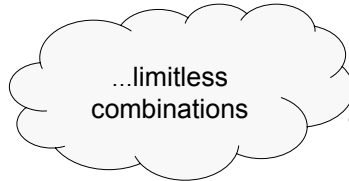


## ...LIMITLESS COMBINATIONS

*"In the battle there are only the normal and the extraordinary forces,  
but their combinations are limitless;  
no one can comprehend them all"*



造

= to create



SUN TZU

## Morphological Analysis

- Defined in 1942-43 by Fritz Zwicky, an American astrophysician
- It allows to find possible solutions to complex problems characterized by several parameters
- It can be effectively applied in:
  - new product development
  - services
  - patents

# Morphological Analysis

**Parameters:**

X            Y            Z            ...  
↓            ↓            ↓            ↓

**Solutions for each parameter:**

m            n            p            ...

**Possible answers to the complex challenge:**

➔ m x n x p x ...

...limitless combinations



# Morphological Analysis

StepS:

1) Specify your challenge



2) Select the corresponding parameters



3) List variations



4) Research all the possible solutions to the problem



5) Try different combinations



6) Increase the examined solutions

# Morphological Analysis

Ex.: New product development

1. **Objective:** *"Improving existing models of cars"*

2. Analyze cars and **list** some of their **parameters:**

- **improving elements**
- **optional equipment**
- **internal processes**
- **temporary properties**



3. Generate the **variations** for each parameter:

- Which *improving elements* can be found?
- Which *optional equipment* can be offered to customers?
- Which are the different kinds of *internal processes* in a car?
- Which *temporary properties* can make a car special in its early phases of life?

# Morphological Analysis

4. Research **all the possible solutions** to the problem:

▪ 5 alternatives X 4 parameters → 1024 different combinations

IMPROVE EXISTING MODELS OF CARS				
	IMPROVING ELEMENTS	OPTIONAL EQUIPMENT	INTERNAL PROCESSES	TEMPORARY PROPERTIES
1	fuel consumption	ABS	automatic	powerful engine
2	breakdowns	air-conditioning	operator-controlled	perfect tyre
3	vibrations	heated seats	random	absence of dust
4	noise	CD player	continuous	cleanness
5	odor	Bluetooth technology	intermittent	new car smell

# Morphological Analysis

## 5. Try different combinations:

- Choose randomly one variation for each parameter and connect them to create new possibilities

IMPROVE EXISTING MODELS OF CARS				
	IMPROVING ELEMENTS	OPTIONAL EQUIPMENT	INTERNAL PROCESSES	TEMPORARY PROPERTIES
1	fuel consumption	ABS	automatic	powerful engine
2	breakdowns	air-conditioning	operator-controlled	perfect tyre
3	vibrations	heated seats	random	absence of dust
4	noise	CD player	continuous	cleanness
5	odor	Bluetooth technology	intermittent	new car smell

# Morphological Analysis

- Random combination:
  - odor
  - air-conditioning
  - operator-controlled
  - new car smell
- Result: Fragrance-control system for cars
- Advantages: **With a touch of button**, drivers can choose from jasmine, mint, a fresh leather smell, or perfume scents, all blowing through the air-conditioning system



# Morphological Analysis

Ex.: New service for car washes

NEW BUSINESS EXTENSION FOR CAR WASHES				
	METHOD	PRODUCTS WASHED	EQUIPMENT	PRODUCTS SOLD
1	full	cars	sprays	related products
2	self	trucks	conveyors	novelties
3	hand	houses	stalls	discount books
4	mobile	clothes	dryers	edible goods
5	combination	dogs	brushes	cigarettes

Fonte: M. Michalko, 1991

# Morphological Analysis

- Random combination: self, dogs, brushes, stalls, sprays, dryers and related products
- Result: self-service dog wash characterized by:
  - **ramps** leading to waist-high **tubs** to **spray pets**, scrub them with **brushes, shampoo**, and blow **dry** them;
  - Selling **dog products** (shampoos and conditioners).
- Advantages: **Pet owners wash** their **dogs** while their **car** is going through the full-service car wash.

