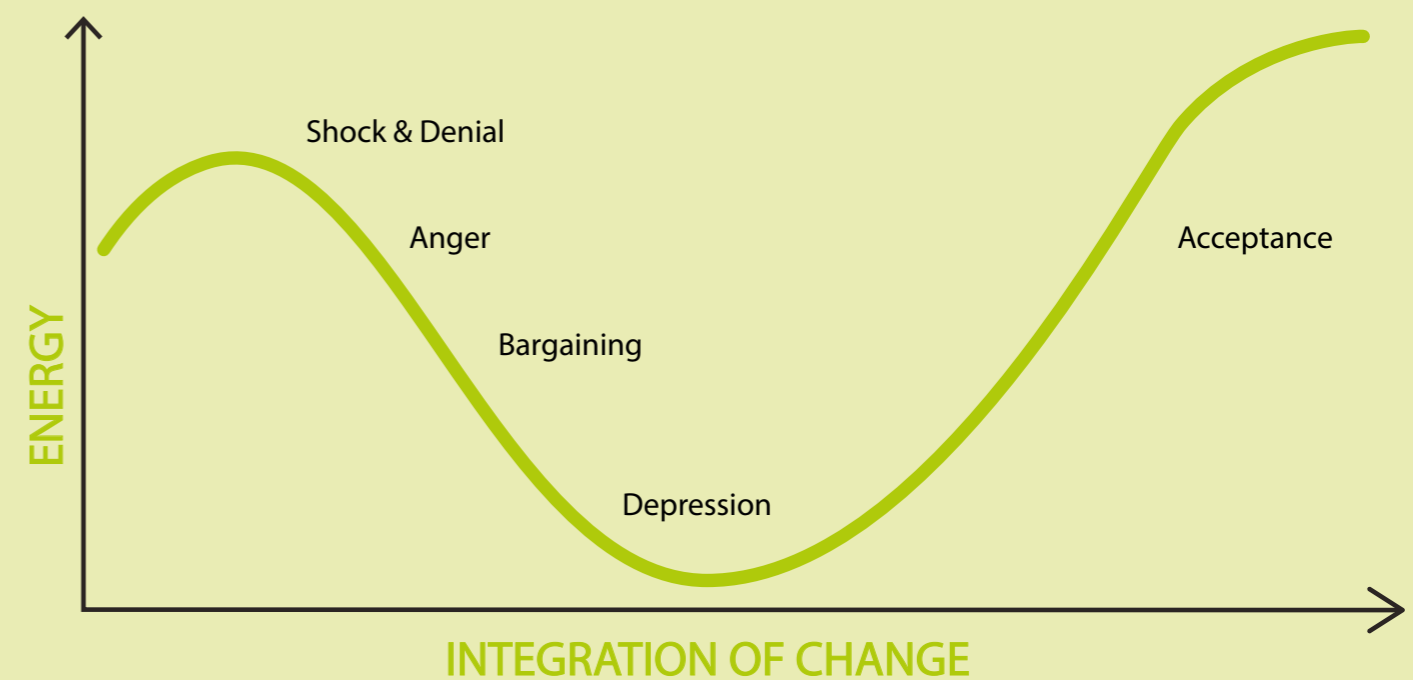
Kübler-Ross' Change Curve

Elisabeth Kübler-Ross described five stages that most people go through in whole or in part when grieving or losing, a process that involves major changes in one's personal life:

- **Phase 1 – Shock & Denial:** the person protects himself by rejecting the truth altogether. This behavior gives a person the opportunity to let the truth come to him in a measured way. At the end of this phase, the person starts looking for the facts, the truth, the culprit.
- **Phase 2 – Anger (or protest):** the person protests against the sad experience and has a lot of anger. Thoughts like: "Why me?", "why now?", "so much", "this is discrimination". Also thoughts of revenge.

- **Phase 3 – Bargaining:** if one finds that protesting and anger does not help, one can try to cope with the loss by setting goals or making promises.
- **Phase 4 – Depression:** when the sadness can no longer be denied and protests, negotiations, etc. have not helped, depression often sets in. The person feels powerless and withdrawn.
- **Phase 5 – Acceptance:** over time, the person accepts the grief.

This process of grieving often occurs when organizational changes are underway. The disadvantage of this model is that empirical evidence is scarce.



Kübler-Ross Change Curve

Literature: E. Kübler-Ross. *On Death and Dying* (1969).

Wikipedia: <https://nl.wikipedia.org/wiki/Rouwverwerking>.

The Satir Change Management Model

Virginia Satir's **Change Management Model** is similar to Kübler-Ross's, but its emphasis on performance makes it more useful in organizations. Five phases are distinguished:

Phase 1 – Late Status Quo: before the start of the change, it is determined what the current performance and what the state of affairs such as technology, corporate culture, starting point is.

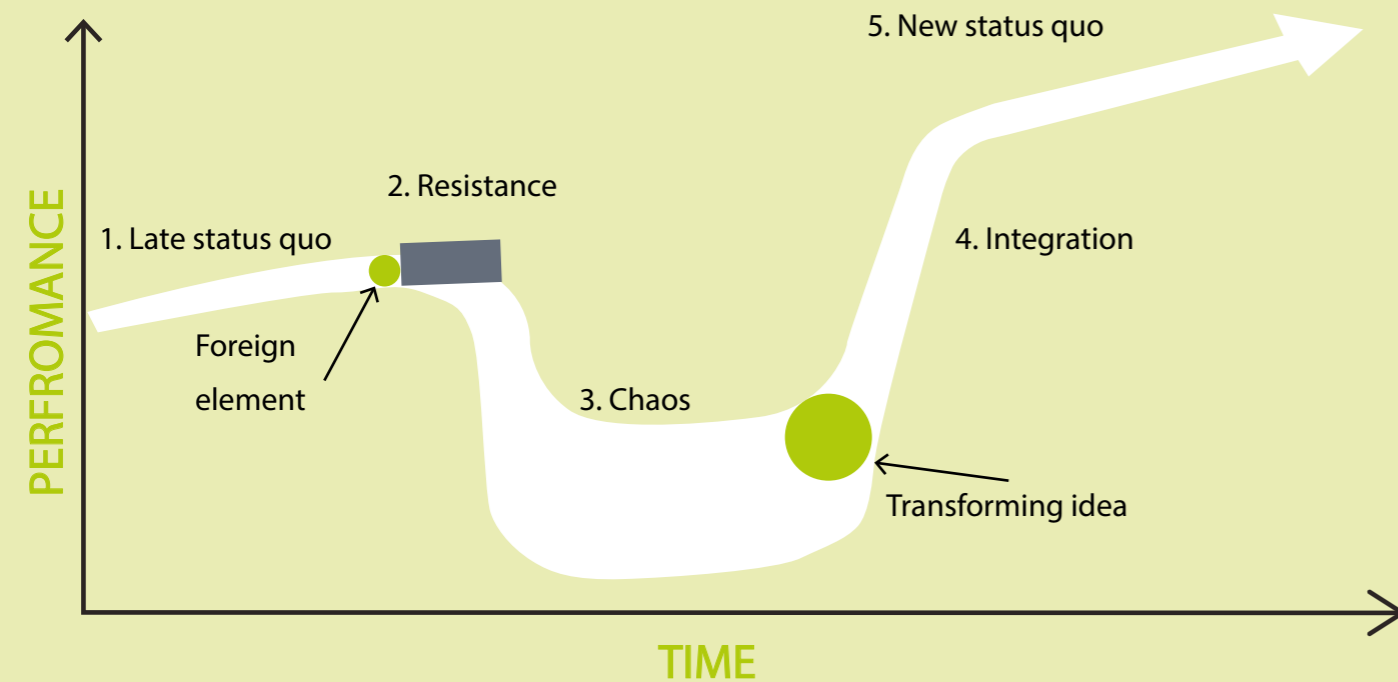
Phase 2 – Resistance: employees respond with negative emotions. It must be determined what is causing the resistance.

Phase 3 – Chaos: this marks the nadir of motivation and the pinnacle of resistance to change.

Phase 4 – Integration: productivity is picking up again and enthusiasm is rising.

Phase 5 – New Status Quo: a 'new normal' emerges and performance improves.

Building on the first phase, the performance of the organization is continuously measured.



Satir Change Management Model

Literature: V. Satir. *The Satir Model: Family Therapy and Beyond* (1991).

Aanvullende informatie: <https://bethestrategicpm.com/the-satir-model-for-change-for-strategic-pms/>.

Maurer 3 Levels of Resistance and Change Model

Rick Maurer's **3 Levels of Resistance and Change Model** describes **three levels** of resistance that organizations face when they want to make a major change:

- **Level 1 – I don't get it:** this is the case if employees have not received sufficient information or if they do not agree with it or do not know what it means for them.
- **Level 2 – I don't like it:** this is an emotional response that occurs when employees are shocked, anxious, upset, or forced to change their daily routines, habits, and roles.
- **Level 3 – I don't like you:** here the emotional resistance focuses on the people who caused the change.

According to Maurer, changes will fail if these resistances are insufficiently recognized.



Maurer 3 Levels of Resistance and Change Model

Literature: R. Maurer. *Beyond the Wall of Resistance: Unconventional Strategies That Build Support for Change* (2010).

Further reading: <https://bethestrategicpm.com/the-maurer-3-levels-of-resistance-and-strategic-project-management/>

Adoptiecurves van Rogers en Moore

Everett Rogers' theory of innovation is widely known. Using the **Adoption Curve**, the total target group of a product is divided into **five segments** (or stages) according to a normal distribution (Gauss curve, see diagram below):

- Innovators (2,5% of the population)
- Early Adopters
- Early Majority
- Late Majority
- Laggards.

In marketing theory, the Innovators are an important group because they are at the forefront of adopting a new product and serve as an example for the groups in the next stages of adoption.

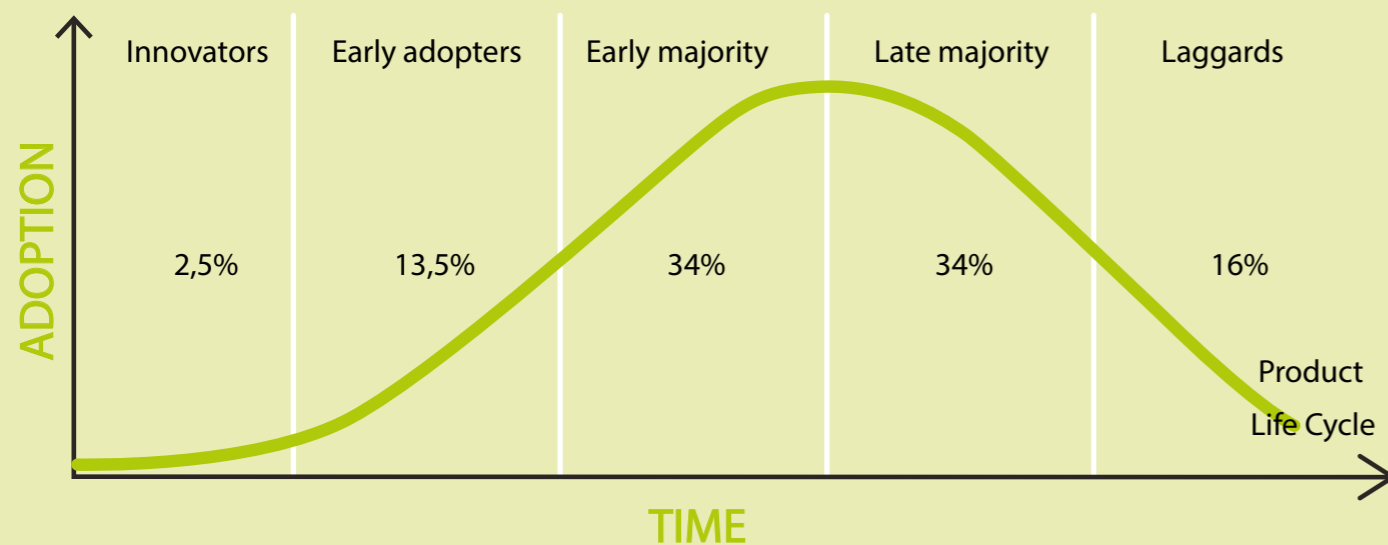
Geoffrey Moore argues that with promising new products there is a gap between the innovators

and the early majority, because people who are enthusiastic about the technology have very different expectations than the majority of (still waiting) users.

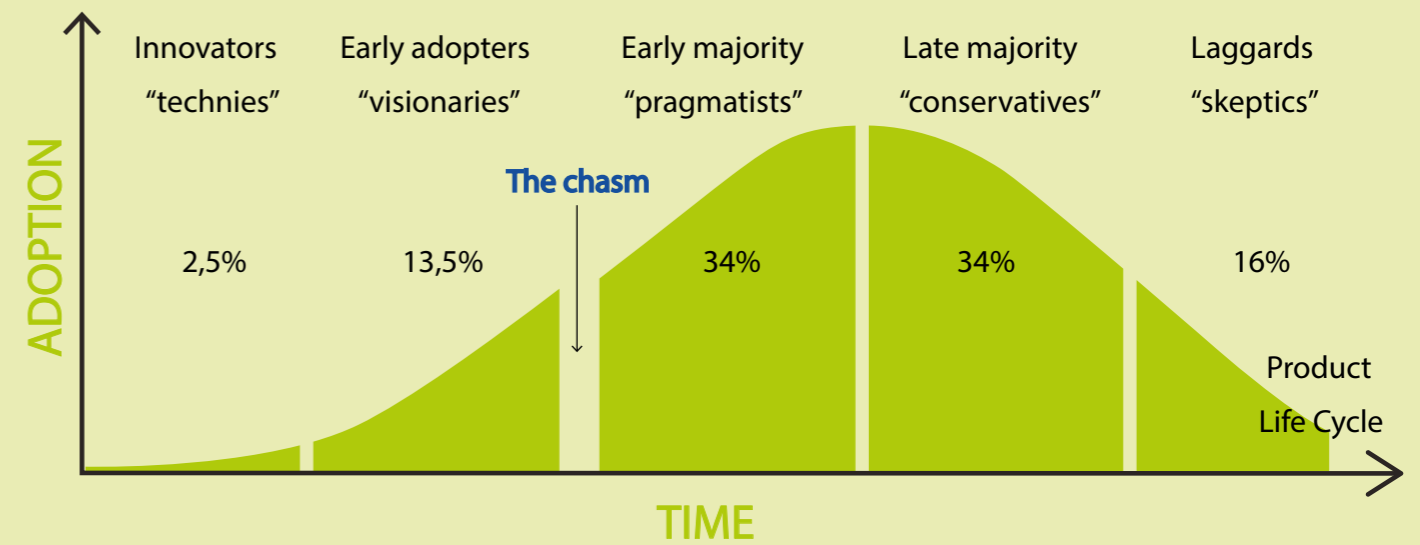
This gap can be bridged by positioning the innovation in the right way, for example by initially offering the innovation for free (consider open source software). It is often crucial that the enthusiasts convince others to use the new product.

The distinction that the American consultancy firm Gartner makes in this context between the hype cycle and the innovation cycle is particularly relevant for new smart technology.

Five phases are distinguished, which indicate how a particular innovation is discussed in the media.



Rogers Adoption Curve

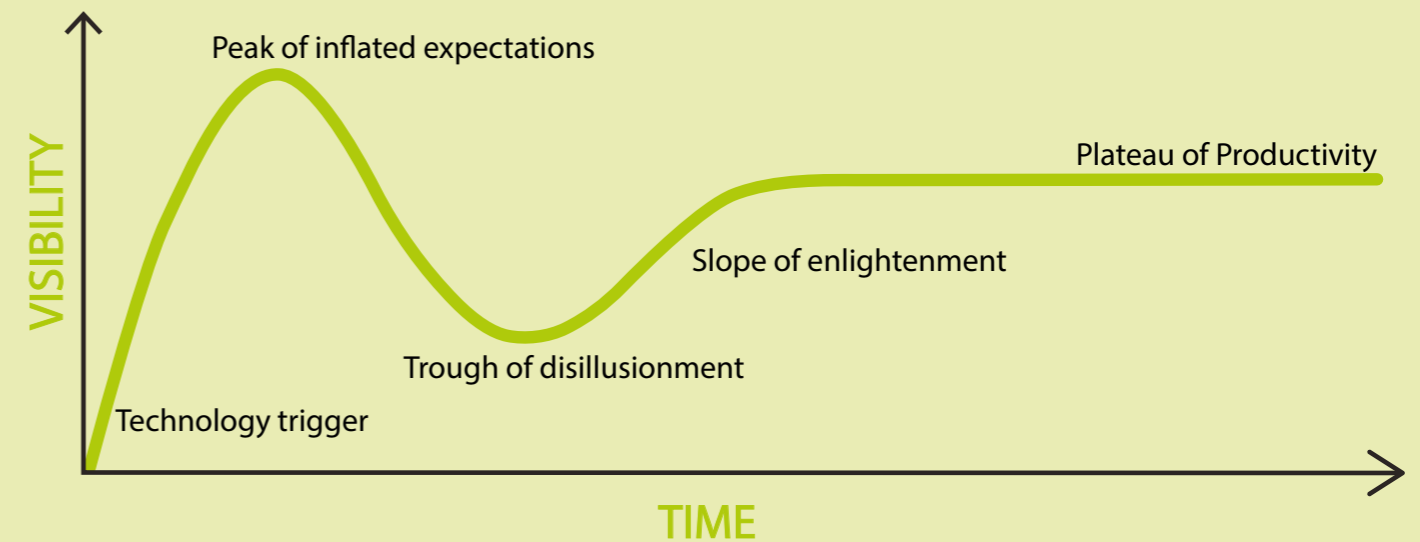


Moore Adoption Curve: Crossing the Chasm

The five phases are:

- Phase 1. Technology Trigger
- Phase 2. Peak of Inflated Expectations
- Phase 3. Trough of Disillusionment
- Phase 4. Slope of Enlightenment
- Phase 5. Plateau of Productivity.

Only in phase 4 does it become clear to the majority of users how the new technology solves their migraine problem. From that moment on, an innovation is accepted and becomes a common part of day-to-day business operations.



Gartner Hype Cycle

Literature: E. Rogers. Diffusion of Innovations (1962).

G. Moore. Crossing the Chasm: Marketing and Selling Disruptive Products to Mainstream Customers (1991)

Wikipedia: https://nl.wikipedia.org/wiki/Innovatietheorie_van_Rogers.

https://en.wikipedia.org/wiki/Crossing_the_Chasm.

https://en.wikipedia.org/wiki/Gartner_hype_cycle.

Zahra & George Absorption Capacity Model

In addition to the adoption and change models, it is good to take note of an **Absorptive Capacity Model**. According to Zahra and George, absorptive capacity has **four dimensions**, namely:

1. Acquisition
2. Assimilation
3. Transformation
4. Exploitation.

Acquisition

Acquisition refers to a company's ability to identify and acquire knowledge from external sources (for example, suppliers).

Assimilation

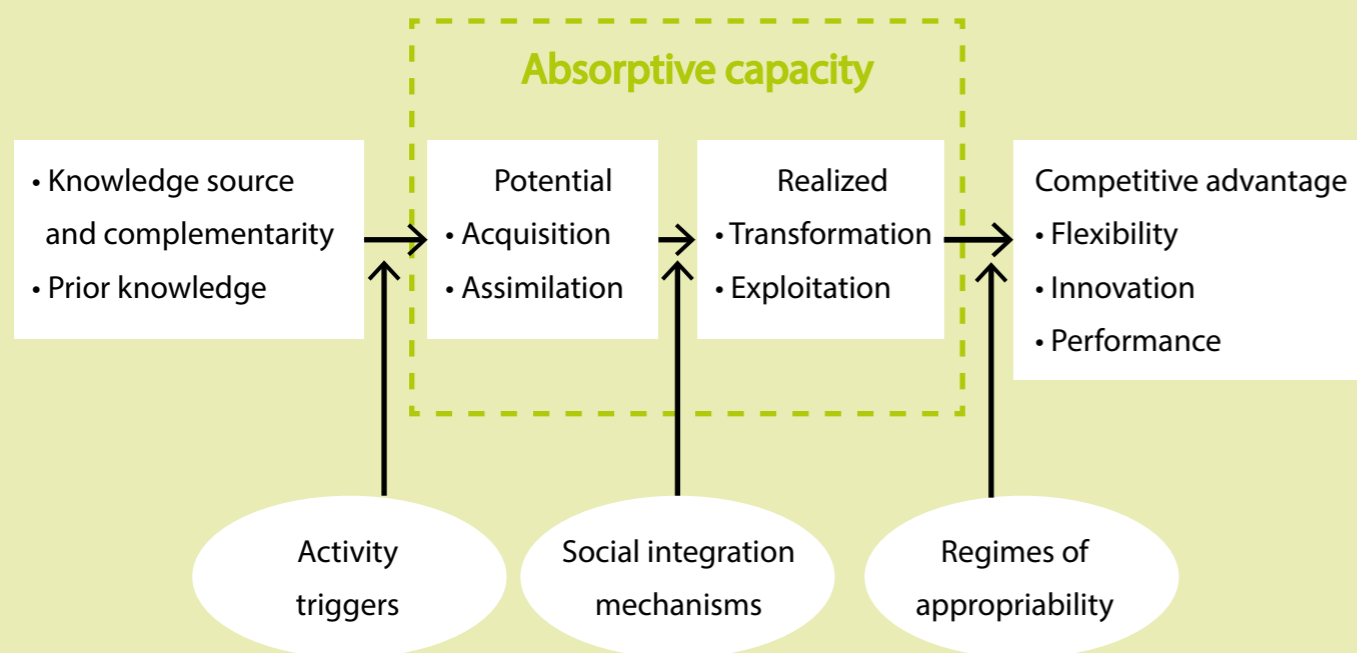
Assimilation refers to a company's ability to analyse, interpret and understand externally acquired knowledge.

Transformation

Transformation means combining existing knowledge with acquired and assimilated knowledge for future use.

Exploitation

Exploitation refers to a company's ability to create something new based on the 'transformed' knowledge.



Zahra and George Absorptive Capacity Model, 2002

Literature: Absorptive Capacity: A Review, Reconceptualization, and Extension door S.A. Zahra & G. George (Academy of Management Review, 2002).

Wikipedia: https://en.wikipedia.org/wiki/Absorptive_capacity.



ATD Human Performance Improvement Model

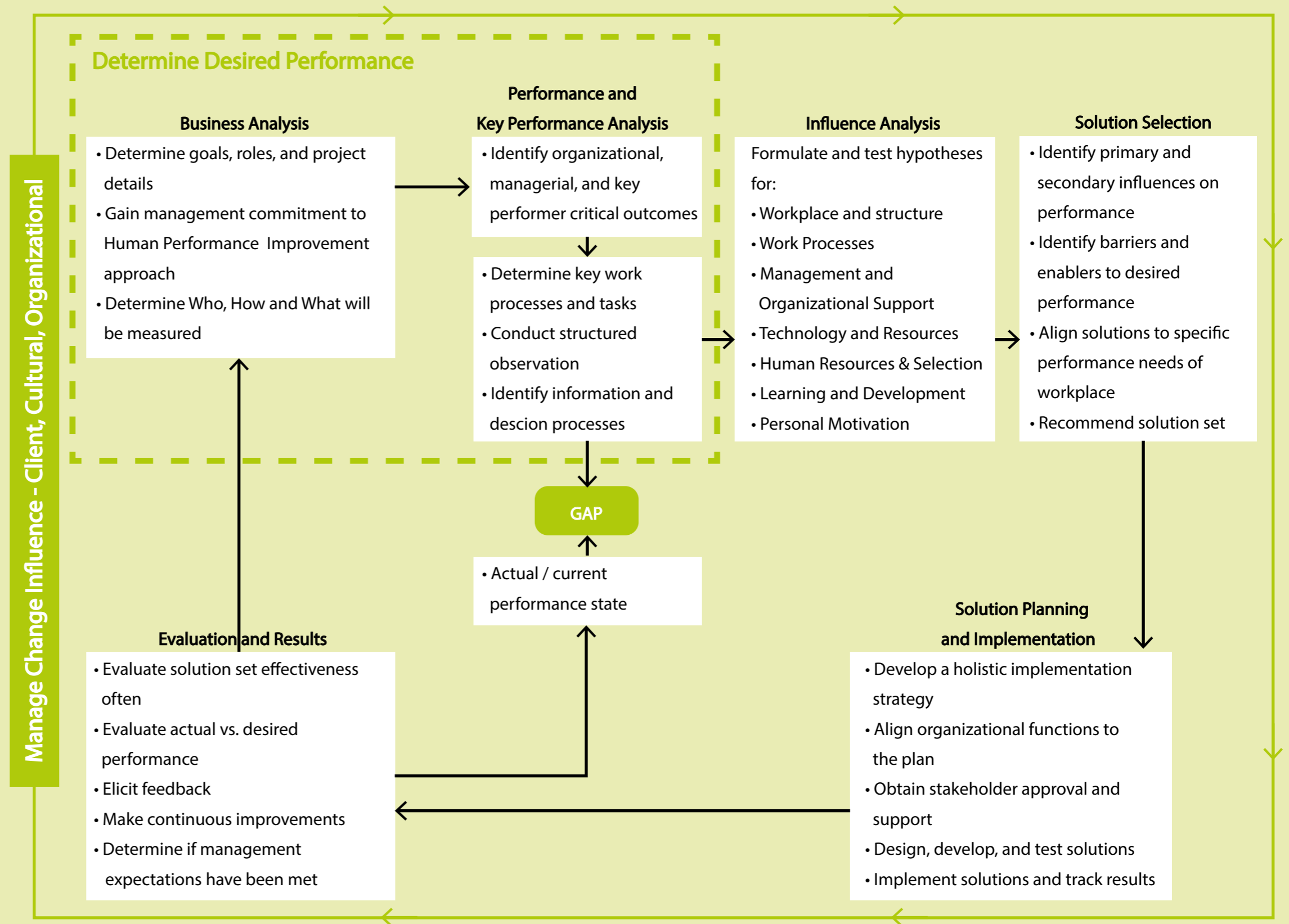
The **Human Performance Improvement Model** was developed in 2005 by the American Association for Talent Development.

This model is a tool to prepare, plan, implement and evaluate Interventions to improve human performance.

The model is based on **six steps**:

1. Performance analysis
2. Cause analysis
3. Intervention
4. Implementation
5. Change management
6. Evaluation & measurement.

The performance analysis often identifies a difference between the existing and the ideal situation (gap). In the next step, the causes of that gap are investigated. A solution is then developed to close the gap. This can for example be done through training, but in many cases other solutions are also suitable. The developed solution is implemented during the next step, after which the results are determined. The image below shows which aspects are (or may be) involved in the various steps.



ATD Human Performance Improvement Model

Source: <https://www.vectorsolutions.com/resources/blogs/atd-human-performance-improvement-hpi-model-2/>.

Rummler-Brache Nine Boxes Model

The Nine Boxes were developed by Matthias Rummler and Alan Brache. It is a diagnosis model to arrive at the best suitable solution for a learning question by going through the nine boxes. The model prevents the solution from being sought in one corner by asking you a number of questions for each box.

Organization Goals

- How clearly are strategy, vision and mission formulated?
- How concretely have they been translated into KPIs and performance levels?
- How have they been communicated to all employees in the organization?
- Up to what level have strategy, vision and mission been translated? To what extent can the – desired – performance for employees be achieved?

Organization Design

- To what extent does the structure support or hinder the realization of the goals?
- Are there any vacancies and does that create performance problems for those we need to develop?
- What are the characteristic differences between the formal and the informal organizational structure? What impact does this have on performance?
- What structural measures have been taken for performance improvement? Reporting, decisionmaking and consultation structures.

Organization Management

- To what extent does the management style support or hinder the realization of the specific performance for which our development assistance is requested?
- Which fixed systems are there for the ‘planning and control’ process (planning, communication, control, performance measurement, capacity planning, budgeting, forecasting, etc.)?

Process Goals

- What are the most important primary processes?
- What are the main supporting processes?
- How do these processes contribute to the realization of the organizational results?
- What hinders the realization of the organizational results in these processes.

Process Design

- How do the processes work?
- What tasks are supported by the processes?
- Is it clear who has what role and is responsible for the processes and tasks?
- For which tasks are the processes experienced as a burden?
- To what extent do formal working methods and procedures support or hinder the achievement of organizational results?



Process Management

- Do professionals know what role and responsibility they have in the processes?
- Do the professionals work according to the processes?
- What encourages professionals to work according to the processes?
- What prevents professionals from working according to the processes?
- What does the improvement cycle for the processes look like?

Performer Goals

- Are targets clearly translated and recorded to teams/professionals?
- To what extent is there input steering, output steering or a combination?
- Do professionals know and sense which goals they contribute to?

Performer Design

- Is it clear to professionals what tasks, powers and responsibilities they have?
- Is it clear to professionals which tasks,

- authorities and responsibilities are assigned to departments/colleagues who work in the same chain?
- Do professionals know what colleagues in the chain need from them as input/output and vice versa?
- How much discrepancy is there between the actual work process and production process?

Performer Management

- Do professionals have the necessary knowledge, skills and attitude?
- Is development stimulated, facilitated and measured?
- How is (successfully) developed at the moment?
- What contribution is expected from the professional himself and his manager with regard to development?
- Do professionals have the physical, mental and emotional capacity to achieve their goals?

Literature: G.A. Rummler & A.P. Brache. Improving Performance: How to Manage the White Space in the Organization Chart (1990; 2001).

Further reading: <https://sites.google.com/view/htp7150-t3/models/rummler-brache-9-boxes-model>.

Quirke Escalator

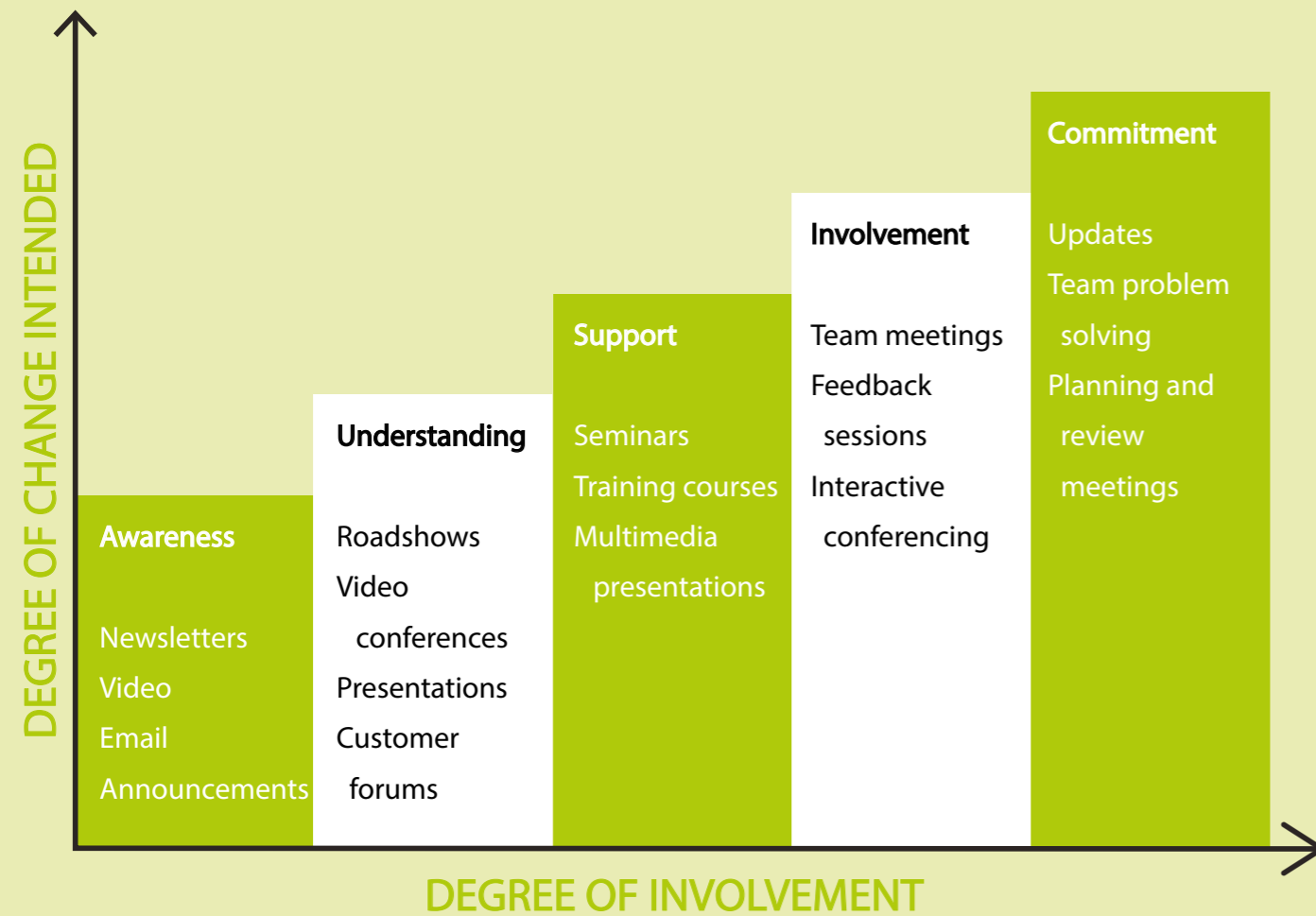
Improving the ability to adopt and the willingness to change requires the necessary (internal) communication. We use the **Quirke Communication Escalator** as a tool for successfully setting up internal communication. This model by Bill Quirke indicates which resources you can best use, depending on the necessary interaction with the employees.

The objectives of the internal communication are divided into **five phases**.

These phases are:

1. Awareness
2. Understanding
3. Support
4. Involvement
5. Commitment.

For each phase, specific means are most suitable for informing or communicating. For example, email is unsuitable for establishing interconnectedness.



Quirke Communication Escalator for internal communication

Literature: B. Quirke. Making the Connections: Using Internal Communication to Turn Strategy into Action (1994).

Further reading: <https://rebelsguidetopm.com/winning-stakeholder-support-when-time-and-energy-are-limited/>.



World Class Maintenance

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