

## Introduction

CATWOE is a problem-solving tool developed by Peter Checkland and David Smyth. Its idea is a result of developing the Soft Systems Methodology (SSM) that was developed in the late 1960s by the British systems thinker Peter Checkland while working at Lancaster University in England to be used to solve problems in business processes. In 1975, David Smyth, a member of Checkland's team, observed that the SSM is more successful when considering certain elements: Customers, Actors, Transformation Process, Owner, and Environmental Constraints. Peter Checkland helped him and added the World view. They first published their work on CATWOE in 1976.

## Definition

CATWOE is a simple checklist to find solutions to problems.

## When to Use it

The CATWOE Analysis is used to explore the system where the problem took place. The tool doesn't intend to explore the problem itself, which makes it different from other problem-solving tools. It identifies problem areas, what a company wants to achieve, and which solutions can influence the stakeholders.

## Details

The CATWOE Analysis happens on the existing system or process within an organization. It offers an ethical framework for the problem-solving approach. The components of CATWOE below are used to think about a problem and/or the solution:

**C – Customers:** The first step in the CATWOE Analysis is to identify the customers, understand how the process or system influences them, and find out what problems they encounter before considering solutions.

**A – Actors:** The actors refer to everyone involved in the situation and who will take part in the solution. Actors can include stockholders and employees who are directly or indirectly involved in the project.

**T – Transformation Process:** Transformation is the change that a system or process leads to. It's the process in which input (including raw materials and man-hours) is transformed by an organization into output (such as a final product or solution to a problem).

**W – World view:** This is considered the most important element in the CATWOE framework, as it tends to view the big picture of the situation and considers the different stakeholders and interested parties from the environment surrounding an organization and the influence they can have.

**O – Owners:** This usually refers to the owner, entrepreneur, or investor of an organization, who wants to make changes and who decides whether a project should start or stop. As decision-makers, they have the highest authority.

**E – Environmental Constraints:** In contrast with the World view, this is about the actual environmental elements that may influence the organization and can limit or restrict the system. Examples include ethical issues, laws, and resources.

## Example

This example is about a change that an airport wants to make to the landing procedures where aircraft initiate their landing differently to reduce noise significantly. Using the CATWOE analysis, we deal with the following:

**Customers:** the airlines, their employees, and passengers who will be affected by the change.

**Actors:** the air traffic controllers who work at the airport and give different instructions for the planes to don't break as hard on the runway. Also, the pilots of the different airlines are actors and have to start their landing procedures in a different way and monitor their braking.

**Transformation process:** It is noticed in the landing process, that when the plane approaches the runway from the sky, its speed has already decreased significantly, and after landing on the runway, the wheels of the plane are pressed to stop it. In the case of the proposed change the landing process will be changed dramatically by using a longer approach path, this reduces the speed of the aircraft in the air and when landing they will not have to brake for a long time on the runway which leads to a lot of noise. The entire procedure requires that different signals and instructions are given by air traffic control to the aircraft in the air.

**World view:** homeowners who surround the airport will want procedures to reduce noise from aircraft landings. Other stakeholders, including the airlines, have conflicting interests. They will probably argue that longer approach routes can lead to dangerous situations in the air. For passengers, it might be inconvenient to have longer travel times.

**Owners:** the airlines are the ones who will eventually give or deny permission for changing the approach route and braking procedure. But, the airport board has the authority to force the change in the procedure.

**Environmental constraints:** laws made by the government, weather conditions, geographical features of the runway, and the increased emissions that can lead to environmental issues. Also, the competition from other airports can be studied as an environmental constraint.

From this example, we find that CATWOE analyzes the system and builds a holistic understanding that incorporates the different perspectives of the system elements to integrate solutions that fit these elements.

## References

<https://www.designorate.com/catwoe-problem-solving/>

<https://blog.ganttpro.com/en/catwoe-analysis-soft-systems-methodology-and-root-definitions/>

<https://www.toolshero.com/problem-solving/catwoe-analysis/>

