

The Ideal IFR is no IFR, Criticism to the TRIZ Concept of Ideality



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1. The concept of Ideality

Ideality is one of the most powerful concepts of TRIZ. The ideality of a system is measured by all its benefits divided by all its harms. An ideal stage of a system is when the system is better, faster, low cost, low error, low maintenance and so on. In other words, the ideal system consists of all positive functions and no idle and negative functions.

According to TRIZ, the Ideal System is a system that does not materially exist, while all its functions are achieved. Altshuller says "IFR is a fantasy, a dream. It can not be reached, but it will allow us to build a path to the solution..." (*And Suddenly the Inventor Appeared*). The inventor should think like a magician to achieve the IFR without making any effort.

2. Application of Ideality and IFR

The concept of ideality helps the user to think of an ideal solution in a problem situation. It also guides the problem solver to choose a solution that is closer to the ideal final result (IFR). Ideality is calculated by the formula “all useful functions+benefits divided by all costs+harms”. TRIZ advises to achieve as much of ideality as possible because the best solution is the one that is closest to the IFR. The Ideal Final Goal is an imaginary ultimate goal although may not be achievable. The concepts of ideal machine, ideal product, ideal process and ideal final result etc. help the problem solver thinking solutions in the right direction.

3. Limitations of the TRIZ concept of Ideality

There are many limitations in the TRIZ concept of ideality and IFR. I am not going to say that ideality is imaginary and not achievable, because that limitation of Ideality is already known to and accepted by TRIZniks. I have a set of other limitations for ideality:

- The calculation of ideality is difficult and impossible
- The concept of Ideality is entirely subjective
- There are many controversial ethical issues
- The concept of Ideality varies from different standpoints
- The IFR changes at different stages of development
- And finally, the Ideal IFR is no IFR

4. The calculation of ideality is difficult and impossible

The ideality of a system is calculated by the formula “all useful functions/benefits divided by all costs/harms”. The degree of ideality increases with the increase of useful functions and decreases with the increase of harmful functions. Ideality becomes 100% when the system contains all positives and no negatives.

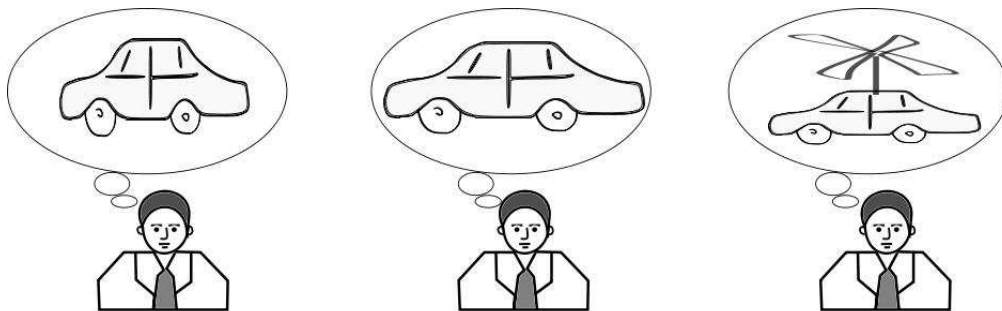
$$\text{Ideality} = \frac{\sum \text{useful functions and benefits}}{\sum \text{harmful functions} + \sum \text{costs}}$$

- But the question arises how do you measure the qualitative aspects like comfort, pleasure, convenience, satisfaction etc.? Even if you calculate by using some imaginary unit of measurement then how do you equate it with quantitative aspects like speed (in kmph), size (in sft), weight (in kgs), price (in \$s) etc.?

- Some costs/harms and benefits are not visible and hence not measurable.
- Generally our calculation of costs (or harms) and benefits (or usefulness) is guided by our knowledge and perception, i.e., what we have learnt in economics, science, engineering and other studies. But this process has serious limitations. Nobody can evaluate the costs and benefits based on all aspects or branches of studies.
- Generally harms and benefits are calculated from human point of view. What is ideal to humans may not be ideal to other sects of animals. What is ideal to lions may not be ideal to goats. There is no way to calculate the benefits and harms for all the species on the earth.
- Many things are difficult to categorize whether useful or harmful.
- Different branches of studies may differ in their concepts. While an automobile engineer may invent an ideal car for driving to nearby market, the physician/physiotherapist may advise to take a walk and avoid the car.

5. The concept of Ideality and IFR is Entirely Subjective

The concept of Ideality and IFR may vary from person to person. For example, one may say that the ideal car should take no space for parking, another may say the ideal car should consume no petrol or gas, another may say the car should be large enough to carry a big family, another may say the ideal car should be able to fly and so on. As the choices and preferences are subjective one may think that an ideal car should be tall and another may think that the ideal car to be short.



Similarly when we talk about the main useful function (MUF), one may say that carrying people is the main useful function of a car, another may say speed, comfort, fuel efficiency and controllability are more important than just carrying the people. What is thought to be important by one group of people may be thought to be important by another. For example, fuel efficiency of the car is important for the lower middle class users, but immaterial for the higher economic group.

Thus our concept of good and bad depends on our personal feeling, social environment, cultural background, available facilities, legal system and other factors. What is thought to be fashionable by one person or group or section may be thought to be unnecessary or ugly or out-of-fashion by another.

6. Controversial issues in ethics and idealism

There are many moral issues that always remain controversial.

Let's take an example of pesticides. One TRIZ specialist may say that the pesticide should kill only intended insects and should do no harm to human beings and other animals. Another TRIZ specialist may believe in non-violence. He may say that the ideal pesticide should not kill any insect but should only repel or drive them away.

There are many moral controversies in the society like "mercy killing", "paying money to beggars", and "killing animals to eat" etc. For example, if a person is suffering from intolerable pain in an irrecoverable disease for long period, what is the ideal drug for him- the drug that kills the person or the drug that helps the person to survive? Besides, who will decide what is ideal in this case, the patient who is suffering from the pain or her family members or the doctor or the law of the land or the idealist problem solver?

Similarly, while some people fight for animal rights a large section of people kill animals for their food. The question arises, what is the ideal machine - the machine that cuts a cow fast into pieces or a machine that avoids killing of a cow? Unfortunately the TRIZ idealist has no satisfactory answer.

If there are many "ideals" then the question arises what is the "real ideal"? Even if we use TRIZ only for developing machines we cannot ignore the co-systems and super-systems of the machines, which includes human beings and the society. "The Ideal solution should have no negative impact on other adjacent systems".

7. The concept of ideality varies from different standpoints

If our objective is to kill a person then the gun may look like a pen to avoid detection. If our objective is to threaten a person then the pen may look like a gun so that the target person is scared. What is ideal for a killer is not ideal for a saver and vice versa.

What is ideal for one culture or religion or custom may be considered a taboo by another culture or religion or custom. One group of people may consider luxury to be ideal and another group may not. For example, some modern fashion may consider minimum dress to be ideal whereas some conservative sects consider it as a taboo. More interestingly some religious sects consider minimum dress (or

being naked) to be ideal. So what is the IFR here – using less cloth for more coverage or more cloth for less coverage? The concept of ideality fails in cases of personal choices.

A general hedonistic view is to maximize enjoyment or happiness or pleasure but there are some religious sects that believe in avoiding enjoyment and pleasure. Which machine the TRIZ idealist should invent – the machine that gives more pleasure or the machine that gives no pleasure?

8. The IFR changes at different stages of development

The concept of ideality changes as we move from one stage to another in the process of evolution. For example, when there was no flying engine the IFR was to build an engine that can fly. Now with the improvement of aeroplanes the IFR is to carry x number of passengers or y amount of cargo. When that is achieved the IFR will be something different.

Ideality varies for each component/subsystem of a product. For example while improving the ink of a pen we find that “the best ink is no ink and the pen should write without any ink”. While developing the body of the pen we find that “the best body is no body. The pen should write without a body”. After developing all the components of a pen we finally say, “the best pen is no pen, only its functionality”.

Now the pen is gone out of our ideal world, only its writing function remains which is achieved by using computers, light pens, touch screens and various other devices used to substitute writing. But the next stage of evolution is why do we write? What is the purpose of writing? How to improve writing? We arrive at an IFR “the best writing is no writing- only its function, i.e. communication”.

Now we have to improve communication too. With our brilliance in applying TRIZ ideality we find that the “best communication is no communication”. And many of you must have thought further, “the best food is no food” and “the best life is no life” and so on. Thus a vague application of ideality can take us to unknown zones. If we are carried away by such formulas we may end up with confusions leading to mistakes.

9. The Ideal IFR is no IFR

In previous paragraphs we saw that there are situations where we arrive at multiple IFRs. When we have confusion like whether “this” is the IFR or “that” is the IFR we should take an opportunity to apply the formula of IFR on the IFRs.

When we apply Ideality on IFR we find “The Ideal IFR is no IFR- only its functions”. And interestingly that is true, although may sound ugly and disheartening to many TRIZniks.

10. Conclusion

The limitations of TRIZ concept of Ideality hail from its root philosophy of Idealism. As the “ideas” are there in human minds/brains they are subjective in nature. The concept of “Ideal” and IFR may vary from person to person as they are biased by individual judgments. Similarly the IFR may vary from system to system and at different phases of the development of a system.

However, the same limitations may be considered as the strengths of Idealism. As the IFRs can be different for different people and groups, the solution developer should not always take his own IFR for granted. She has to consider the benefits of all adjacent systems, sub-systems and super systems while developing a solution. It is always more ideal to solve problems at higher levels.

Abbreviations

TRIZ- “Teoriya Resheniya Izobretatelskikh Zadach” in Russian or Theory of Inventive Problem Solving

IFR- Ideal Final Result

MUF- Main Useful Function

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