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Systems, Business Processes and Management

Business TRIZ

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Michelle Bindel

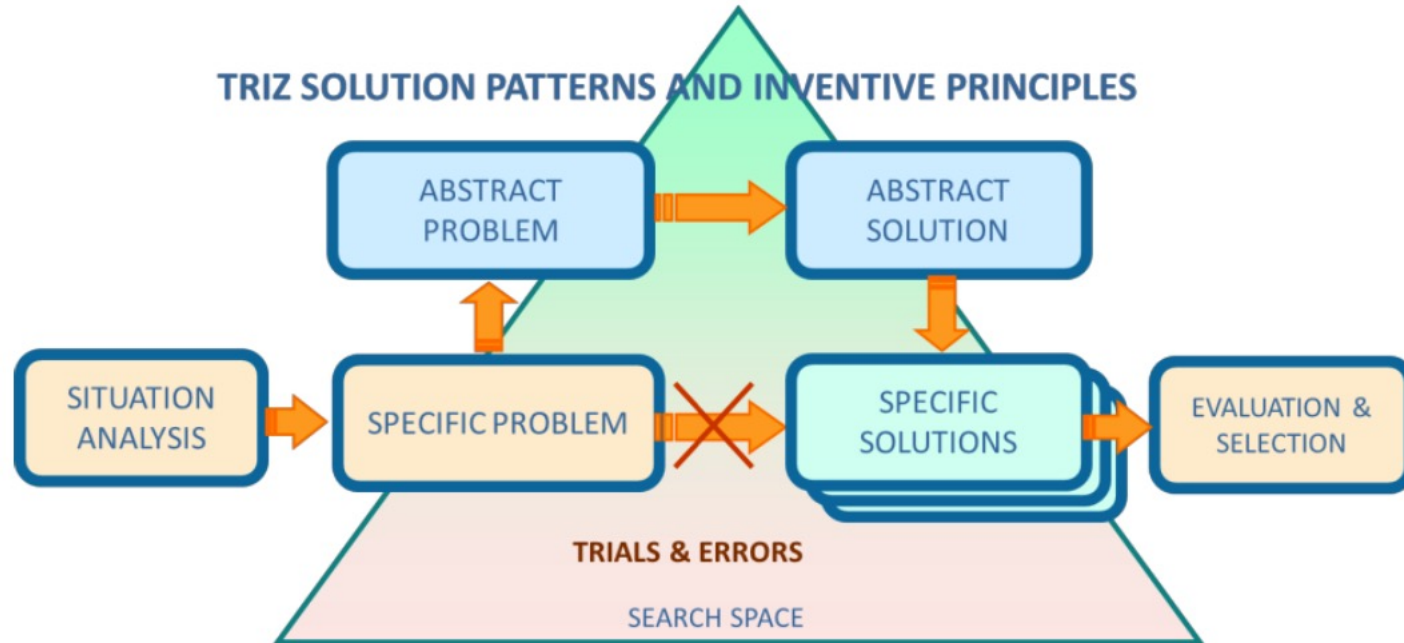
ABLAUF

1. TRIZ
2. Translating TRIZ to Business
3. Main Approaches in Business TRIZ
 - Contradictions, Ideality, Trends of Business Evolution
4. Popular Tools in Business TRIZ
 - Function Analysis, RCA+, Contradiction Matrix and Inventive Principles, VCM
5. Roadmap

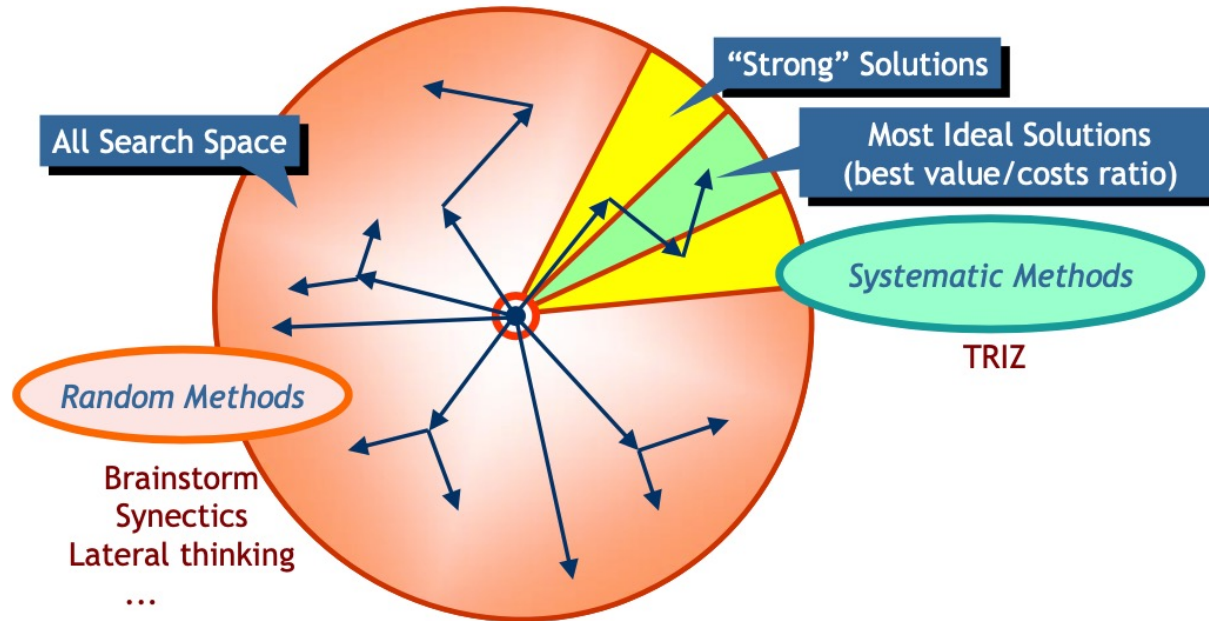
TRIZ

- russian acronym of „теория решения изобретательских задач“ (Teoria reschenija isobretatjelskich sadatsch)
- Theory of solving inventive problems
- collection of over 30 tools
- generating inventive ideas and breakthrough solutions in a systematic way
- foundation:
 - majority of inventions complies with a relatively small set of principles
 - principles can be reused
 - boost our thinking and offer solution patterns
 - guided towards the so-called “strong” solutions

TRIZ



TRIZ



TRANSLATING TRIZ TO BUSINESS TRIZ

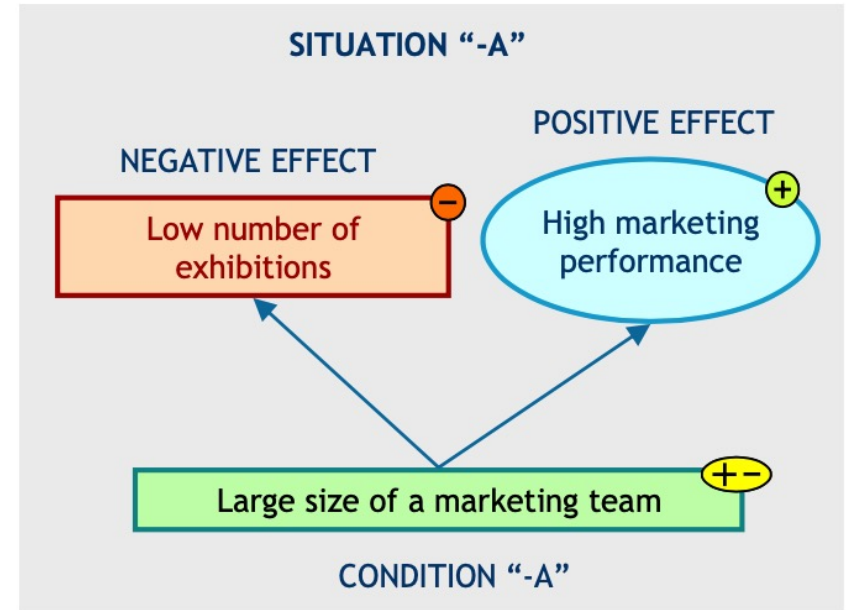
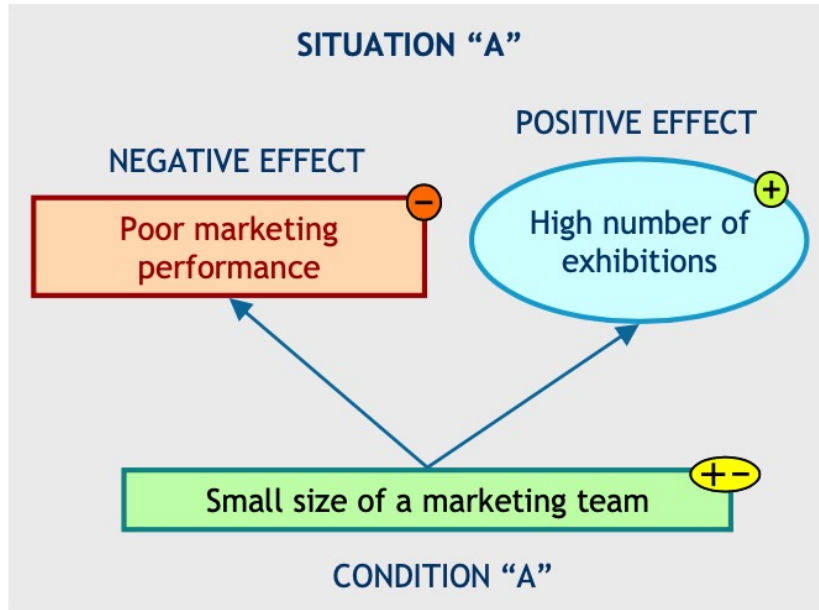
- TRIZ created by engineers for engineers
- within the last 15-20 years expanded application to non-technical areas
- successful application to existing business problems triggered development of TRIZ for Business and Management
- still actively evolving during recent years
- TRIZ focuses on studying high-level patterns and regularities of non-linear (inventive) evolution of technical systems
- the same or very similar general patterns can be applied to non-technical systems

Car	Company
based on the laws and principles of physics and chemistry	based on business, psychological, market, and social laws and principles
networks (systems) of generic components	
components: <ul style="list-style-type: none">• interact with other components of outer systems• engaged in transactions• deliver certain functions• process either material or information• provide reactions and feedback	
break with the wrong input	

CONTRADICTIONS

- most problems are based on a dilemma or trade-off between two contradicting elements
 - must be solved to find a solution
- types of Contradictions:
 - wanting to achieve opposite states for one component
 - (Technical Contradiction)
 - improving one component worsens the state of another one
 - (Physical Contradiction)

CONTRADICTION

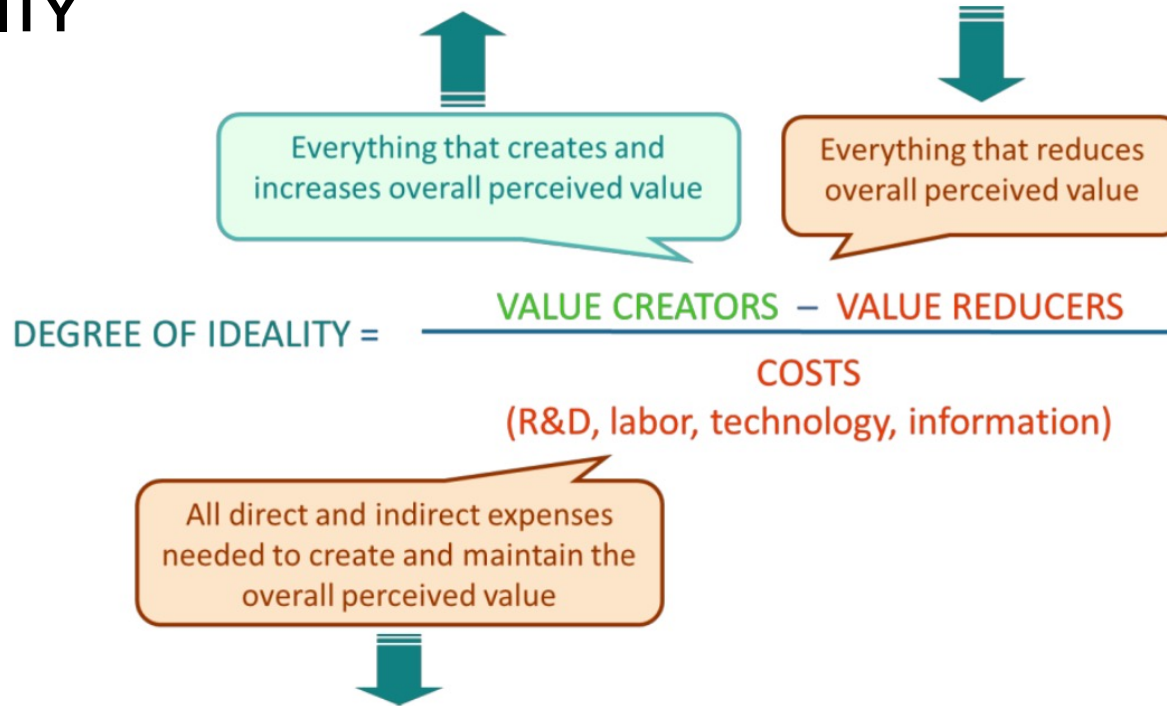


IDEALITY

- indicates a ratio between the perceived value delivered by a certain system, product or service and all types of expenses and investments needed to produce this value
- used to compare two competitive systems
- defined as useful functionality of a system minus all negative factors that diminish its value, and divided by costs

$$\text{DEGREE OF IDEALITY} = \frac{\text{VALUE CREATORS} - \text{VALUE REDUCERS}}{\text{COSTS}} \\ \text{(R\&D, labor, technology, information)}$$

IDEALITY



TRENDS OF SYSTEM EVOLUTION

- Trends of Evolution are reproducible
 - Evolution is not random
- TRIZ can be used to predict the future evolution of technologies
- instead of listening to the demands of the customers, listen to the „voice“ of the products
- which principles form the basis of the product?
 - predict how it will evolve according to the Theory of Systems Evolution

TREND:

Non-changeable
fixed system or
service

System or service
consisting of
different parts with
flexible relationships

Increasing the
degree of freedom
of system's parts
and service
events/transactions

Systems/services with
dynamically appearing-
disappearing part(s)

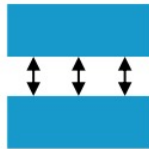
Dynamically
appearing
and disappearing
system/service

Virtual system/
service

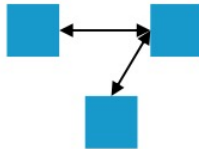
EXAMPLE:



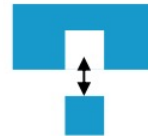
A large company
with non-flexible
hierarchical
structure



A company with
several units having
their own freedom



A network of
independent
companies



Interim management,
mobile company parts



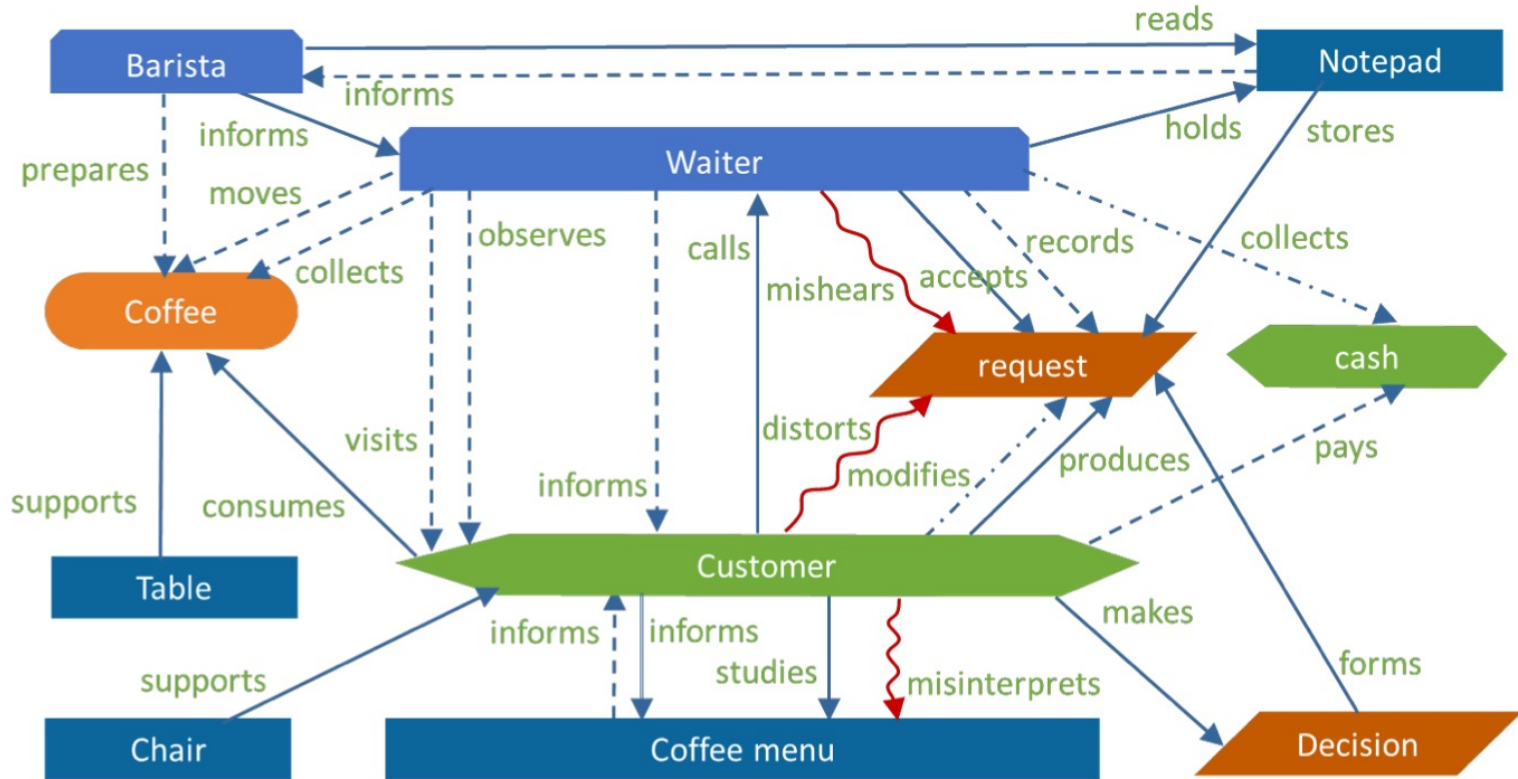
A company
which is created to
deliver a function
and disappear



Completely
automated
web-based
service

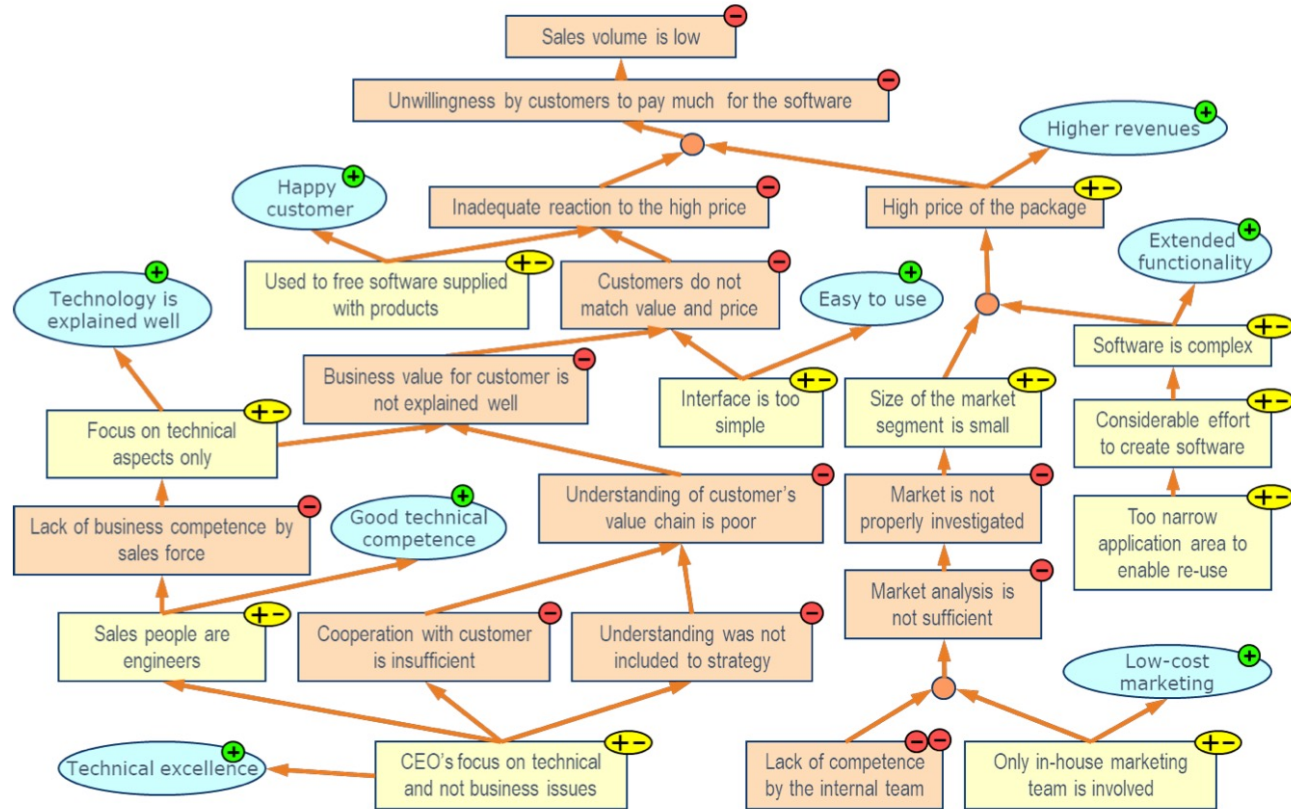
FUNCTION ANALYSIS

- helps to identify (hidden) interactions within a system
 - negative or insufficient
 - poorly controllable
- uncovering potential for further improvement
- rank functions delivered by systems components and create functional hierarchy → establishes different levels of value delivered by system components
- valuable functions should be improved, unimportant ones should be trimmed
- extended Version for Business (e.g. immaterial objects)



ROOT-CONFLICT ANALYSIS (RCA+)

- used to define problems in terms of contradictions
- top-down decomposition of a general problem defined as a negative or ineffective
- result to a tree of interrelated contradictions
- can become quite extensive and complex
- leans on Cause and Effect Chain Analysis (CECA)



CONTRADICTION MATRIX

- provides a systematic access to the most relevant subset of Inventive Principles depending on a type of contradiction
- after we have identified the contradictions
- the columns and rows of the matrix correspond to the parameters that trigger the contradiction
- Business Matrix 3.0 (D. Mann) instead of Contradiction Matrix by Altshuller

1. R&D Spec/Capability/Means
2. R&D Cost
3. R&D Time
4. R&D Risk
5. R&D Interfaces

16. Product Reliability
17. Support Cost
18. Support Time
19. Support Risk
20. Support Interfaces


1. Weight of moving object
2. Weight of stationary object
3. Length of moving object
4. Length of stationary object
5. Area of moving object

25. Loss of Substance
26. Loss of Time
27. Loss of Energy
28. Loss of Information
29. Noise

	<div> <div>Improving feature</div> <div>Worsening feature</div> </div>	Volume of moving object	Speed	Force	Tension or pressure	Shape	Reliability	Harmful actions due to the object	Easy to operate	Easy to repair	Complexity of device	Difficulties of detection and measure
		7	9	10	11	12	27	31	33	34	36	37
9	Volume of moving object	-	7,29 ,34	15,28 13,19	6,18,3 8,40	35,1 5,18 ,34	11,35,27 28	2,24,3 5,21	32,28 13,12	34,2,2 6,27	10,29 4,34	3,34,27,1 6
10	force	15,9,12,3 7	13,2 8,15 ,12	-	16,21 11	10,5 5,40 ,34	3,35,13,2 1	13,3,3 6,24	1,28,3 25	15,1,1 1	26,35 10,18	36,37,10 19
11	Tension or pressure	6,35,10	6,35 ,36	36,35 21	-	35,4 15 10	10,13,19 35	2,33,2 7,18	11	2	19,1,3 5	2,36,37
12	shape	14,4,15,2 2	35,1 5,34 ,18	35,10 37,40	34,15 10,14	-	10,40,16	35,1	32,15 26	2,13,1	16,29 1,28	15,13,19
15	Duration of action of moving object	10,2,19,3 0	3,35 ,5	19,2,1 6	19,3,2 7	14,2 6,28 ,25	11,2,13	21,39 16,22	12,27	29,10 27	10,4,2 9,15	19,29,39 35
33	Easy to operate	1,6,35,15	18,1 3,34	28,13 35	2,32,1 2	15,3 4,29 ,28	17,27,8,4 0	15,2,7	-	12,26 1,32	32,26 12,17	12,4,5

40 INVENTIVE PRINCIPLES

- does not offer an exact solution
 - generic strategies and recommendations
- already successfully resolved similar contradictions
- have to be translated to a specific solution, that can be applied within the context of our problems
- Adaptation: 40 Inventive Principles for Business and Management
 1. Segmentation
 2. Extraction (Extracting, Retrieving, Removing)
 3. Local Quality
 4. Asymmetry

#2: TAKING AWAY	Examples
	
Strategies and recommendations	
<ul style="list-style-type: none"> ○ If some part of your system or your process interferes with other parts or creates a negative effect, remove ("take away") the interfering part of your system (or activity of your process) by separating it from the system or the process. ○ Isolate interfering part of a system or a process from the rest of the system or a process. ○ If some property of your system interferes with other properties of functions of the system, find out what part of the system is a carrier of the property and separate it from the system by creating another system or transferring the property to some other part of the system. ○ Remove the necessary property of a system or your process by creating a system or a process which has the required property only. 	<ul style="list-style-type: none"> <input type="checkbox"/> Outsourcing non-core parts of business systems and business processes. <input type="checkbox"/> Separating development and production activities. <input type="checkbox"/> Separating manufacturing and reparation. <input type="checkbox"/> Taking away an interfering part of the business process. <input type="checkbox"/> Performing marketing studies directly at customer side. <input type="checkbox"/> Locating development teams in geographic areas with concentration of top competence. <input type="checkbox"/> Removing dangerous manufacturing unit outside the city. <input type="checkbox"/> Increasing sales by bringing a product to a customer's side. <input type="checkbox"/> Letting customers exclude those parts of the product that they do not need before purchase. <input type="checkbox"/> "Isolate" in time or space a part of a business system or a process that creates tension. <input type="checkbox"/> Distant learning. <input type="checkbox"/> Working from a home office. <input type="checkbox"/> Lean manufacturing. <input type="checkbox"/> Activity-Based Costing instead of allocation cost accounting. <input type="checkbox"/> Establishing a number of new companies with new products which promote the same brand.

VALUE-CONFLICT MAPPING (VCM)

- performed by completing a table which matches customer demands and market trends with certain parts of a system and their properties responsible for fulfilling the demands and trends
- establish the contradictions between the key market demands and trends and the components of a current system
- decide what part of our business model or our value proposition we would like to innovatively improve
- Tool developed for Business TRIZ

#	MARKET DEMAND	SUBSYSTEM	PROPERTY	VALUE	BUSINESS DEMAND
C1	Short walking time	Shopping space	Area	Small	
C1	No crowds	Shopping space	Area	Large	
C1		Shopping space	Area	Small	Low Rental costs
C1	Broad selection of goods	Shopping space	Area	Large	
C2	Products freshness	Goods	Expiration time	Short	
C2		Goods	Expiration time	Long	Avoid product loss
C2		Goods	Expiration time	Long	Low-cost storage
C3	Quick advice from the personnel	Personnel	Number	High	
C3		Personnel	Number	Low	Cost saving
C4	High quality of advice	Personnel	Competence	High	
C4		Personnel	Competence	Low	Cost saving
C5	Fun shopping				
C5					
C6					
C6					
C7	No waiting				
C7					
C8	Always available				
C8					
C9					
C9	Attractive				
C9	Broad selection				


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graph LR
    subgraph Customer_Market [Customer / Market]
        SS[Shopping space] --> A[Area]
        A --> As[small]
        A --> Al[large]
        P[Personnel] --> N[Number]
        N --> Ns[small]
        N --> Nl[large]
        P --> C[Competence]
        C --> Ch[high]
        C --> Cl[low]
        G[Goods] --> Nu[Number]
        Nu --> Nh[high]
        Nu --> Nl[low]
        G --> P[Price]
        P --> Ph[high]
        P --> Pl[low]
        G --> Et[Exp. time]
        Et --> El[long]
        Et --> Es[short]
    end

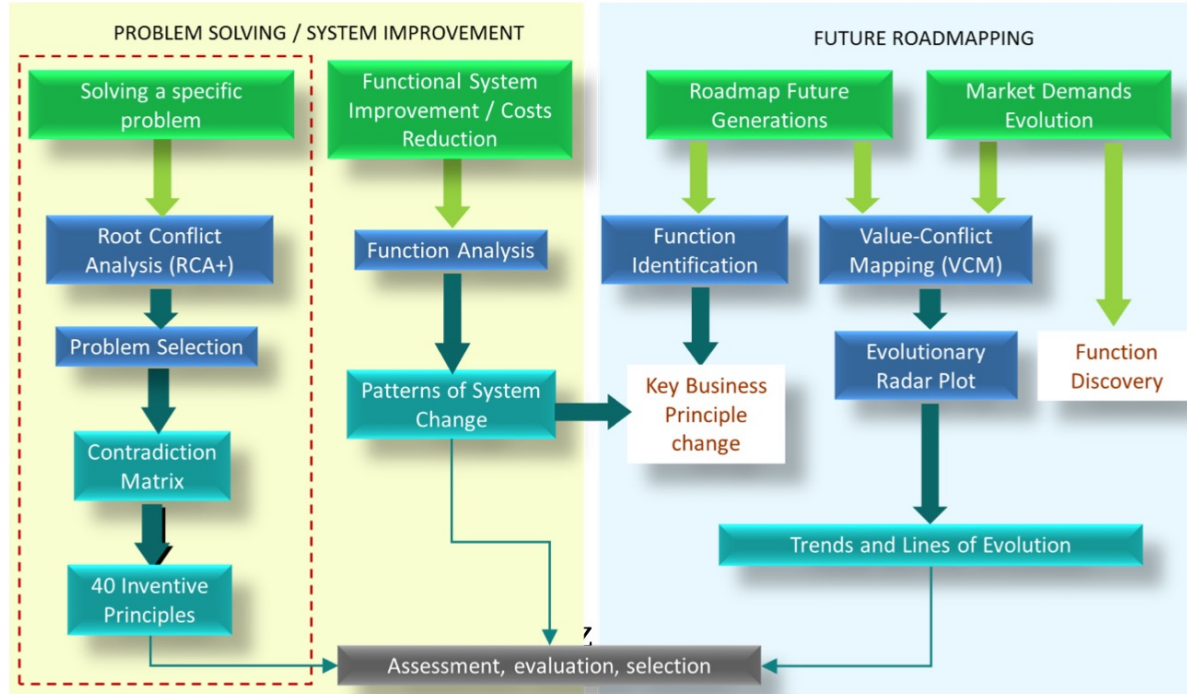
    subgraph Business [Business]
        LRC[Low rental costs]
        CS[Costs saving]
        APL[Avoid product loss]
        LCS[Low-cost storage]
    end

    As --> LRC
    Al --> LRC
    Al --> NoC[No crowds]
    Al --> BSG[Broad selection of goods]
    Ns --> CS
    Nl --> CS
    Nl --> QA[Quick advice]
    Ch --> CS
    Cl --> CS
    Cl --> HQA[High quality of advice]
    Nh --> AA[Always available]
    Nl --> LRC
    Nl --> RPR[Reduced purchase risks]
    Ph --> HM[Higher margin]
    Pl --> HM
    Pl --> AP[Attractive prices]
    Pl --> FS[Faster sales]
    El --> NPL[No product loss]
    Es --> NPL
    Es --> PF[Product freshness]
    Es --> LCS
  
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TOOLS OF BUSINESS TRIZ

LEVEL 1: SOLVING A SPECIFIC PROBLEM / CHALLENGE	LEVEL 2: INNOVATION OF SYSTEMS AND PROCESSES, PROBLEMS DISCOVERY, DISRUPTIVE COST CUTTING	LEVEL 3: FUTURE INNOVATION ROADMAPING
<ul style="list-style-type: none"> • Problem Perception Mapping. • Ideal Solutions. • Root Conflict Analysis (RCA+). • Principles of Separating Conflicting Requirements. • 40 Innovation Principles for Business and Management. • Contradiction Matrix for Eliminating Business Contradictions. • Ideas Portfolio. • Multi-Criteria Matrix of Solution Ideas. Integral Ideas Landscape. 	<ul style="list-style-type: none"> • Business Model Assessment. • Function and Cost Analysis. Problems Discovery. • Function Idealization (Trimming) for Systems and Processes. • Object-Field Modeling. • Standard Inventive Solution Patterns for Business and Management. • Merging Alternative Competing Systems (Feature Transfer). • Function Oriented Search (FOS). • Main Parameters of Value (MPVs). • S-curve Evolution. • S-curve Analysis of Systems Evolution. 	<ul style="list-style-type: none"> • Benchmarking. • Value-Conflict Mapping (VCM). • Multi-Screen Analysis (MSA). • Business Models Navigator. • Laws of Business Systems and Products Evolution. • Trends and Lines of Business Systems Evolution. • Subversion Analysis. • Anticipatory Failures Analysis. • Diversification of Business Models and New Markets Discovery. • Business Innovation Roadmaps.

ICG T&C ROADMAP TO TRIZ FOR BUSINESS AND MANAGEMENT



RESULTS OF THE "BUSINESS TRIZ ONLINE WINTER 2021" CONFERENCE

Examples for solved problems:

- Solving the Problem of Construction Mode for Traditional Industry Park in the Large Cities
- Using Business TRIZ Method to Improve the Speed of Checkout Process of Convenience Stores
- Resolving the Dilemma of Monitors in Kindergartens by Business TRIZ

→ used mainly the tools presented here

REFERENCES

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THANK YOU!

QUESTIONS?