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## BACK TO CREATABILITY

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### *Abstract*

The idea was born for a presentation planned to win people from the regional industry to attend a common TRIZ-study group in greatest possible numbers.

Because the participants of the event were used to take decisions based on facts and not on promises the positive effect of TRIZ should be made measurable and shown in vivid graphic style. Because such information evidently was not available, the author had to generate the data by himself.

This paper describes the analysis of the own in-house situation done by the author.

A new term – creatability – was formed by the combination of the two words “creative” and “ability” to simply describe the corresponding human faculty.

**Keywords:** TRIZ, creativity, innovation level, contradiction, Psychological Inertia.

### **1. Introduction**

KACO GmbH + Co. KG – a member of the Brazilian Sabó-Group – is a leading seal manufacturer mainly for the automotive industry and consequently is exposed extremely to the effects of globalisation. Radical innovation therefore is essential and TRIZ sometimes rescued us in difficult applications.

The author already started with TRIZ in 1996 as an autodidact. Four years later TRIZ was introduced at KACO on a broader basis. Therefore the existing data should be sufficient to make a safe statement about the effect of TRIZ.

The analysis should result in answering the following questions:

1. Is there a quantitative effect of TRIZ?
2. Is there a qualitative effect of TRIZ?
3. Is it possible to “reactivate” employees whose creativity is blocked after long years of experience?

### **2. Analysis of the in-house situation**

#### **2.1 General**

To work on the nature of the task all inventions/ innovations of our house have been analysed back until the year 1975 – that means over a period of 30 years!

Precondition for the inclusion into the analysis was that the invention seems to be patentable and fits in our company’s strategy, or a patent is already pending or even granted.

For the analysis we have chosen 3 persons that attracted attention by a greater number of inventions and at the same time work in the development area before and after the introduction of TRIZ.

The assessment of the innovation level took place basically according to Altshuller’s 5 innovation levels. But the KACO procedure includes in addition to Altshuller commercial and strategic aspects so that the results can differ between Altshuller and KACO.

The number shown in the symbols of the diagrams only serves to track the invention itself and its inventor.

## 2.2 Quantitative effect of TRIZ

To measure the quantitative effect of TRIZ the number of inventions/ innovations generated per year was used. Figure 1 shows all KACO inventions/ innovations per year within the period of the last 30 years.

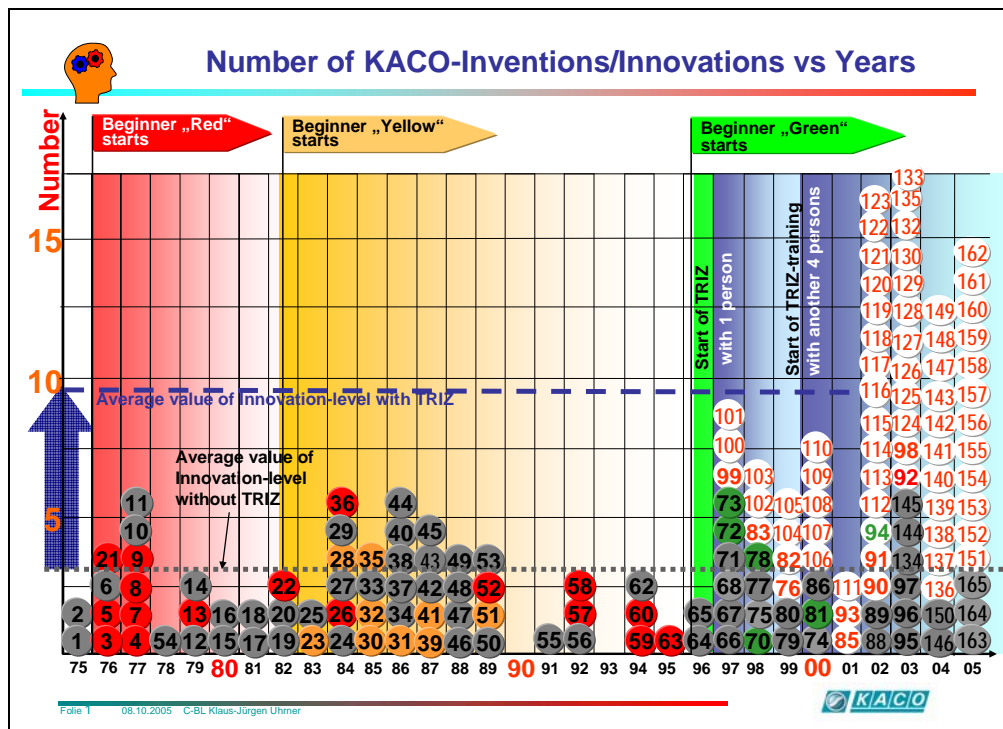


Fig 1: Number of all KACO- inventions/ innovations per year vs time and starting points (White symbols stand for TRIZ-based inventions)

To give a clearer picture figures 2, 3 and 4 show in contrast to figure 1 only the share of employee “Red”, “Yellow” and “Green”. In all three cases we can see the tendency that shortly after having started (“Red”) or after a warming up time (“Yellow” and “Green”) they begin with a larger number of inventions per year only to get down afterwards.

The reason for this effect seems to be the impact of Psychological Inertia. This suspicion is confirmed by figures 6, 7 and 8 where one can see much more clear the creativity blocking influence of increasing experience.

If we come back to figure 1 and compare the average numbers of inventions/ innovations per year without and with the influence of TRIZ we see an increase from 3,0 to 9,7 inventions/ innovations per year. That means that the number of inventions/ innovations per year under the influence of TRIZ is more than three times greater than without TRIZ.

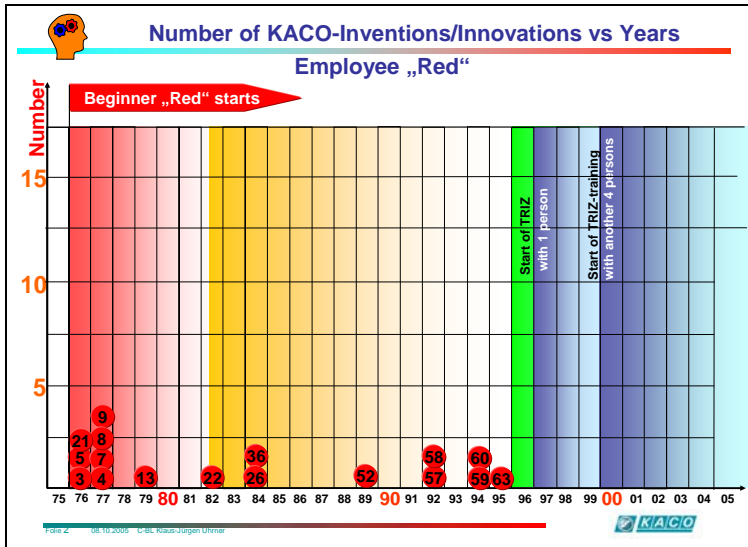


Fig 2: Number of inventions/ innovations per year vs time of employee “Red” before introduction of TRIZ

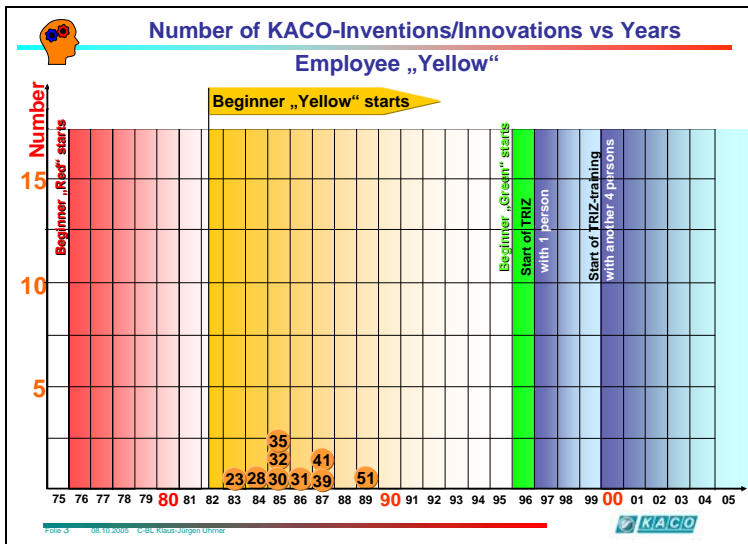


Fig 3: Number of inventions/ innovations per year vs time of employee “Yellow” before introduction of TRIZ

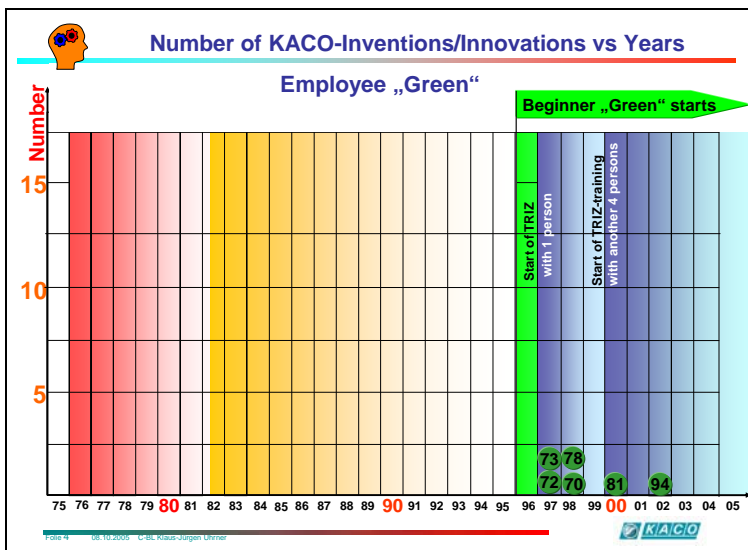


Fig 4: Number of inventions/ innovations per year vs time of employee “Green”

### 2.3 Qualitative effect of TRIZ

To measure the qualitative effect of TRIZ the innovation level of the inventions/ innovations was used. Figure 5 gives an overview of the innovation level of all KACO inventions/ innovations during the last 30 years. What inevitably hits in the eye is the fact that the “cloud” of innovation levels significantly concentrates on a higher level after the introduction of TRIZ.

Figure 5 shows also the average values of innovation level. As we can see the average innovation level increased from 2,4 to 3,4 after the introduction of TRIZ! This means according to Altshuller the transition from level 2 to level 3 respectively from “qualitatively, but not substantially change” to “essential improvement and radical change”!

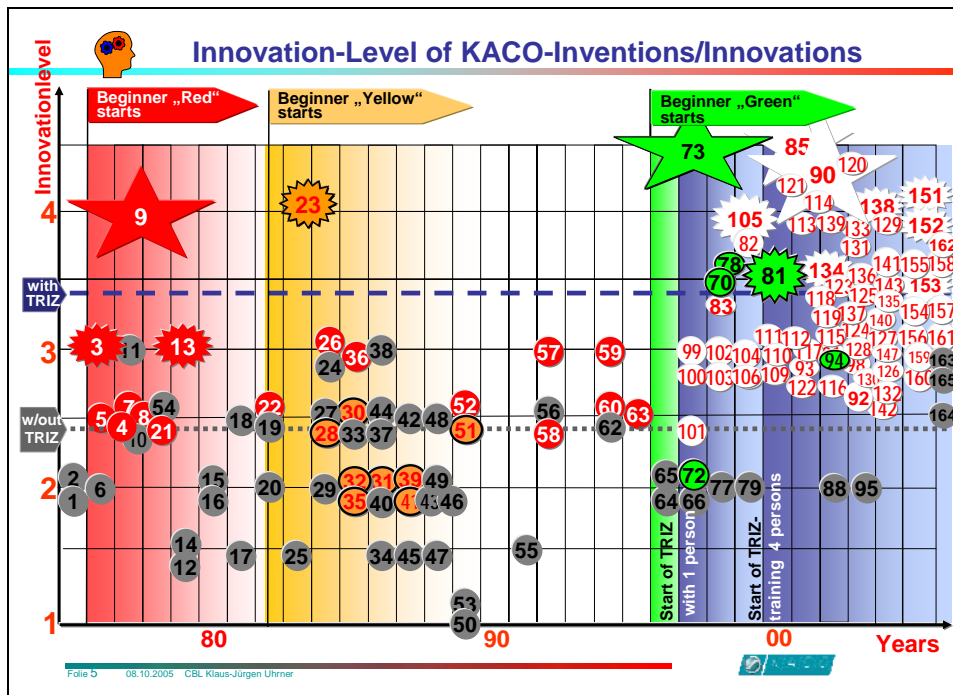


Fig 5: Innovation level vs. time of all KACO inventions/ innovations  
(White symbols stand for TRIZ based inventions)

Figures 6, 7 and 8 give us a clearer picture of the typical behaviour of the three selected employees. The point in common is that after a typical training period of about 1,5 years each of this employees has given birth to a great idea that was of utmost importance for the company.

In case of “Red” the big bang (#9) made us into the market leader with one of our product groups. The great idea of “Yellow” (#23) was more scientific and helped a lot to better understand the function of elastomere seals. Accordingly we could further improve reliability of our products. Last but not least the valuable contribution of “Green” (#73) enabled our entrance in an ever growing new product segment. Due to its environment-friendliness we already have won awards.

From figures 6, 7 and 8 we can see that after the great idea the innovation level drops down in each case and does not come back again. What might be the reason?

The reason seems to be the same as with the quantity of ideas (fig. 2, 3 and 4): as the inventor becomes more and more an expert he loses his innocence of thinking, with other words, he is driven by Psychological Inertia.

Figure 5 makes clear that whenever a beginner (“Red”, “Yellow” or “Green”) enters the team, than radical inventions are born. So Altshuller is right in saying: “Revolutionary ideas – as a rule – will be created only, if participants with a completely different knowledge basis refresh the team!”

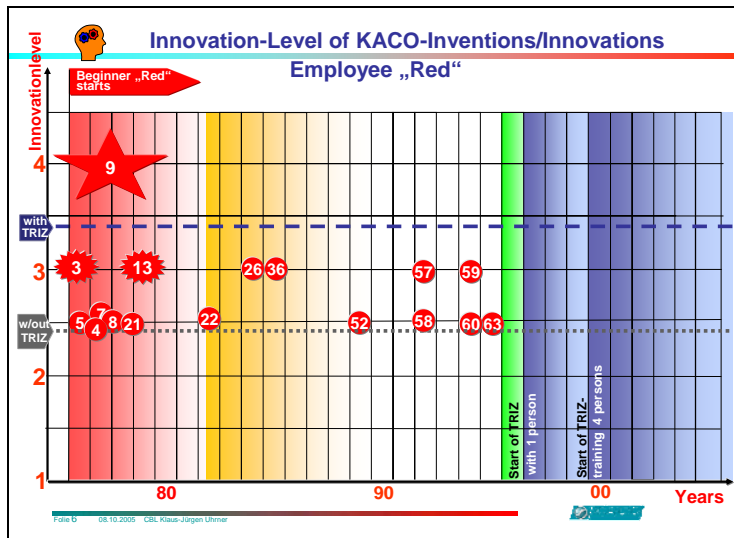


Fig 6: Innovation level vs. time of employee “RED” before introduction of TRIZ

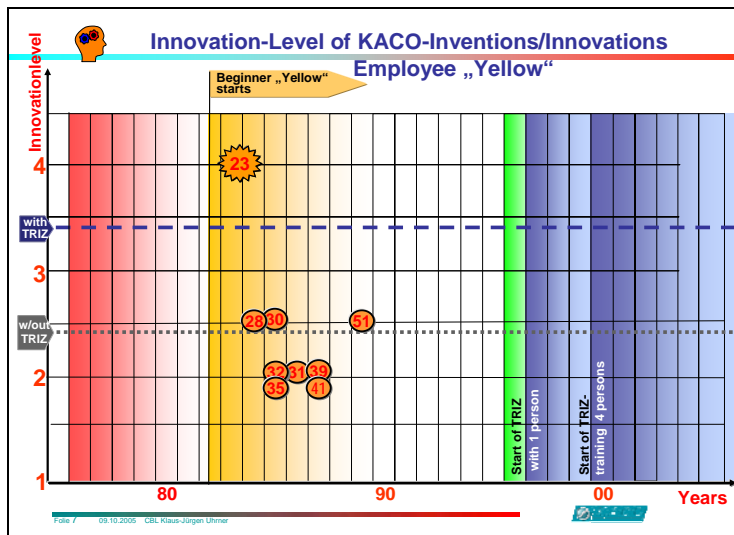


Fig 7: Innovation level vs. time of employee “Yellow” before introduction of TRIZ

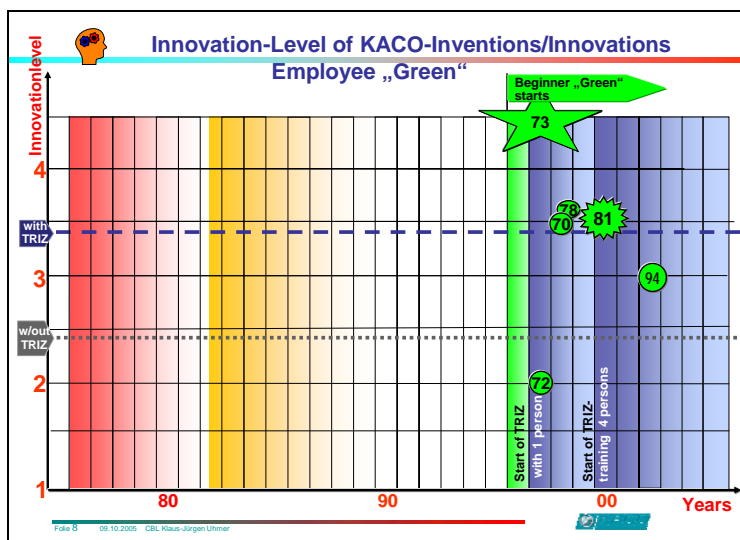


Fig 8: Innovation level vs. time of employee “Green”

Another rule of Altshuller says that the characteristic of a real innovation is the resolution of a contradiction and the decisive feature between innovation level 2 and level 3 is the resolved contradiction in case of level 3. To check whether this is also true in case of KACO all the inventions/ innovations have been examined to see whether a contradiction has been resolved or not. Afterwards the result has been combined with the individual innovation level. The result generated in this analysis is shown in figure 9.

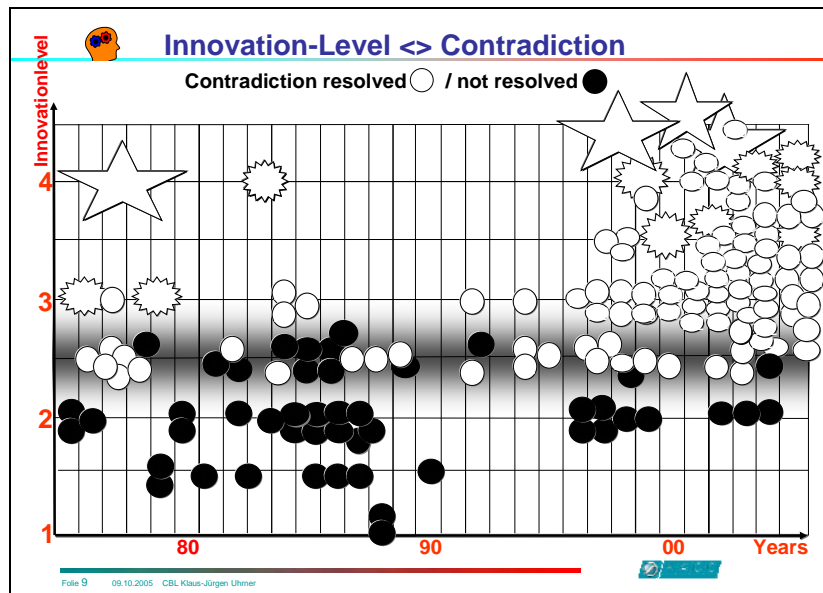


Fig 9: Innovation level and contradiction resolution  
(White symbol = contradiction resolved, black symbol = contradiction not resolved)

It can be clearly seen that there is a “grey zone” between level 2 and level 3, but on level 3 and above all contradictions have been resolved. Whereas on level 2 and below contradictions stay unidentified and unresolved. Like in the previous case also here Altshuller can be confirmed for 100 %!

### 3. Conclusion/ Summary

A clear quantitative effect of TRIZ was found with a tripling of the number of inventions/ innovations per year.

As clear as the quantitative effect TRIZ showed a qualitative effect with an increase of innovation level from level 2 to level 3.

But what is more, in figures 1 and 5, we see, after the introduction of TRIZ both values, the number of innovations as well as the innovation level, exploded so to speak.

The exciting question was: could these experts be transferred back to their original condition by TRIZ, what means not to be blocked by expertise and be free of Psychological Inertia, again?

The answer is not only “yes, they can be reactivated”, but they obviously gain in addition more creativity. They even become better inventors than they have ever been. This is without any doubt the quantitative and qualitative effect of TRIZ.

All these together justify the title of this paper: BACK TO CREATABILITY.



# Evaluation of Innovation Level

Innovation Level	Original	Contradiction Conflict	Compro-mise	Closeness to IFR	Techno-logy	Innovation	Required Knowledge	Market Position	Rate of Return
<b>IV</b>	radically changed	identified, resolved through radical new solution	completely resolved	clearly closer	beyond present technology	break-through beyond present technology	beyond normal paradigm of engineering fields	market leader	clearly improved 15%
<b>III</b>	clearly changed	identified, resolved through novel elements	practically resolved	closer or similar	inside present technology	break-through inside present technology	from other disciplines	improved	improved 10%
<b>II</b>	qualitatively changed, but not elementary	identified, reduced	still existing	similar or remote (higher complexity)	inside present technology	no innovative break-through, progress visible	from own speciality and some uncommon methods	little improved	improvement possible
<b>I</b>	retained	not identified, not reduced	still existing	far away	inside present technology	no innovative solution	from own speciality	not improved	no improvement