

Freeform Innovation and Ideative Energy.

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Abstract:

Freeform Innovation (FI) is a process-based ideation technique that produces a sequence of outcomes. It is intuitive, easy to learn and provides a convenient entry to most problem spaces. FI seeks the opportunistic and rapid conversion of available “ideative energy” found within a problem-space or its environment. Necessary guidance in seeking new forms or functions is provided through triggers also found as part of the available ideative energy.

To demonstrate the practical use of FI as a gateway to innovation, we start with an item appearing in an ALDI catalogue. This evolves into a concept for a screwdriver / torch / camera / smart-phone combination, an item that is not known to exist at present. A simple notation has been developed to keep track of progress at the various stages of ideation.

1 The need for new process-based tools for innovation:

1.1 Finding a basis on which to proceed:

A recent paper by Arshad [1] presents the case for more process-based and practical approaches in innovation literature. A factor that makes practical innovation difficult is not knowing exactly how to proceed. Disciplines of scientific investigation or engineering design have well defined procedures which we learn over time and which provide clarity and confidence at the early stages.

In innovative/ inventive problems, we are faced with the fact that there are no exact rules to start with. Our task then becomes to first devise an approach and second to use this approach to solve the problem – both of which are unfamiliar activities.

1.2 Shortage of process know-how:

TRIZ is an exception as it deals with the **process** of innovation. The vast majority of innovation literature, management best-sellers, and the internet, provide a narrative of a few noteworthy **outcomes** that are variously labelled, after the fact, not with scientific rigour but mostly as a matter of opinion of the expert.

As we lack the technology to dissect, explain, and connect the details of the internal processes which led to the outcome, we mostly learn new terminology like disruptive innovation, but not the precise knowledge to replicate this phenomena in our own setting.

1.3 Marketing orientation:

Consequently, innovation has made the transition from what should have been a strong technology focus towards a management and business focus, and then on to its mainly marketing orientation at present.

2 Freeform Innovation (FI):

2.1 Introduction to FI:

In light of the above, we may see the need for a quick and workable gateway to practical innovation. In FI, our focus is on ease of learning and the rapid generation of innovation output. Rather than concentrate first on learning structured methodologies and then on their correct implementation, it suggests that we focus on the problem itself.

It is based on a proposed concept of “ideative energy” which is gradually acquired as we study in detail the problem and its environment. Mental triggers, found within the problem, are used firstly to launch and then to steer the ideation process. The process is essentially opportunistic. FI strategy develops with each iteration.

FI can be the first approach one should try before using other techniques. It is a direct and applied form of innovation activity.

2.2 The FI process:

There are two basic components to this approach: active observation and active thinking. The term “active” is critical as it signifies intensity and a practical orientation to the two components, which are repeated sequentially as well as simultaneously through each iteration.

- A. Active observation enables us to acquire ideative energy from studying the problem-space. Ideative energy is built up by clarifying the form or function of the problem, by intensifying our focus and by reduction of distractions. Active observation provides the rationale, the trigger and its direction. It initiates the process.
- B. Active thinking transforms the ideative energy into a gain in either function or form. The main transformation follows a scheme explained below. It must also provide the trigger for the next iteration, so as to sustain the process.

The process is repeated using available triggers until either the desired level of ideation is reached or the ideative energy is exhausted (i.e. entropy sets in).

2.2.1 Active Observation:

Active observation is the investigative component of Freeform Innovation (FI) which aims to extract ideative energy from a survey of the problem-space. This is energy which drives the ideation forward. Contaminated information or an excess / over-supply can be a hindrance and is treated as a negative form of ideation energy, which must be reduced. We proceed as follows:

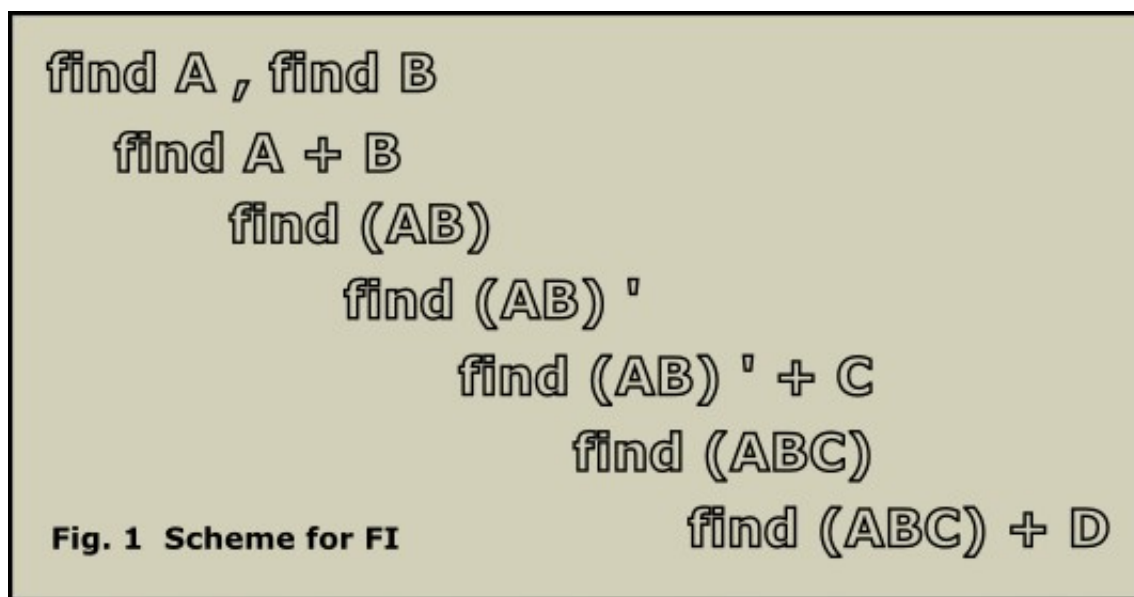
- A. Observe all available information.
- B. Re-focus on a subset for sharper focus and clarity.
- C. Tag an item of interest, or an aspect of an item of interest.
- D. Find suitable trigger and its related direction to initiate the FI process.

2.2.2 Active Thinking:

Active thinking is the creative component of Freeform Innovation (FI) which transforms ideative energy into a gain in either function or form. The main transformation takes place at this stage. It also must provide the mental trigger for the next iteration. In this paper, we observe the following:

- A. Possibility of transformation of ideative energy into new forms.
- B. Possibility of transformation of ideative energy into additional functionality.
- C. Extraction of new triggers and directions for the next iteration of FI.

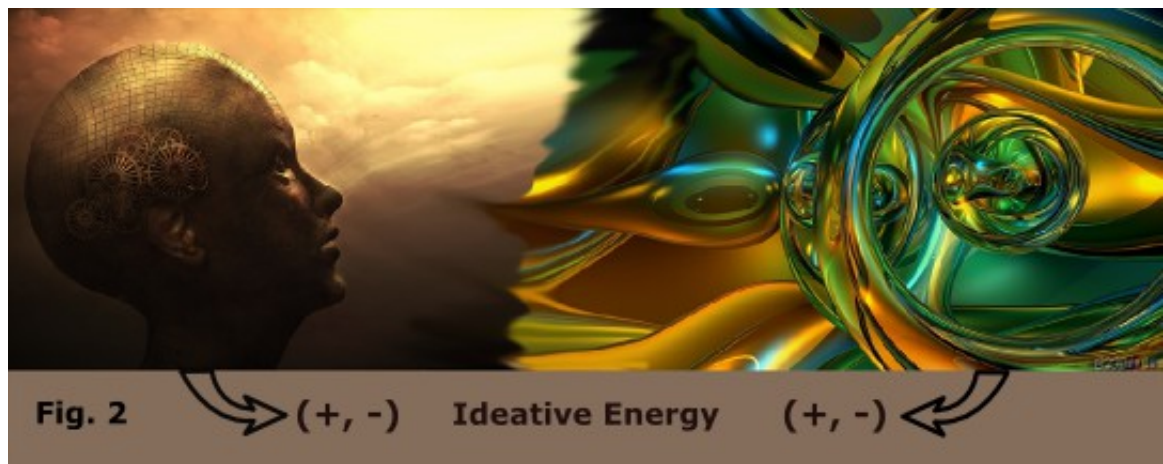
A scheme for FI in the example shown is listed below and explained in Sec. 4 & 5.



3 The concept of Ideative Energy:

The concept of Ideative Energy (IE) recognises two very distinct aspects that are critical to innovation. The first is the mental inclination, strength and knowledge necessary to achieve an innovative outcome on the **user side**. The second is the opportunity for progress that is presented from the **problem-space side**. Both can and will vary considerably in every instance.

Ideative energy is a powerful and needed concept which can be used to explain the likely enablers and disablers of an innovation activity on both the user and the problem side. It provides greater vitality to the innovation process by considering new dimensions beyond the tools, structure and training.



The concept will be further developed in a forthcoming paper. The reader may gain some idea from the example that follows.

4 An example of Freeform Innovation:



At a first glance this item in an ALDI catalogue provides no apparent clue for innovation. There is little ideative energy in the information presented. Things appear to be in as normal a state as can be expected. There is no clear trigger for innovation.

The proximity of the end of the torch to the screwdriver bits raises the possibility of the body of the torch acting as the handle for these bits.

Better functionality can be achieved if the light from the torch were directed in the working direction of the bits. This extra constraint requires us to reconsider the problem from its basics. The proximity has provided the trigger to initiate the FI process. We do not know where it will take us just yet.

hurry, limited



Active Observation



Active thinking

A ○

B ○

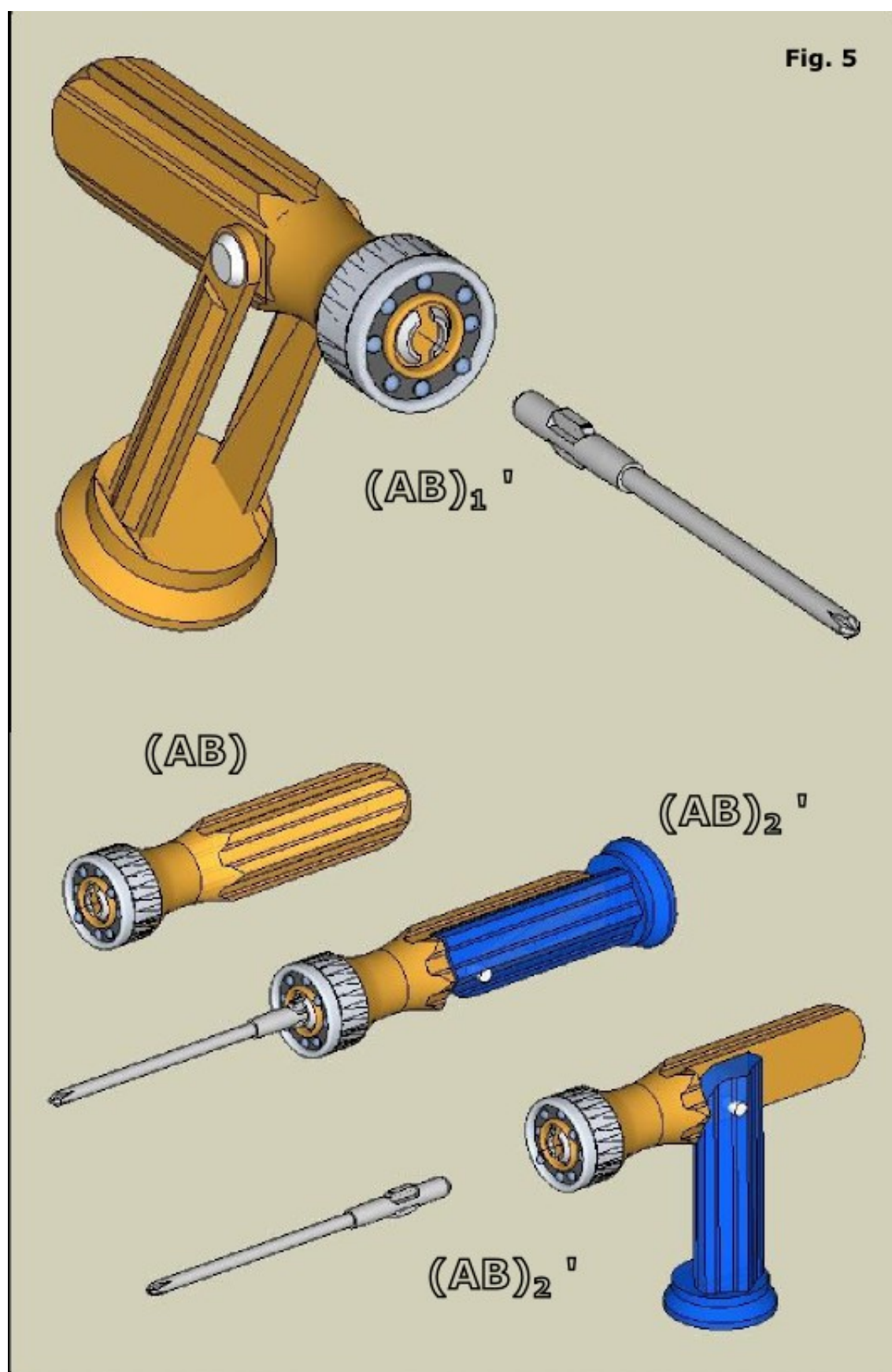
A+B ○

(AB) ○

Fig. 4



Fig. 5



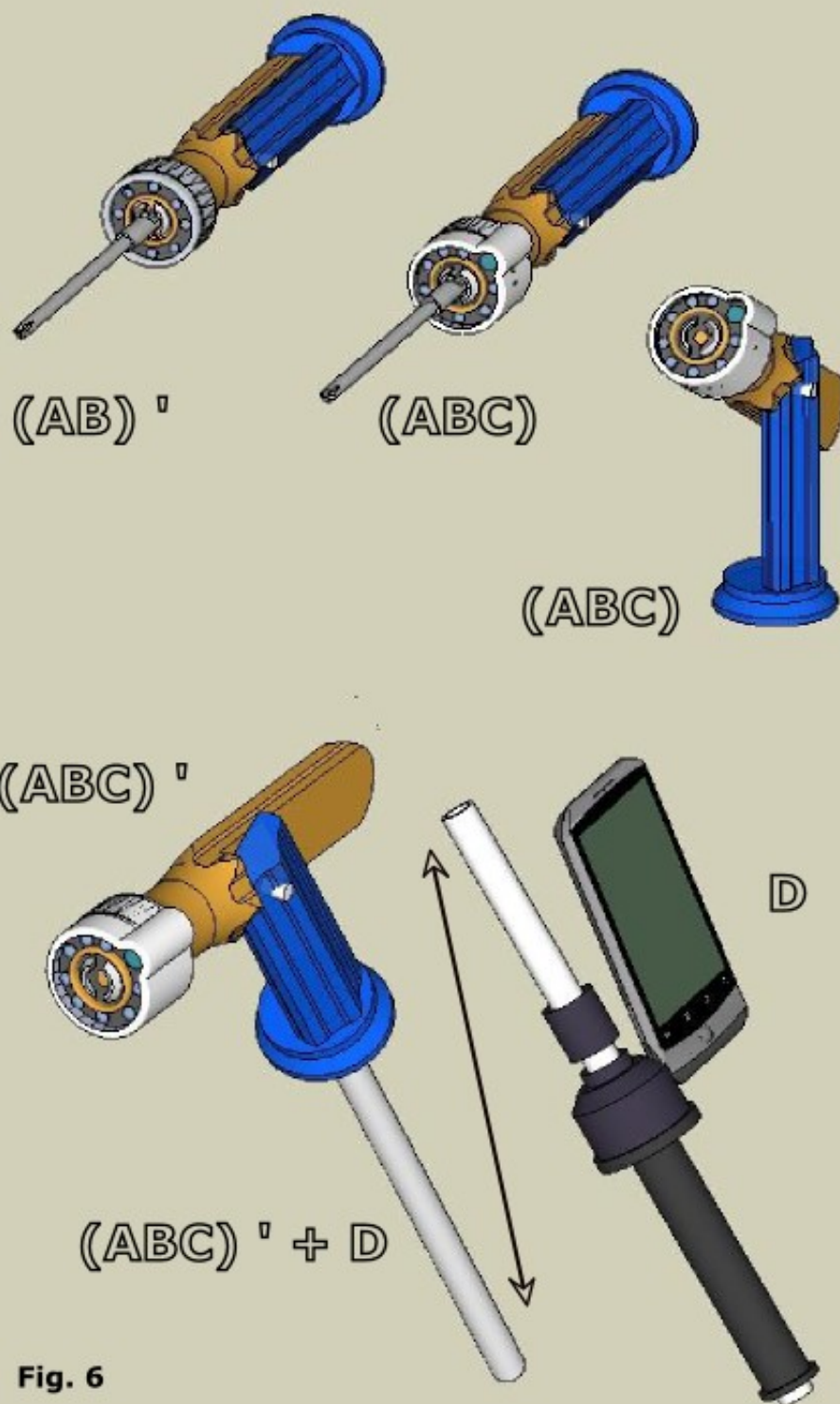
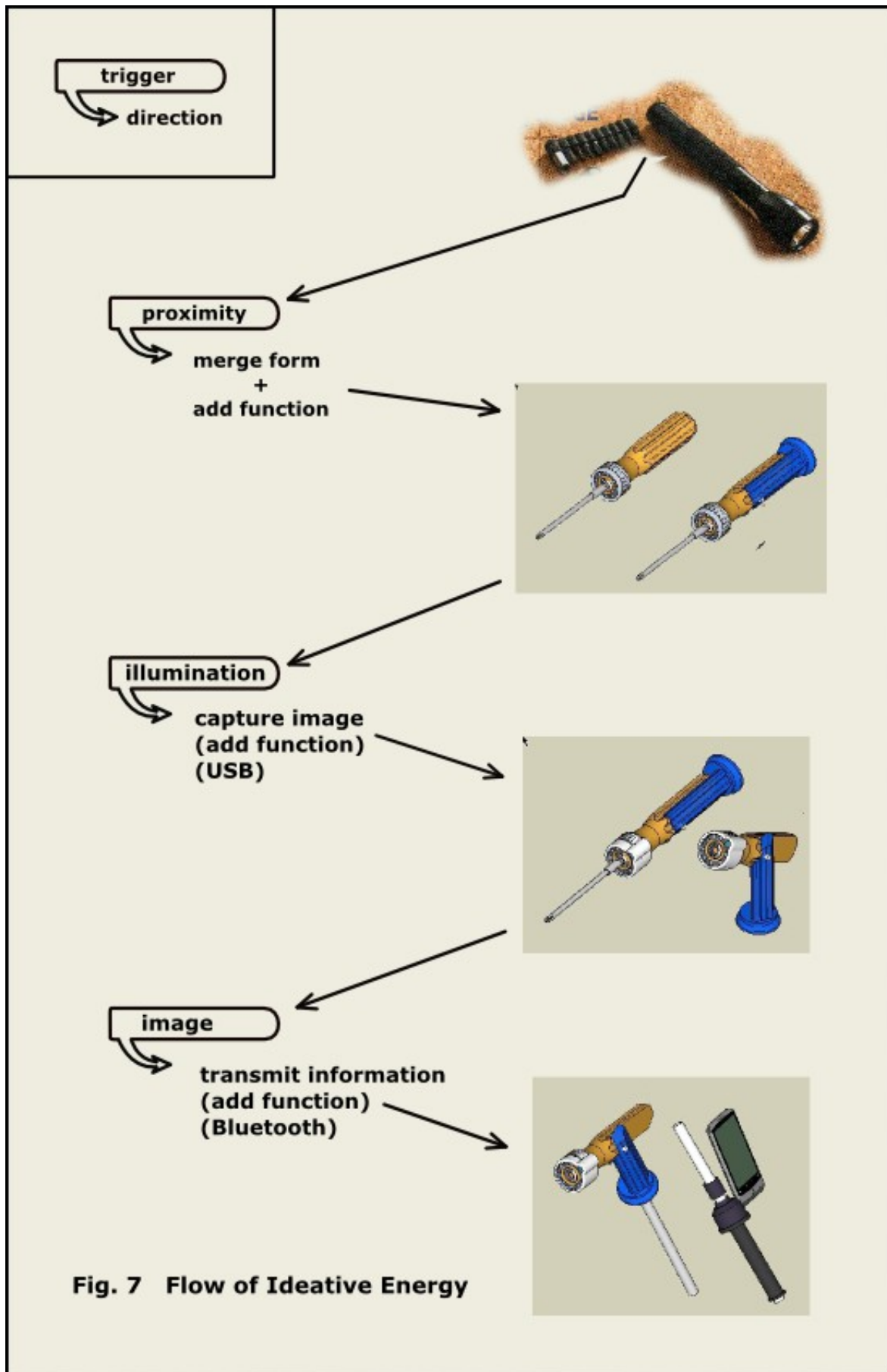


Fig. 6



5 FI notation – form & function:

FI notation has been developed to track the progress of ideation which occurs in a free-form and opportunistic manner. A component of this notation, which deals with form and function interactions, is briefly explained:

5.1 Find A, find B

To begin, we focus on two functions, A and B, as forming the basis for this activity. We also could have focused on a single function A, which we could try to improve. Alternately, we could focus on the further evolution of a single form (A). In any event, some initiating trigger must also be identified.

5.2 A + B

The plus sign in “A+B” is the additive operator as used in arithmetic. It signifies the **addition of two functions**. The intermediate solution is to use the two items together as a unit, which not acceptable in this case. We therefore transition onwards.

5.3 (AB)

The notation “(AB)” signifies the **merging of two functions into a single new form**. We can now see the contours of a solution emerge. One physical shape can satisfactorily perform both functions A and B at the same level as one might expect from the originals.

5.4 (AB)' (AB)''

The apostrophe or prime symbol indicates that the **merged functionalities have been enhanced**. Two or more such signs would indicate further enhancement. The increase in functionality is as follows:

1. An integral stand allows the torch to stay upright in a desired orientation. This is useful for working in confined spaces, e.g. hands-off under a car.
2. Some or all of the LEDs can be switched on/off as needed.

5.5 (AB)₁' (AB)₂'

The subscript 1, 2, etc., implies different designs at the same level of functionality. The type of stand differs in the two design. Once a design is selected for further development its subscript is not used.

5.6 (AB)' + C = (ABC)

Function C is that of a digital camera suggested by the trigger to capture images. It's intermediate form (AB)' + C is impractical unless merged into the existing form as (ABC). The images are held internally on a removable USB stick which is accommodated in the (ABC) form.

1. A digital camera for image capture, replacing one or two LEDs.
2. As a search device for out of reach places when used with a telescoping pole.
3. As a device to record assembly / disassembly sequences at pre-set intervals.

5.7 (ABC)' + D

To transfer information in real time, we replace the USB with an internal Bluetooth chip. The device, is now termed (ABC) '. The prime symbol represents the short range wireless function. In this form, the device can perform all of the functions as in form (ABC), and connect with a smart-phone or iPad type device for real-time images.

6 Alternate route for development:

Fig. 8 shows a possibly alternate path of development. These are commercially available Swiss Army knife style products, one developed by Gerber. The reader may wish to compare both styles of product evolution as an exercise for further ideation.



7 Conclusion:

The paper presents a workable approach: Freeform innovation (FI). The concept of ideative energy is introduced as the precursor to innovation. In FI, there is no structured methodology to follow, only a few guides to active thinking. It is shown that reasonable outcomes can be expected as a result. A compact notation to keep track of the innovation stages is also introduced.

References:

1. Arshad, S. Saleem, **"Innovation: Thinking Differently to Create Value."**, TRIZ HomePage in Japan, posted 26 January 2014

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