INNOVATION

Creativity Templates
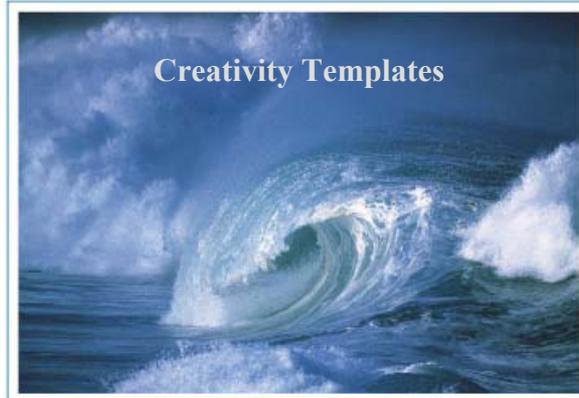
Don't wait until that change in the market surprises you!

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- The Attribute Dependency Template

- Internal and external variables

- The Replacement Template

- The Displacement Template

- The Component Control Template

The Attribute Dependency Template

Example: An antenna in the snow

Example: An antenna in the snow

Problem description:
- A company produced an antenna for military in a region where winter temparatures reach – 40 °C
- The antenna must have light pole, because it had to be carried by three soilders
- The load of ice on the antenna causes an overload on the pole
- The dilemma of the antenna designer.

(a) A light but weak pole.　　(b) A strong but heavy pole

(a)　　　　(b)
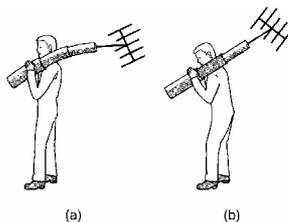
Problem Analysis

Contradiction between two conflicting
requirements
1. It must be robust enough to
    withstand the weight of the
    ice accumulating on the
    antenna
2. On the other hand
    strengthening it would make
    it difficult to carry arround

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Implementation of the attribute dependency template
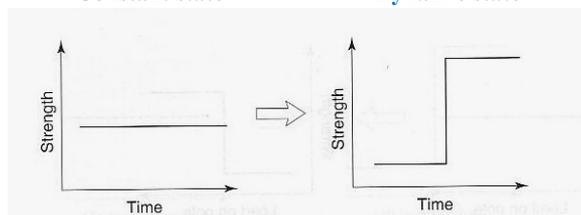
Step 1: Choose the two independent variables

Variable 1: Weight or strength of the pole (clearly related to the
problem)

Variable 2: Time (no reason to strengthen the pole before ice starts
accumulating on it)

Step 2: Add a dependency in the form of a step-function

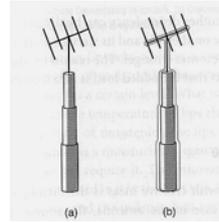**Constant state**   **Dynamic state**

Strength | Time   Strength | Time

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The dependency of the two variables dynamizes the pole problem.

a) The pole will be light in structure and will be easly carried and moved.

b) After installation, when a load of snow may weigh the antenna down, the pole must become stronger so as to withstand it

BUT HOW TO REACH THIS?

The strengthening material must be located in the area of the pole and at the time when the load on the antenna arises.
There are only ice and snow bounding aroung the pole! (Cause of the problem)

Turn the problem into a solution?

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SOLUTION

Source of the problem = source of the solution = **ICE**

Transform the problem to opportunity

ICE Strong material
Ice-coated pole strong enough to carry the ice-loaded antenna
Use the ice to adhere to the pole, not only to the antenna by creating a rough surface to the pole

Summary
Attribute Deoendency conncts two variables which are not previously connected. The connection is a functional dependency that may be described as a step function.

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Internal versus External Variables

INTERNAL VARIABLE

Fully controlled and determined
by manufacturer
„strength of the pole"

EXTERNAL VARIABLE

A variable of a component within the
immediate environment of the
product and in direct contact with it

Not under manufacturer's control

Example: time, envionmental
temperature and load of snow
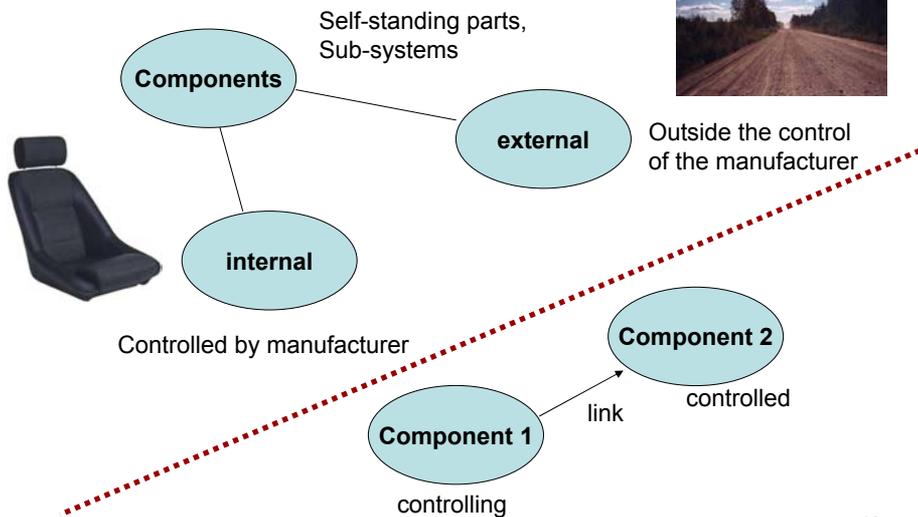
The Replacement Template

Definition:
A Replacement Template is based on the replacement of a resource or component existing in the system or in its immediate environment in order to fulfill a necessary role
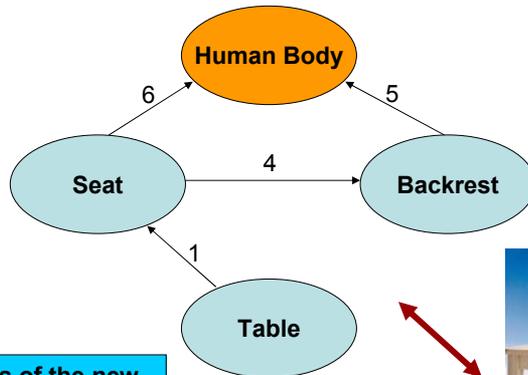
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A System consists of :

Self-standing parts,
Sub-systems

Components

external

Outside the control
of the manufacturer

internal

Controlled by manufacturer

Component 2

controlled

link

Component 1

controlling

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The chair example

Human Body

6   5

Seat   4   **Backrest**

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Table

Characteristics of the new component
1. **It must be local**
2. **It must carry out the required function**

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Summary

Operating the template in a reverse order
1. **Operate the replacement on some system**
2. **Scan the space of possible benefits**
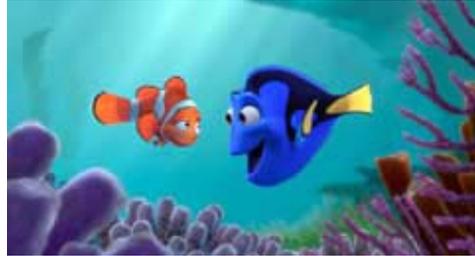3. **Check → Problem solved or response to a new need created**

Result

Saves resources
The system becomes more compact
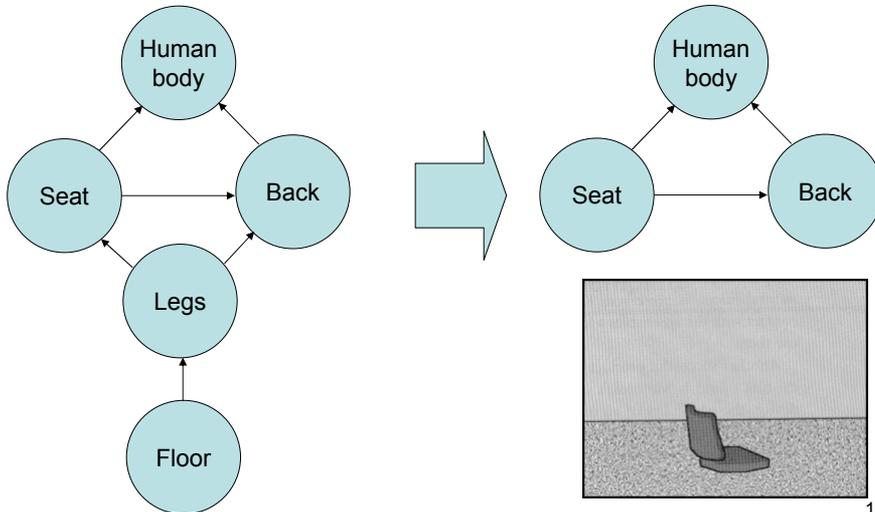
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Replacement Template in the nature

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The Displacement Template

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- Make a list of internal and external components.
- Construct a product configuration mapping all desirable control connections between all listed components.
- Locate the essential components, mark them and list the functions they fullfill in all their connections.
- Choose an essential component and exclude it from the configuration, along with the function it had fullfilled.
- Search for a market benefit resulting from the displacement you have effected. Remember that the principle Function Follows Form supports you. Try to find new market niches that may derive benefits from the removal.
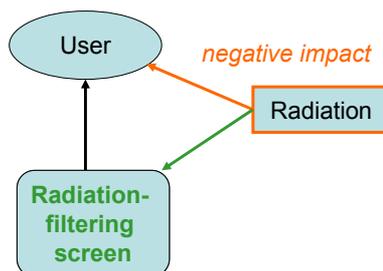
The Component Control Template

Introduction

The CCT is characterized by making a new link between a component in the internal environment of the product and a component in its external environment.
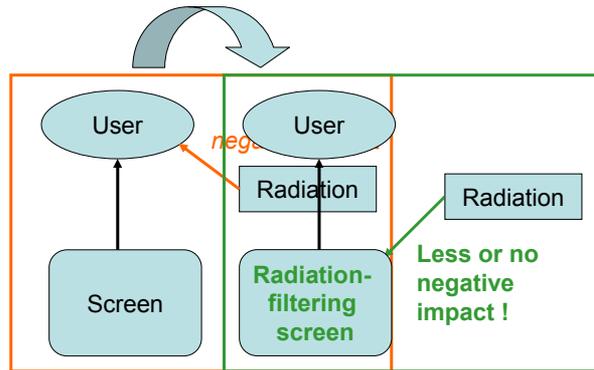
A simple example:

- **The external component is one that comes in contact with the product but is not controlled by the manufacturer or the deliverer of the service.**
- **The solution for this negative effect is to include a component with a new link into the configuration.**

Our example:

User

User

neg...

Radiation

Radiation

Screen

Radiation-filtering screen

Less or no negative impact !

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The adapted products have a new link of control with an external component that was not previously included in the product configuration.

External components were previously present in the environment of the product, but were not included in its confiuration.

New link between the external and internal component was achieved by the additional component

Our example:

User

Radiation

Radiation-filtering

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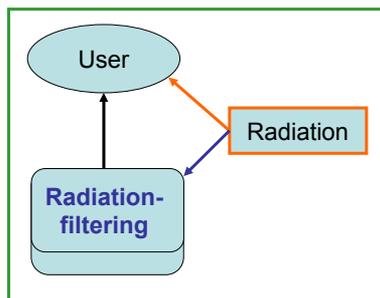
• **Using this template is initiated with selection of an external component and locate the problem related to the connection between this and the product**

• **Template is based on identification of a negative connection between an external component and the product configuration.**

• **This connection will be solved by establishing a new link between the external an internal components**

Negative Connection

User

Radiation

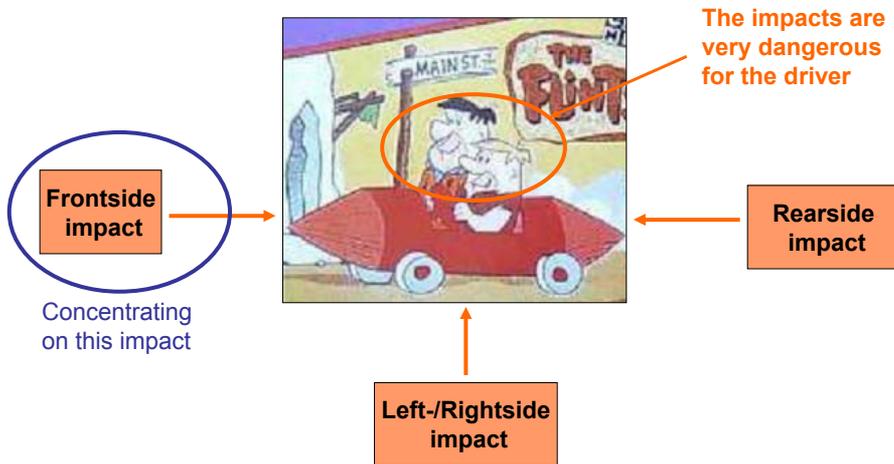Radiation-filtering screen

New Link

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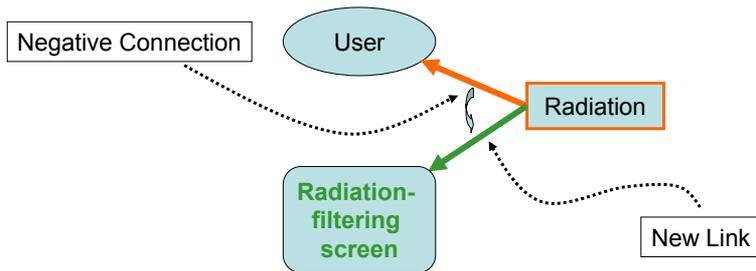
• **Searching for external components gives us a limited list of components (number is finite and they are easy to define)**

• **The result will be possibilities for innovation**

• **From this innovation we get a specified benefit**

• **The new benefit has the result that the negative state is getting limited or neutralized**

• **Note: locating negative states is comparable to searching for needs**

• **Assumption of this procedure is that its easier to locate problems than to search for solutions to needs**

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An example: The car
Scanning the crashimpact- components for the driver who sits in the car.

The impacts are very dangerous for the driver

Frontside impact

Concentrating on this impact

Rearside impact

Left-/Rightside impact

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So we have such a component picture:

Driver

Frontsideimpact

Car with a driver-airbag system

new flintstone-car ☺
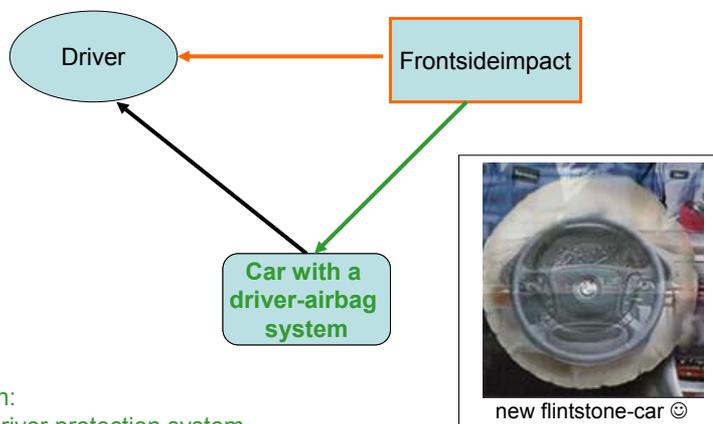
Innovation:
Install a driver protection system
Result: invention of airbag system → now, the danger for the driver is
decreased (driver airbag system)

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• **In most cases the adaption of the product to the environment often requires investment in research and technology.**

Exceptions:

• **The adaptions are minor and needed only for formulating a new marketing message for a product.**

• **Sometimes it doesn't require the addition of a new component to the configuration, but exposing an unknown aspect of an existing component or of the configuration itself.**

→ **You can find this out by using the CCT.**
→ **Advantage: R&D effort will be nothing or very less, (because you use a configuration which was already included in your product)**

• **Example: Orbit®- Gum – it aids preventing dental caries, because its a low-sugar-gum. Every low-sugar-gum do it! But in the past there was no link to dental caries. They found it and had a new marketing message.**

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Operational prescription

1. **Make a list of internal components (over which the manufacturer has control)**

2. **Construct a product configuration: mark all the control links existing between the identified internal components.**

3. **Make a list of environmental components that come in physical contact with the product configuration.**

4. **Scan the environmental components one by one, trying to locate for each a negative connection, existing or potential, with the product configuration**

→Signals from the product environment help to determine possible developments on the product!

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The End