Sherlock
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WITH EXERCISES

Make your team more effective!

ON THE TRAIL OF PROBLEMS AND EFFECTIVE SOLUTIONS

A PRACTICAL HANDBOOK OF EFFECTIVE PROBLEM SOLVING FOR MANAGERS

authors
Grażyna Potwora
Bartosz Długokęcki

Introduction

From the author

The e-book “On the trail of problems and effective solutions” was written for **managers and executives**, who find it challenging to deal with problems that arise in their teams and in the organisation as a whole. The manual contains a lot of knowledge about effective problem solving using the Problem Solving method and its tools, as well as ways of generating effective solutions. Step by step, you will learn how to effectively use a given tool and who should be in the Problem Solving team and coordinate the work.

Grażyna Potwora

She graduated from Psychology at the University of Silesia. She is a Lean Management consultant. For almost 22 years, she has worked as a Project Manager and Senior Expert in the transformation of production and service processes. She also enjoys coaching and preparing new training products. Since 2010 she has been associated with Lean passion. Previously, she ran her own consulting company for 10 years: Polskie Centrum Produktywności Sp. z o.o. She specialises in Lean tools and soft elements of Lean transformation.

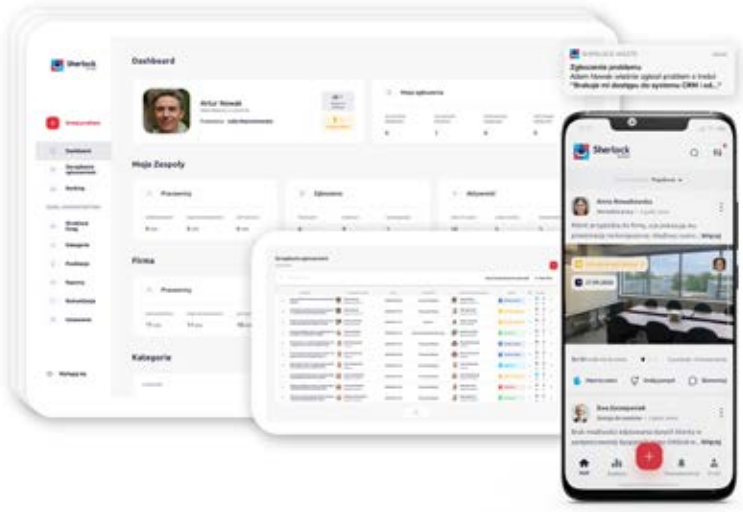
I have spent most of my professional life working with Lean,” says Grażyna, “because it is the only approach that brings benefits everyone: customers, bosses, owners and also employees... who are often neglected when faced with the changes that running a business or organisation brings. I have been dealing with Problem Solving for 20 years and I am glad that nowadays logic and systemic problem solving techniques are becoming popular.

Many years of professional experience are confirmed by work for many companies: Pipe Life, Arcelor Mittal; Spomlek, Indykpol, Wavin, Stomil Sanok, MWiK Bydgoszcz, Solaris, Adamed, Ichem, Hochland, Saint Gobain Group, Pfleiderer, Sweedwood Poland, Bongrain Group, Lajkonik Snacks - Bhalsen, Heinz Polska, PZU, Herbapol Lublin; Norma Polska, Liberty Direct, Forte; Maspex/ Lubella, PSA Finance Polska, Thermoplast, Essillor Optical Laboratory, TCL Operations Polska, Humax Polska, DB Schenker; Metinvest (Ukraine), Synthos, Ponar, Proama, Iglotex.

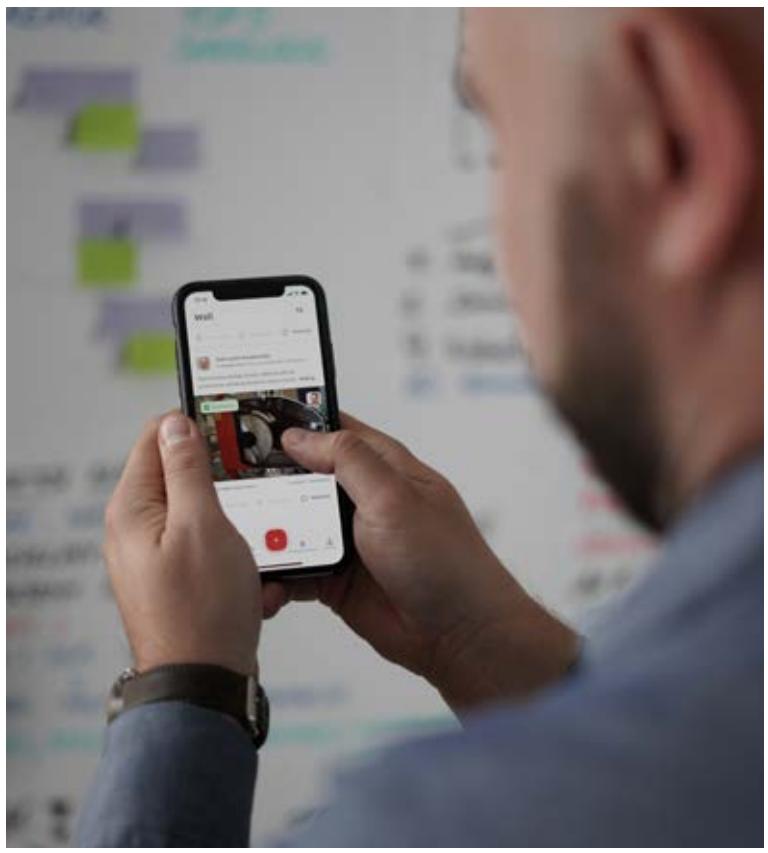
Sherlock Waste

Turn frustration into innovation!

The e-book was written in cooperation with Bartosz Długokęcki, co-founder of Sherlock Waste - **an application that engages employees** in submitting ideas, implementing improvements and solving problems together.



Thanks to the application, customers achieve immediate results in increased efficiency and long-term changes in the corporate culture



Application features

Sherlock Waste is an app in which users can:

- Report areas for improvement and problems within the company
- Observe others' reports and react if they have the same problem
- Add your own ideas for solutions to any requests from across the company
- Vote for the best ideas
- Participate in discussions through comments
- Check the status of your applications at any time
- Participate in positive gamification through points and rankings
- Continuously monitor activity and business effects

If you want to try out Sherlock **for free** in your company - call us on
+48 519 400 318
or write to us at
contact@sherlockwaste.com

www.sherlockwaste.com

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What is an effective solution to the problem?

Surrounded by problems

Every day you face dozens of problems and you don't even know when you will solve them. A traffic jam on the commute to work, a rebellious teenager at home, a hung computer - you know the drill. What's more, your job can be based on solving problems. As a manager, you are faced with many challenges and problems in your organisation and those of your employees.

What is the problem?

For most of us, the problem is the discrepancy between what we expect and the reality. Is this the cause of much frustration? Or are problems jewels? Einstein said that they are solved on a different level than they originated, so they push us forward! Taiichi Ohno, the founder of the Toyota Production System, criticised his co-workers when there were... less than the day before.

> There should always be more or less problems, because solving one problem and **every change in the environment creates another.** When there are fewer problems, it is a sign that you are sweeping them under the carpet.

How to work with problems?

SIf problems are a daily occurrence, why dwell on them? Well, **you use different parts of your mind** for solving everyday, minor problems, and others for more complex ones. On the **easy ones, you reach** to experience and standards. You use events that sink into your memory. You get immediate and good solutions. In organisations, this is done through daily operational meetings at dashboards where the previous day's results are discussed.

A few minutes - just enough time for each participant to reflect on their experiences or discuss whether we have worked according to the standards. The same is true of the various systems of writing problems on paper.

We have 5S “red cards”, tags on which you write down equipment problems in TPM (Total Productive Maintenance). Finally, there are the Employee Idea Systems. Here we use paper or electronic sheets (as in the Sherlock Waste system). Problems are then read out and solved quickly. But not all.

Difficult problems

Some resist. The film in the packaging machine breaks. Problem reported, recorded. Quick idea - train an employee. We train them. A day passes. Boom! The foil is torn again. We train others; we train thoroughly; the Japanese Sensei trains! The foil continues to fall. Hands fall down too.

Daily check-in with ongoing problem solving

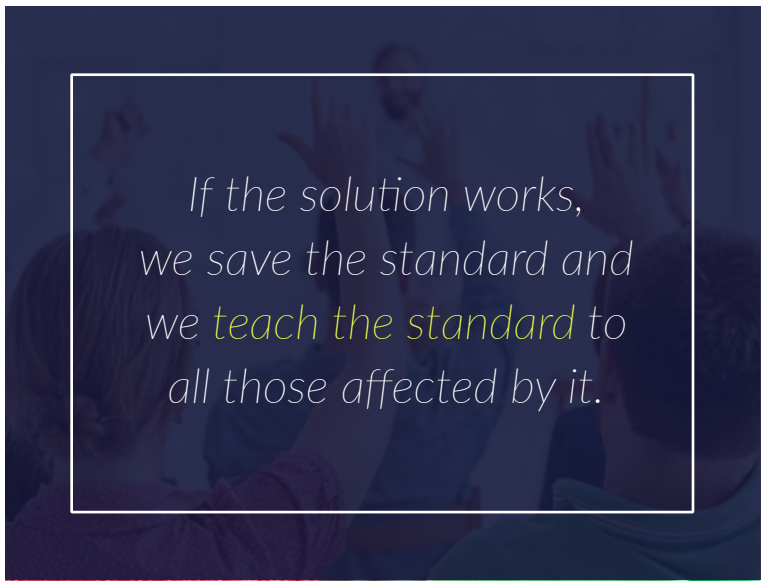
In the case of difficult problems, it makes no sense to keep jumping from one solution to another.

Why? Because testing solutions without knowing the root cause is like Russian roulette. In this case, there is a need for creativity, for going off the beaten track. You need the help of others. With minor problems it means more experience or knowledge. But the real **big role falls on the team when solving difficult problems.** Then there is a synergy effect. Free associations, emotions, scraps of information of each participant, at some point come together and you get the right cause and then the solution. The condition is to follow a logical path.

You start with the facts, you move on to the causes and subsequently to the termination. One of the most important tips for solving the most difficult problems is to refrain from proceeding directly to solutions.

What to do if the problem returns?

At first glance, solving more complex problems **can be compared to the scheme of scientific work,** in which we formulate the problem at the outset. Then we check whether its solution serves the organisational goals. The next stage is facts. We examine them, looking at the problem from different angles. Based on the facts, we formulate a hypothesis about the causes. We verify it. If we have found a cause, we formulate a solution hypothesis and check it again. We do an experiment.



Each step of the Problem Solving path is accompanied by specialized, yet easy-to-use Tools, which you will learn in a moment. In addition, you'll learn how to lead a team to get the most out of their creativity and thus increase the likelihood of finding the right solution.

Homework

Find out how employees in your organisation report problems. Verbally or in writing? In the "leader's ear" or in briefings? If verbal, are problems recorded by those who receive them?

Ask 5 employees from 5 different departments:

A. How many problems have they reported in the last month? If nothing, find out why.

B. B. What has happened to the problems reported?

Write down the conclusions of your research:

- which works well
- and what needs to be changed?

Team work on the problem

How do you select people for your team?

When selecting people for your Problem Solving team, keep in mind several principles that will increase its effectiveness:

- The team should consist of **several people** - not less than 3, ideally 7,
- we invite those who can **provide us with information**, are involved in or responsible for the problem area,
- to this **we add someone who has no idea about the problem**. This person usually asks simple questions that the more experienced ones are ashamed to ask. A second role is to stimulate creativity and build new associations with the other team members through unconventional, “unprofessional” statements.

Place and time of the meeting

Give the team a quiet place and appropriate equipment - a flipchart or overhead projector. Also make sure there is a good time for the meeting, preferably **around 10:00 in the morning** when the brain is statistically most active, or **around 14:00 - 15:00** after lunch. Before the meeting, it is a good idea to agree on an end time and make a contract with a few rules, e.g. “one person talks and the rest listen “ or “no phones”.

Designation of roles

Meetings normally last one hour. The moderator **should not take on all organisational and content-related roles.** This leads to passivity on the part of the other participants and overload for the facilitator. You can either have the facilitator prepare the measurements, the situation description, the business context (leader, manager), or you can ask the facilitator to take minutes or record the participants’ statements during brainstorming.

Team Moderator

Leader, if the problem is in your area of assignment, you cannot be a moderator. Having wrestled with the problem for some time, you probably already have a solution ready in your head. If you lead the team, it is straightforward to confirm the preconceived idea. There have been many times when an "objective" leader has stood in front of a group and flashed his eye as soon as one of the participants put forward a thesis in line with his thoughts. This is a waste of time. This does not mean that you should disappear. You present the facts you know, even your view of the problem, but never run a panel. You need a moderator for that.

What should a moderator be like?

The moderator should be **introduced to the problem,** for example by talking to a real leader, but does not have to have in-depth knowledge of the subject. This should be provided by the participants.

Problem Solving team session

> *A moderator should be neutral, objective, good communicator, able to listen, curious about other people and their opinions.*

Public speaking skills (body language, communication techniques such as paraphrase, feedback) are useful. Finally, it is good to have organisational skills. His/her role is to lead the team to the highest possible level of creativity, especially when generating causes and potential solutions. Remember that the goal of the Problem Solving team is to reach non-obvious solutions. How to make the Problem Solving team reach the heights of its capabilities?

> We solve more difficult problems
> by **going off the beaten track**.
> Your task is to activate creativity,
> which, unlike intelligence,
> is not constant throughout life.

Creativity is like a muscle

If trained, it develops; if neglected, it fades. It can be highly developed in employees in basic positions, and atrophied in managers. Creativity is about creating new inter neuronal connections. The newer, more unusual situations a person deals with in life, the higher the creativity.

Creativity training

The facilitator can raise the team's level by **a "warm-up" at the beginning of the meeting.** Logic puzzles and other games requiring concentration and out-of-the-box thinking work well. The way in which information is presented can also help to raise the level of creativity. If you are kinaesthetic (meaning you have to touch to understand), go to the place where the problem occurs or bring a product or detail to the room. Visual learners will respond well to pictures, films, a diagram drawn on a flipchart or a sketch. Auditory learners are only a few percent. So **just talking about the problem has little effect!**

Tailoring to the audience

It is therefore worth combining an Excel table (logic) with a colourful story, demonstration and moving from the general to the specific (creativity). These are just two **examples of our preferences.** Maybe you know other methods, for example the popular business DISC? Remind yourself how different people are. I would like you to know that the form of a story about a problem has to be adapted to a diverse audience, not to yourself. Otherwise, you will not "turn on" in **the teamcreation on a higher level in the team.** This higher level is the hormones secreted when we feel emotions. With a form of communication that does not suit us, a large part of creative ideas will remain dormant.

Homework

Pick any problem that keeps coming back, though it seemed, that we have found a solution. Write it down on a piece of paper:

A. Who should be on the Problem Solving team? List the positions.
B. Who could moderate the Problem Solving team meeting and why?
C. Together with the facilitator, plan how to present the problem to the team to stimulate their creativity. Plan: if and how to go to the Gemba (workplace where the problem occurs), what to bring into the room and what and when would be a good graphic illustration of the problem.

Include not only Power Point slides, but also flipchart drawings. Don't forget the "food" for logical left-hemispheres. What statistics and calculations can you present?

Problem solving logic - PDCA and FPR

The problem, the difference between expectation and reality, can be of two kinds. Either you do not know the reasons for this discrepancy and then you ask “why?” or knowing the cause you know what the solution is - then you ask “how?” From a bird’s eye view, problem solving is most easily illustrated by the Deming Circle, or PDCA Diagram.

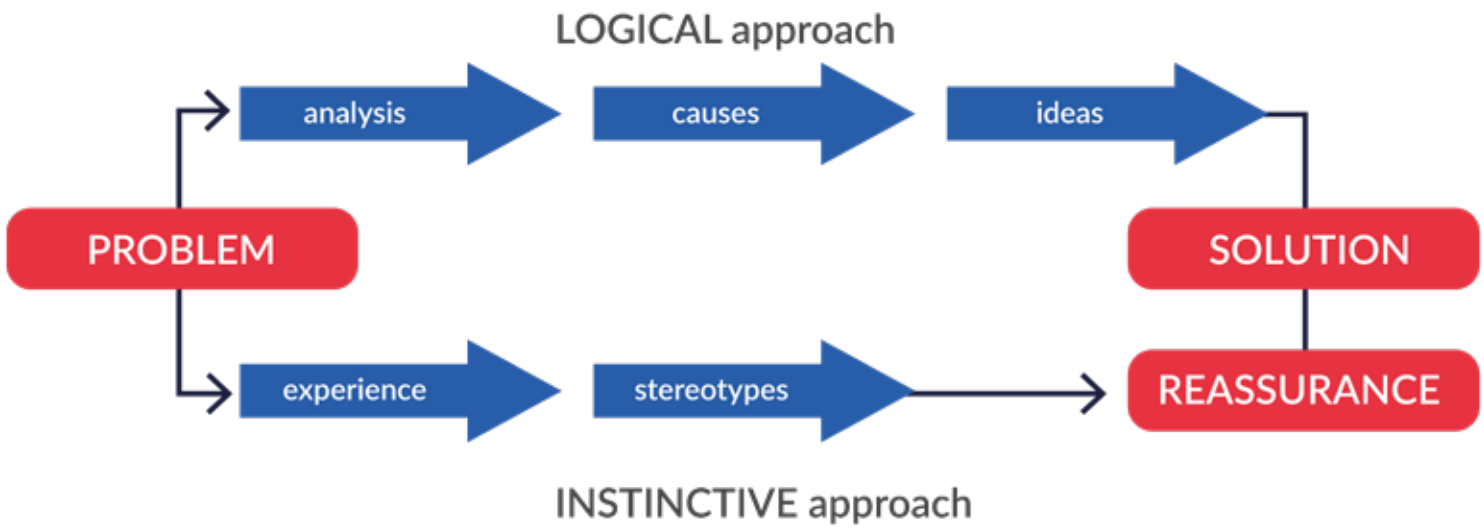
Deming wheel

The first quarter is **Plan, i.e. plan how you will solve the problem.** The first quarter results in potential solutions. At this stage you go through the whole logical sequence from facts to hypothetical solutions with your team. The first team meeting is used to establish the facts that are known by the relevant members of the Problem Solving group. At this time we alsowrite down questions about what is unknown. Between the first and second meeting we collect missing facts, conduct measurements, statistical analyses, opinion polls, etc. The second meeting of the team usually serves to identify the root causes of the problem. Between the second and third meetings we verify the root causes that were discovered earlier. A third meeting should be held if there is no single, logical solution to the problem discovered by the team. The third stage of the team’s work results in the generated potential solutions. The team then selects the most likely, but still hypothetical, solutions. This concludes the activities of the first quarter of the Deming Circle.

PDCA scheme illustrates basic rule of continous improvement. It was created by **William Edward Deming** (1900-1993), American specialist of statistics who worked in Japan.

The second quarter **‘Do’ means ‘implement on trial’.** You no longer need Problem Solving Team meetings. The problem goes back to the problem area leader. The problem solver organises experiments with potential solutions. The third quarter of the Deming Circle **“Check” is to verify** that our experiments have had the effect of removing what was the problem. Finally, **the “Action” quadrant** can mean either **standardising solutions** that have had the desired effect, or returning to the first quadrant if the experiments have not had the desired result.

The most important is the first quarter: “Plan” and in it **establishing the right facts.**



Without gathering the necessary facts, arriving at the right causes becomes random. And without the right root causes, solutions are also random. In other words, without the facts you are sliding down the slope with almost no chance of solving the problem. **Entering the first quarter, you have three stages of FPR,** none of which must not be overlooked:

Facts

Facts are fact gathering and tool 5W + 1H.

> Such a path leads you by the hand and **prevents the so-called "solution-jumping"**, which we remember to avoid in more difficult problems.

Causes

The second part is related to the search for root causes, their selection and verification. Here you have several tools at your disposal: 5 Why, Fishbone (Ishikawa diagram) to look for causes. Pareto and P-S Matrix are selection tools, helping you to choose the most important causes. The FTA is a tool that helps to verify potential causes in relation to the organisation's standards.

Solutions

Finally, you come to generate solutions with the help of e.g. **Philips 623 Brainstorming.** You choose the most likely solutions with the help of, for example, the Performance-Value Array (PVA).

Homework

Look at the problem you have chosen. Together with the facilitator, write down the names of the people you will invite to the Problem Solving sessions. Don't limit yourself to your department or even your plant/unit. Maybe a supplier? Maybe a customer? Maybe a representative from another location? The more broadly, the better. Arrange them for the first Problem Solving meeting.

When is it appropriate to appoint a Problem Solving Team?

Another issue is the decision to enter the Problem Solving procedure. It takes time of the participants, it generates costs for collection of facts and data, and also costs for running the experiments. It is not necessary for every of the 100 everyday problems. Moreover, 99% of them you can solve immediately. If you can't do it alone, you seek help from a specialist, a more experienced colleague or a leader. If that still doesn't work, you report the issue in a briefing. Only when everything else seems to fail you start the Problem Solving procedure.

Don't run too many meetings at once.

Case study

I remember a manufacturing company in the food industry. A plant employing 250 people was able to run 5 Problem Solving projects simultaneously. If there were more – the effectiveness decreased and the duration of each PS increased. The decision which problem to solve was made at the weekly management group meeting. If one of the PS problems had already entered the experimental phase; a card with the next pre-selected problem was pulled out and entered on the "Top 5" board. The said problem was then given to one of the 15 moderators prepared to run the sessions, and the said moderator was then getting to work.

What is the preparation of the moderators about?

The preparation of facilitators cannot consist of sending them an email informing them about new task assigned to them. In my experience, what works best is a 2-3 day workshop where each of the 12-15 participants conducts a "dry" Problem Solving session and gets some feedback from the rest of the participants and the coach. Then it is worth planning a stage when the facilitators conduct real sessions, but with a coach /a trainer in the room. During breaks they receive feedback and support. Only then can the facilitator go out into the world and lead the sessions by himself. If not ready, facilitators often postpone meetings indefinitely; and even if they manage to organise one; it is very little effective.

Problem-solving systems

Most improvement organisations solve problems in a systematic way. The above presented Facts - Causes - Solutions illustrate the stages of intellectual work. There is still a need for a practical path, written out in more detail. This is what problem-solving systems are. Several of them have gained international popularity.

8D system

It was created by the US Department of Defense in 1974. It is extremely popular in the automotive industry. It is used in **the customer-supplier relationship.** The customer initially describes a problem with a product, and the supplier is required to take immediate steps to prevent the delivery of defective products. This is followed by a deeper analysis using problem-solving tools.

A3 system

Japanese system used while solving complex problems. Main role in the said system is played by the duo of: **a mentor**, representing the point of view of the whole company and **an expert**, leading the processes of analysis, problem solving and keeping the results.

DMAIC system

This analytical system is related to the Six Sigma method. It works well **with process irregularities,** but requires expert knowledge.

There are also many original systems developed by organisations. Everywhere, however, you will encounter the Deming Circle pattern, i.e. the three intellectual stages you are already familiar with, as well as the implementation and maintenance of change.

Homework

Find out if your organisation already has a Problem Solving system. If so, find someone who does, e.g. 8D in the Quality Department. Conduct an interview about the system. Ask her/him:

1. How does it work?
2. What stages does it have?
3. What are the pros and cons?

Problem-solving tools

Collection and analysis of facts: 5W + 1H

Let us return to our Moderator. How can he or she get an idea of the topic in order to confidently face the Problem Solving team? It is simple. You only need two things: a 5W + 1H sheet, a pencil and a leader – the same one who cannot lead the meeting because of his involvement in the problem.

What is this method used for?

The 5W + 1H is a question-and-answer method, for exploring the problem in order to find facts. It is a very versatile tool. You can collect the most important facts in half an hour, but with the help of the 5W + 1H you can also organise an extensive project to measure and search for data. Our facilitator rather stays with the half-hour version. He asks the leader, it is good for him to go to the Gemba, specifically where the problem occurred.

Basic questions

Within the 5W + 1H you ask the so-called basic questions:

- What is the problem?
- Who is involved?
- Where is the problem?
- When does the problem occur?
- Why are we taking care of this?
- How and how much numerically are the losses?

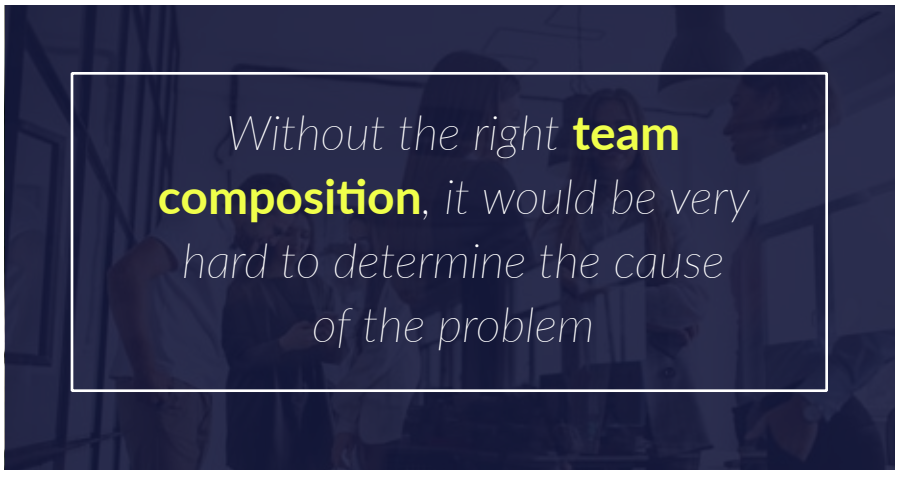
When preparing the meeting, think about the first two questions, especially “Who?” This will help you invite the right people.

Case study

I recall a dairy producing spread cheese. One day they started leaking from the 'silverware'. Production stopped. The facilitator quickly assembled a Problem Solving team. There was an operator, a maintenance person, a quality person, a manager and a procurement person. The latter suddenly said that we had just changed the film for a cheaper one. Well... then we have a solution - the group picked it up. Just go back to the previous film. Unfortunately the 5W+1H was not completed. After the meeting it looked like this:

Question	What we know?	What we don't know?
What?	"Seal" cheese leak on Line 2 (amendment 1). The foil was replaced - new supplier.	What is the density of the cheese?
Who?	Operator: shift 1, operator: modification 2; sourcing of materials, maintenance, quality, manager	No milk supplier
Where?	Line 2 of the plant "Cheese Seals" in Kowaszki	Is the problem on other lines as well and at the plant in the Czech Republic?
When?	April 15 from 6:00 a.m.	Has it happened before? Check last year.
Why?	• the costs related to downtime • the risks of shipping the goods	• check downtime costs • check stocks and possible customer tolerance for delay
How? **How much?**	• 2 tons of unproduced goods • it was checked whether there was a mistake in selecting a recipe • the dosing of the thickener has been checked	• check the delivery

Within the next three days, the “previous” foil was brought in, the machine was started and... it’s still leaking! Second meeting. This time a person responsible for the supply of milk was invited. After an extensive research, it turned out that one of the new milk producers was feeding his cows with unapproved feed, which has affected the density of the milk.



What next?

At the meeting, you go through 5W+1H once again. This time with the team. With the help of the group, you finally complete it. The answers given by the group are written down on a flipchart. Interestingly, the moderator also writes down, with a red marker, all question marks - facts which we don’t know but would like to know. These question marks are turned into tasks. The group members keep adding facts until they have all been added so that they can move on to the next phase - the search for causes.

Homework

Help the facilitator to prepare the draft version 5W+1H and then organise a Problem Solving session where the team completes the data.

Don’t forget to write in red the questions that we don’t know the answers to and to assign fact-finding tasks to the participants.

Searching for root causes

The search for causes can be carried out by various means. The most popular methods are the 5 x Why? and the Ishikawa Diagram.

5 x Why?

If you want to dig deeper into one cause that seems to be an interesting clue - the 5 x Why? It is used **to get to the real root causes of a problem** and to understand them well. The method consists in asking the question "why?" several times, until the final root cause is reached. Sometimes two questions are enough, and sometimes it takes as many as five to get to the root cause. Interestingly, 5 x Why usually takes you to a very distant place from the original question. But this has a great advantage. **It allows us to solve not only the problem we are discussing**, but many other problems related to the same cause. Let us follow this with an example:

Example problem

The problem is the state of documents sent by customers of the bank "Black Gold". Scans are blurred, there is no necessary data. Employees have to staple the pages together, which takes 12 man-hours per month. Another 243 hours are wasted on error rectification work. This relates to the business target for the year to increase the efficiency of the lending process by 10%.

Analysis in practice

1. Why?

Customers do not know that stitching prolongs the process.

2. Why?

Because communication with clients involves filling in missing data after the wrong documents have been sent.

3. Why?

Because there is neither a form in the company nor a standard for talking to the client about the form of document delivery.

4. Why?

Because we focused on the call centre KPI, and that was to reduce the time spent talking to customers by 25%.

5. Why?

Because we have cascaded the objectives directly down to the departments instead of setting process objectives.

In this way we have arrived at the systemic cause of the problem - from which it is quite easy to derive the right solution. Incidentally, we recommend the **Lean Passion 7-step cascading system**, which differs from the classic ones precisely because it takes into account common goals for the process. Note that our problem was quite specific and from the beginning we drew the direction in which we should go.

Ishikawa diagram

And what if you don't have a specific search direction? Then you go for quantity. It is best to generate a large number of possible causes from which the team will choose the most meaningful ones. This is how an Ishika Diagram, also called a Fishbone or Cause-Effect Diagram, works. It shows graphically the influence of different factors, or causes, on a problem.

Meeting session of Problem Solving Team - Ishikawa Diagram

Procedure in practice

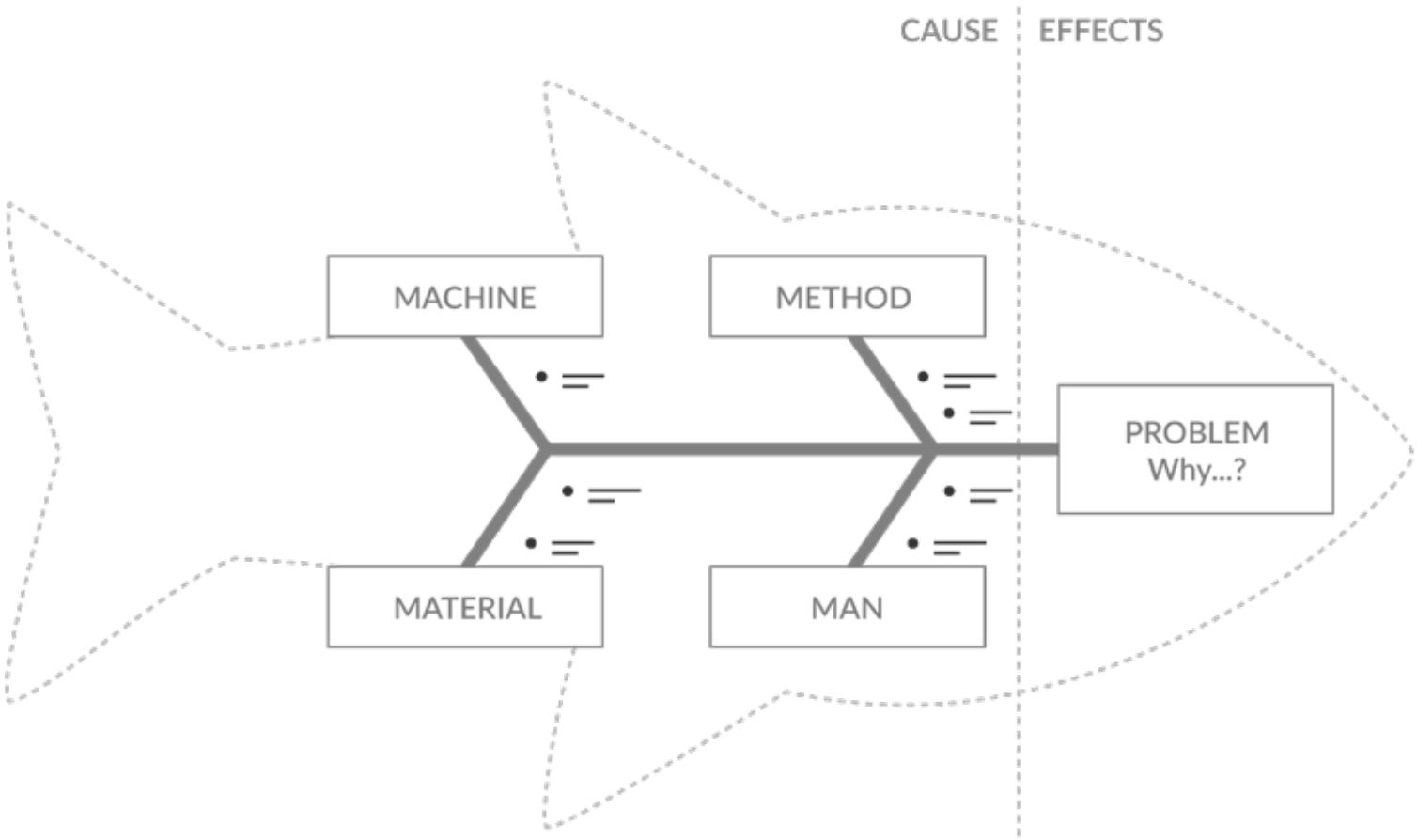
The procedure for creating a diagram should be as follows:

- clearly define the problem/reason for analysis
- write it down at the end of the main axis and define the main categories of causes (e.g. Machine, Material, Man, Method, Management, Environment). When using a non-manufacturing diagram, the category Machine and Material can be replaced by Management and Process
- together with the group, generate as many possible causes of the problem as possible. Remember to let everyone have a say. At this stage you don't look at the quality of the causes - you look at the quantity
- only then do you choose the causes that have the greatest influence to the problem. You can do this, for example, by each participant assigning points to a potential cause

Remember that Ishikawa is only **a team method** looking for causes.

Example problem

Here is an example from the pizza making process. When our baked pizza is covered with tasty toppings, it turns out that some of them fall off the line and land on the floor. On an annual basis, this amounts to 20 thousand zlotys. The Problem Solving group was set up to answer the question: "Why does cheese and ham waste?



Ishikawa diagram – example

Homework

Gather a team of 5-7 people and try to get to the root cause of the chosen problem using the 5 x Why or the Ishikawa Diagram.

Supporting methods in searching for causes

Two additional tools can also help to find the cause of a problem. These are the simple P-S Matrix and the very popular Pareto-Lorenz diagram.

P-S matrix

Choosing the right cause can be quite a challenge. What to do when you have a whole array of symptoms and another set of highly probable causes? This is sometimes the case in complaint causation analysis. Each cause may be related to each of the symptoms. Or it may not have such a link. This is when the P-S Matrix comes into play - the simplest multivariate analysis.

Step by step

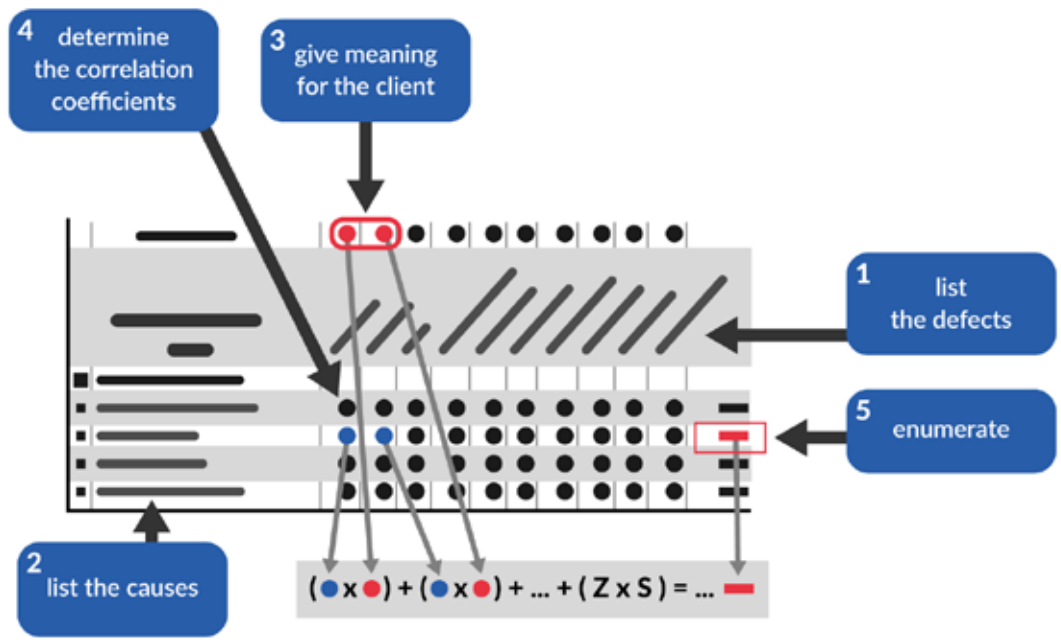
1. You list the symptoms (exactly what the customer writes in the complaint is a symptom, for example "no instructions").

2. Then, together with your team, identify possible causes, for example 'employee error'. You can use the familiar Ishikawa Diagram for this.

3. KYou assign a weight to each symptom based on the client's opinion. A low weight (1-3) is a symptom that the customer hardly notices. A significant symptom (8-10) means that the product has to be replaced or is even dangerous for the customer.

4. Now it is time for a team discussion. You estimate how much each symptom correlates with each cause.

5. Finally the last step. You sum up the importance factors for the customer and the correlation - as in the attached example. You get reasons from the most important to the less important.



P-S matrix – Simple multivariative analysis

Pareto-Lorenz diagram

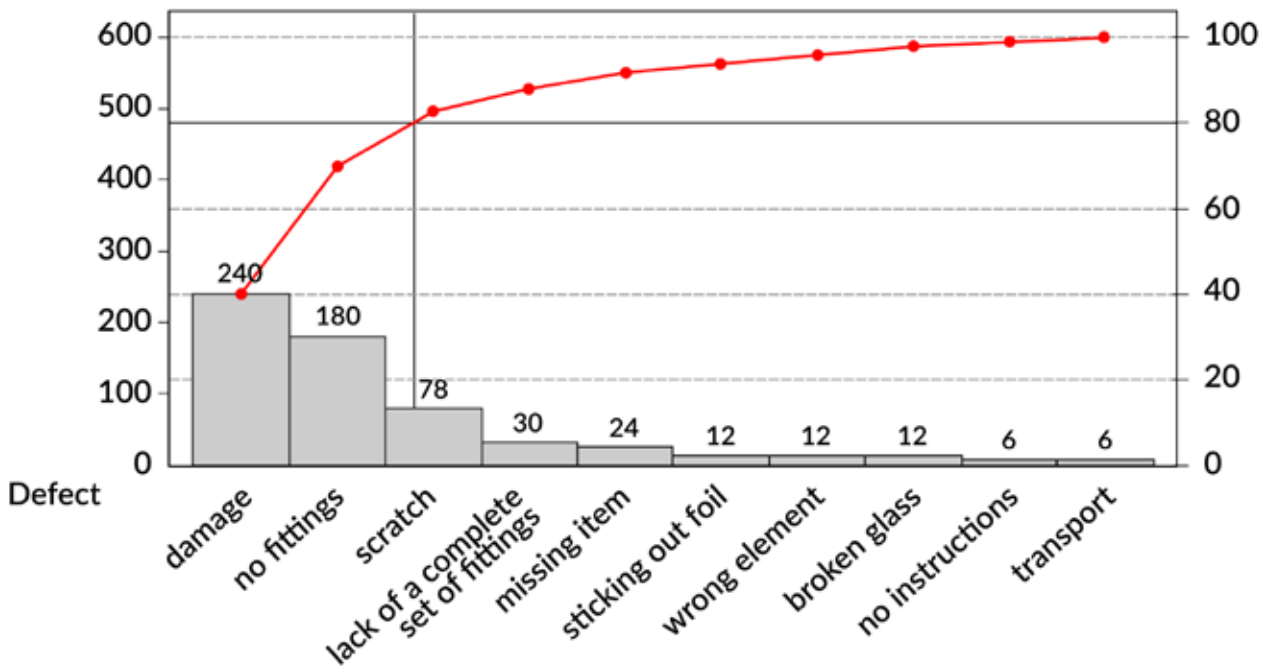
Much more popular method ordering of causes is the Pareto-Lorenz Diagram Pareto-Lorenz Diagram. You count the number of occurrences or the cost of each cause, and for further processing you select the 20% of causes that generate 80% of the problem.

Example problem

Let's take the example of a furniture manufacturing company. As you can see from the customer complaint graph, the first thing you need to deal with is damage and missing hardware. By eliminating both causes, we get rid of nearly 80% of complaints. If, on the other hand, we were to start a project to create instructions and show that the problem has disappeared as a result, we would have almost no effect on the complaint rate. This would be firing a cannon at a "two per cent" sparrow.

> No matter how many reasons you identify as important, it is essential **to verify** that they actually occur.

Keep this in mind especially if you are using Ishikawa or 5 x Why. These are opinionated methods, and in the process of solving problems, at each stage we have to be based on facts.



ILZ	240	180	78	30	24	12	12	12	6	6
Percent	40,0	30,0	13,0	5,0	4,0	2,0	2,0	2,0	1,0	1,0
Cum %	40,0	70,0	83,0	88,0	92,0	94,0	96,0	98,0	99,0	100,0

Pareto diagram

Homework

Go to your organisation's Quality Assurance Department and get data on the most common reasons for complaints. These can be external complaints or internal complaints - discovered by e.g. controllers. You need categories and the number of occurrences of a given event. In addition, you can see what costs are generated by each occurrence of a quality problem.

Your task is to create a Pareto Chart from this data. For the ambitious, a special task: to create a P-S Matrix.

Looking for potential solutions

Very often, one specific solution will emerge directly from the confirmed cause. If this is the case, we conclude the P phase of the Deming wheel and proceed with the experiment. If not, we are left to look for solutions.

Brainstorming using the Philips Method

A popular tool to support this process is the Philips 623 Brainstorming. This type of brainstorming is distinguished by its great efficiency. **In 18 minutes you can generate as many as 72 ideas from 6 people.** The paper form of the brainstorming also prevents stress due to being "called" to the board. Each of the 6 participants has 3 minutes to think about two solutions, which they write on the sheet.

Step 1
The first step is to write at the top of the sheet a description of the problem, which will be the starting point for the search for solutions. This description is a question, starting with: "How?" or "In what way?" For example, "How can we reduce errors in the recruitment process?"

Step 2
The sheets of paper then circle all participants, who write down further ideas until the sixth and final round. In this way, after 18 minutes, we have 72 ideas.

Step 3
The next stage is the removal of repetitive ideas. A separate sheet is used for this. One person from the group - preferably the one with the nicest writing - takes the sheet. The others, one by one, dictate solutions to the group from their sheet number 1. At the same time, everyone crosses out any solutions that are repeated.

Step 4
Once everything is written down, it is time to evaluate the ideas. Each participant can choose a few ideas he/she likes best. For example, if the moderator decides that you have to choose 3 ideas, the best of the 3 ideas you choose is awarded 3 points, the second 2 points and the third 1 point. Write your points in one of the numbered columns of worksheet 2.
Each participant has one column for himself/herself. In the "total" column, count up how many points each idea has received.

7 Question Matrix and PVA

To make the evaluation more objective and not only based on the subjective evaluation of the participants, you select the 7 highest scoring ideas and move to the final evaluation matrix. You select those that you think are most likely to contribute to solving the problem. To parameterise the evaluation of the ideas, you can use the 7-question matrix for a few of the highest scoring ideas.

Preparation of 7 Question Matrix

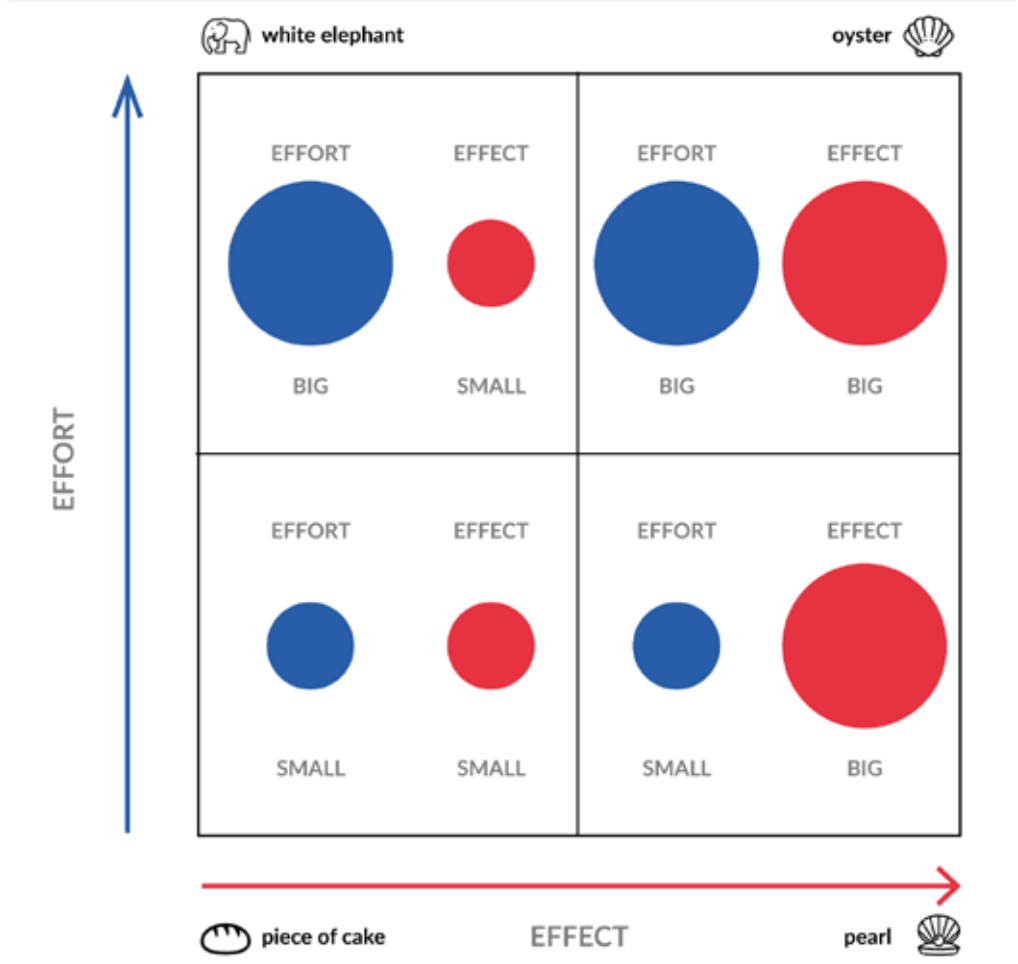
We wonder whether...

- the idea is cheap?
- the idea is easy to implement?
- we can implement it by our own efforts?
- it can be implemented within 3 weeks?
- this is one of our three most supported proposals?
- the idea will result in significant savings?
- it is urgent?

Each question can be answered with a 'yes' or 'no'. As you can easily guess – **the solution with the most "yes" answers is the first candidate for implementation.** Alternatively, you can look for solutions by writing them on post-it notes. Then, for the final evaluation of the proposals, we use the Performance Value-Adjusted Effort (PVA) matrix.

Sequence of implementation of solutions

Obviously, the first candidates for implementation will be solutions where the effort required is minimal and the team anticipates a high impact. Such solutions are called pearls. Most often, ideas from the "little effort - big effect" quadrant go into the experimentation phase first. If the problem is expensive or occurs frequently, the team may opt for ideas from the "high effort - high impact" quadrant. This is called "oystering". It usually takes a manager's decision to implement them. You can use the costs generated by the problem, which you have counted during the 5W+1H. There are also ideas like: a piece of cake. A small effort, but the effect will not be impressive either. Sometimes such solutions are chosen on the basis of "what's in it for me". If, on the other hand, an idea falls into the "white elephant" quadrant, i.e. "big effort - small effect", it is not worth implementing.



Performance-Value Array (PVA)

Homework

Choose one of the causes which emerged from the previous step. Using this as a starting point, formulate a question to seek solutions. For example, if the cause is non-compliance with procedures, our question would be: “How do I get employees to follow procedures”.

Now get a group of several people together and conduct a Philips 623 brainstorm.

Experiments

Time for a trial

We have solutions! One or several. The solution pops up when the root cause is found or we have it on one of the quadrants of the PVA matrix. **Time to try it out to see if it works.** The baton can be passed to the leader. However, mistakes can still be made if the final implementation does not match the users' needs.

There is nothing worse than a solution that is ready-made in every detail, brought to users from behind a desk.

Reflection before implementation

Before implementation, it is worth taking another look at the facts stage. Recall exactly: what the problem is and what user needs will be met by your solution. These can be both practical and emotional needs.

Go to gemba

Now we are getting into details that I may have missed while researching the facts. Why not go to the gemba and observe an employee confronting a problem one more time? If you can, get into their skin yourself. You can also prepare and conduct in-depth interviews about the finer points of the problem. Take a look at the methods proposed in Design Thinking.

Prototyping

If the idea is about something tangible, make a prototype. If you want to fail, then fail fast, often and cheaply - that's the idea behind a prototype. A prototype is not a finished, expensive product. Nor is a prototype a story about a "brilliant" solution. Remember that people **have to touch, or at least see, to really judge!** A prototype can be a hand drawing on a piece of paper, a comic strip, a cardboard model, boxes drawn with chalk on the floor. It is important that you show it to the users and, without any prompting, ask for feedback. Listen to the feedback. Do not suggest anything at all!

Testing

During testing, follow the same process as during the prototyping phase. Don't praise the idea generated by the IT team if you see that the user intuitively cannot start the new form. Remember every little thing. What you tried to do and it didn't work. Ask other users. Learn from it and redesign.

Be smart and work iteratively.
Constantly test and improve
initial solutions.

Homework

Find out:

- what new standards and solutions are being implemented in your organisation
- when the testing phase is planned

Be there, observe, record any user comments. Remember not to interfere with testing.

Be like a photojournalist on the savannah - don't save a roe deer eaten by a lion. Observe, question and draw conclusions.

Standardisation of solutions

You have implemented a solution to the problem. You have also made sure that it works. Do you think we can now open the champagne and settle down for a well-deserved rest? Almost! Because it works until the next user arrives: a second shift, a holiday replacement or (God forbid!) a new employee.

The last quarter of the PDCA is Act - i.e. standardise the work with a new solution. The standard has not only content, but also form. A written form. The work in the new standard has to be observed or recorded; time has to be measured; all of this has to be put on paper in order to create a visual form of the standard. This document should not rest in a folder or a file. On the contrary! You distribute and make it available to all leaders who can use it. It also becomes one of the tools of TWI IP, the process of effectively teaching each employee on a particular job. But TWI is material for a completely different book.

Homework

Review the standard sheets in your organisation. Ask their owners about each heading, and then try to prepare a similar one for the simplest operation in your daily work.

Summary

Dear reader, thank you for the time we spent together. Finally, I have for you the Six Golden Rules of Problem Solving. These valuable tips will help you to take your problem solving journey to the next level. And remembering them will certainly come in handy to keep you calm during the more turbulent moments.

1 When difficult problems emerge – **don't jump** to solutions right away.

2 Look for root causes by trying to investigate the problem **where it occurred.**

3 Be **thorough**, examine every detail.

4 Look at the process **from start to finish.**

5 **Several heads** are better than one! Each participant in the process can provide useful information.

6 **Test** solutions and make improvements.

Templates for work

Philips 623 - Finding solutions

Date:	

Description of the problem:	

	Idea	Idea
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Philips 623 - Voting form

					Date:				
	Idea	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**SUM**
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									

5W1H

Title			
Date		**Area**	

Question		**Answer**
What?	What is the problem?	
Who?	Who is involved?	
Where?	When did this happen?	
When?	Kiedy się to wydarzyło?	
How? **How much?**	How did the problem arise? How often? How many times? What is the cost? What has been done?	
Why?	Why are we doing this?	

Sherlock
waste

Turn frustration into innovation!