FROM VALUE TO TECHNOLOGICAL AND CULTURAL INNOVATION:
A holistic view of innovation.

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This white paper aims at introducing a holistic view of innovation and its interconnections with other phenomena, such as value and processes needed to create new value. Therefore, it is important to understand the interconnections between the value of products (goods or services) [1] and the innovation based on value [2] applied to new and existing products, and how that affects organizations' products strategies.

The act of innovating coincides with that of value change. Value changes are creations or modifications (additions or subtractions) of the value of a thing or solution (potentially a product), achieved by actions or events. There are four types of value [3] in products (goods or services): (i) use value – or value as utility; (ii) economic value – or value as exchange; (iii) cultural value – or value as meaning and sign (in a collective context); and, (iv) perception value – or value as experience (at the individual level).

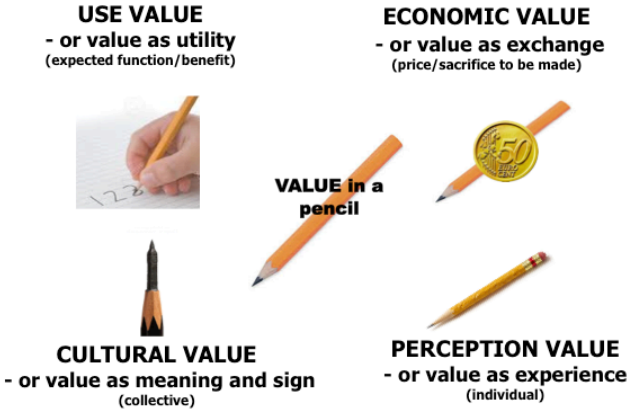
To illustrate these four types of value, we may use the example of a pencil, as in the figure below.

Any simple pencil has, as its main function, the purpose of "leaving a marc on a surface" (that is what we call writing). This function is of use or utility to any user, therefore we might say that a pencil has "use value", or value as utility.

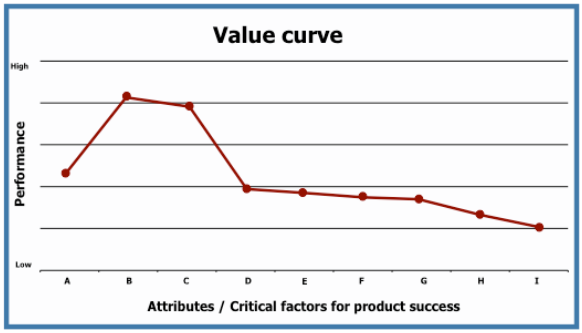
To take benefit from that function, "leaving a marc on a surface", users are prepared to give some sacrifice away in order to acquire any pencil, normally expressing that sacrifice in monetary terms, therefore, that pencil has "economic value" or value as exchange.

Some brand names, limited editions or artistic versions might add extra value to some pencils, at an emotional dimension. This esteem value exists in the collective cultural realm, being understood as "cultural value", or value as meaning and sign, intangible by nature.

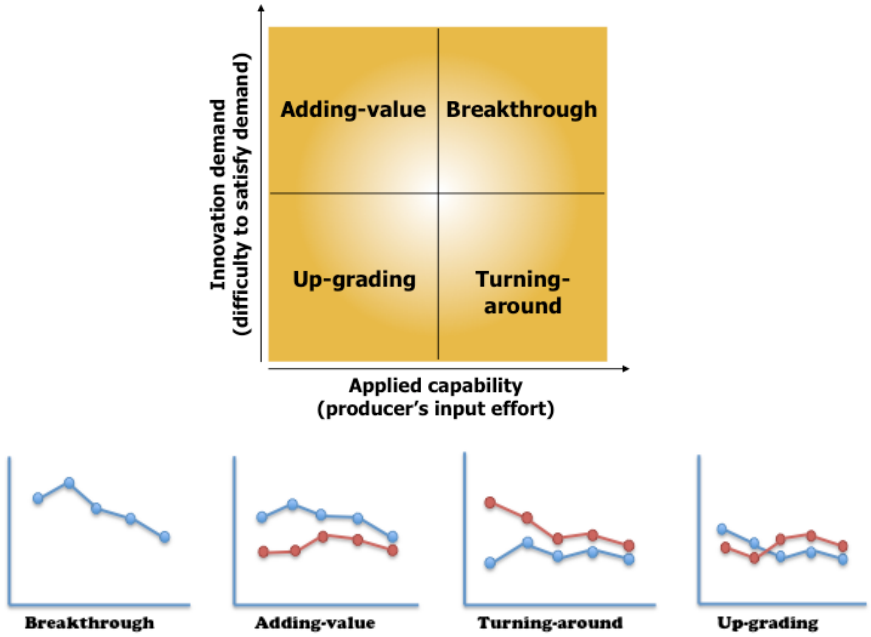
An old or special pencil or some special add-on, given to us by someone close or acquired at a special moment, may have a tremendous emotional significance to one as an individual. This esteem value only exists at the individual level, and it is understood as "perception value", or value as experience, also intangible by nature. Due to the difficulty of making one's "perception value" significant to others, due to its individual nature, the potential economic value of a thing, related to the perception value that it may have to someone, may be inexistent to others, except at the eyes of the beholder.



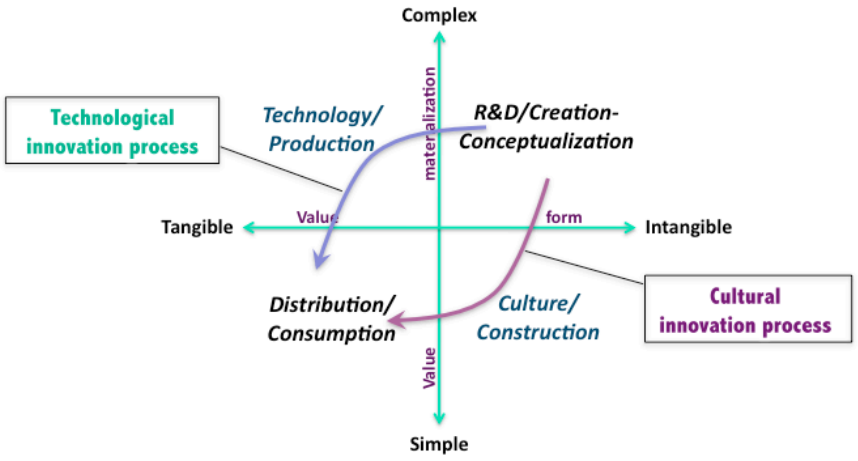
The concept of "value based innovation" (VBI) [2] implies that any act of innovation creates or changes the value curve of a thing or solution, normally presented as a product (good or service). The value curve of a product is defined by the performance of all its attributes. That performance reflects the effort applied by the producer of the product to innovate, and answers the level of demand for innovation coming from the market, as in the figure below.



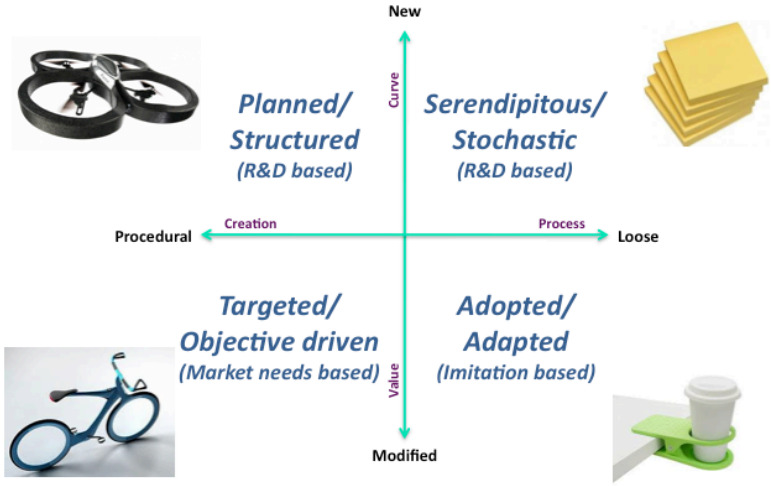
This leads us to four types of innovation based on the resulting value [2], as in the figure below: (i) breakthrough innovation – creation of a new value curve, corresponding to a new product, defined by a stand alone value curve, not comparing to any existing product; (ii) adding value innovation – addition of some type of value to an existing product, placing its value curve above competing products' value curves; (iii) turning around innovation – reducing the performance of the attributes of a product, but turning it into a much cheaper solution comparing to other competing ones, placing the value curve of the product below the ones of competitors; and, (iv) up-grading innovation – changing the performance of some attributes of the product, playing with the value curve of it in order to differentiate to the competitors' ones.



All value phenomena (creation, generation, addition, improvement, consumption, destruction, and accumulation) happen in a context of human activities defined by the resulting value form (tangible or intangible) and the process applied to materialize the same value (simple or complex) [3]. The resulting four levels of human activities are, as in the figure below: (i) ideation level – conceptualization and creation of ideas; (ii) technological level – transformation of any existing resource (material or non material) into a new thing or solution, by applying technology (human transformation); (iii) cultural level – change of human behaviors, induced by or using a thing or solution, through the creation of some meaning to the usage; and, (iv) distribution and consumption level – making a thing or solution available to consumers, for purchase and consumption or usage. The journey from the ideation level to the distribution level can take one at a time or two simultaneously paths: through the technological level, through the cultural level, or through both [4]. The first corresponds to a process of technological innovation, and the second to a process of cultural innovation. The type of creativity methods and ideation tools used for each process differ from one another.



The technological innovation process [5] is defined by the resulting value curve coming out of the innovation process (new vs. modified), and the applied creation process (procedural vs. loose), resulting into four types of technological innovation processes, as in the figure below:



(i) planned/structured process – this process is analytical, systematic, science based (fundamental and applied R&D), and develops new knowledge about natural systems by applying scientific laws (know why), based upon scientific knowledge and models, deductive by nature, and supported by collaboration within and between research units or entities, producing strong codified knowledge contents, highly abstract, but universal.
The first drones, products make by 3D printing technology, satellite communications, first computer and programming languages are clear examples of this type of technological innovation.
The preferred innovation tools for the development of this type of innovations are Value Engineering (VE), including Function Analysis (FA) and Value Analysis (VA), functional performance specification (FPS) and TRIZ, mainly using the following sub-tools: “ideality” (best solution for benefits / cost + harm); “substance and field” (subject – action – object); function analysis; “technical contradictions and 40 innovative principles”; “physical contradictions principals” (time, space, condition, system); 76 standard solutions and effects database”; and, “time and space” (9 boxes).

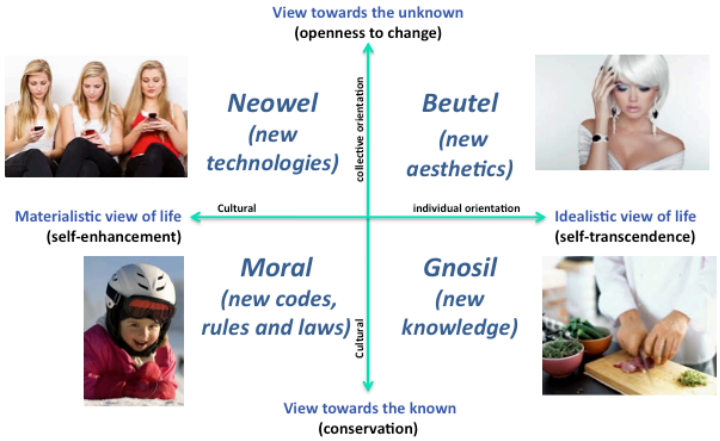
(ii) targeted/objective driven process – answers specific needs of users, consumers or of the organization. This kind of innovation mostly fits in the non R&D based innovation class, focusing mainly on design innovation. The process of this type of innovation is symbolic (art-based), creating meaning, desire, aesthetic qualities, affect, symbols and images (know who), based on creative processes and supported by high interaction between teams and projects, requiring creativity, importance of interpretation, cultural knowledge, creating sign value and implying strong context specificity.
Design furniture, restricted personal and collective equipments, jewelry and other artistic artifacts, conceived to satisfy aesthetic and functional needs of specific market niches, are examples of this type of technological innovation.
The preferred innovation tools for the development of this innovations are Design Thinking, Value Engineering (VE), including Function Analysis (FA) and Value Analysis (VA), Value Proposition Design (VPD), Open and Collaborative Innovation (OI), and TRIZ, mainly using the following sub-tools: “ideality” (best solution for benefits / cost + harm); “time and space” (9 boxes); and, 8 trends of technical evolution”.

(iii) adapted/ adopted process – relates to strategies of adoption and adaptation of innovations initiated and developed by others, based on the “imitation” of products (goods and services) attributes and of organizational processes. This kind of innovation mostly fits in the non R&D based innovation class, focusing mainly on equipment and input-embodied innovation. This type of innovation process is synthetic, engineering-based, applying or combining existing knowledge in new ways (know how), based upon problem solving capabilities and custom production, therefore being inductive, and supported by interactive learning with customers and suppliers, producing partially codified knowledge and strong tacit components which are very context-specific.

Same examples of this type of technological innovation are newly modified household appliances, sports equipment, utilitarian furniture, all improved to facilitate use or follow use trends.
The preferred innovation tools for the development of this innovations are TRIZ, mainly using the following sub-tools: “ideality” (best solution for benefits / cost + harm); “8 trends of technical evolution”; “time and space” (9 boxes); 76 standard solutions and effects database”; and, “trimming”, plus Value Engineering (VE), including Function Analysis (FA) and Value Analysis (VA), Value Proposition Design (VPD), and Open and Collaborative Innovation (OI).

(iv) serendipitous/stochastic process – defined by stochastic results of focused or trial and error experiments, it is mostly based upon fundamental and applied R&D. This also fits in the R&D investment based innovation profile. The process of this type of innovation, like the planned/structured type, is analytical, science based, and developing new knowledge about natural systems by applying scientific laws, supported by collaboration within and between research units or entities, producing a strong codified knowledge content, highly abstract, but universal.
Same examples of this type of innovation are Velcro, penicillin, the microwave oven, and the post-it.
The innovation tools which may lead to the development of this innovations are Value Engineering (VE), including Function Analysis (FA) and Value Analysis (VA), functional performance specification (FPS) and TRIZ, mainly using the following sub-tools: “ideality” (best solution for benefits / cost + harm); “substance and field” (subject – action – object); function analysis; “technical contradictions and 40 innovative principles”; “physical contradictions principals” (time, space, condition, system); 76 standard solutions and effects database”; and, “time and space” (9 boxes).

The cultural innovation process [5] is characterized by the context in which behavior changes happen. This context is defined by the cultural individual orientation (materialistic view of life / self-enhancement vs. idealistic view of life / self transcendence), and by the cultural collective orientation (view towards the unknown / openness to change vs. view towards the known / conservation), resulting into four types of cultural innovation processes, as in the figure below:



(i) neowel – generalized human behavior changes in large portions of the society induced by or using a new thing or solution based on new technology. New technological things and solutions induce new “created” behaviors/habits in relevant portions of the population, developing new meanings and signs. The impact of this type of innovation has a collective dimension as it creates standard behaviors at people’s group level, reflecting a high capability for collective creation and adoption.
The utilization of mobile phones as a vehicle for the exchange of written messages (texting), the audio-visual entertainment, videoconferences and the still to come aero-spatial commercial travelling are some examples of human behavior changes induced by the introduction of new technologies in the market place.

(ii) moral – generalized human behavior changes in large portions of the society induced by or using a thing or solution imposed by codes, rules and laws, or advocated by some preeminent opinion maker. New morals force new “adapted” behaviors in the large majority of a population. This type of innovation has a strong impact at the societal sphere, forcing behaviors at community level, but reflected in a moderate and slow capability for full collective adoption.

The utilization of helmet in many sports activities, the introduction of safety belts in many travelling vehicles, or the reduction of drinking alcoholic beverages by drivers are some examples of human behavior changes induced by new societal regulations.

(iii) beutel – restricted human behavior changes in a fringe or niche of the society induced by or using a thing or solution with some strong artistic or fashionable characteristics or attributes. New aesthetic trends reflected on products (goods and services) induce new "created" behaviors/habits in some small pockets of the population, developing new meanings and signs. This type of innovation mainly impacts the individual level, reflecting a very high capability for individual creation and adoption.

Clothing, shoes, wallets and other personal articles like perfumes and jewelry fashion trends are clear examples of human behavior changes induced by new creation and design aesthetics applied to products.

(iv) gnosil – restricted human behavior changes in a fringe or niche of the society induced by or using a thing or solution caused by the acquisition of knowledge and information. New knowledge, resulting in new attitudes, forces new "adapted" behaviors in some small pockets of the population. The new knowledge refers to scientific findings that have impact on human life. The impact of this type of innovation is manifested at the personal (individual) level, reflected in a moderate and slow capability for vast individual adoption. The cultural changes in this archetype appear to be mostly induced by opinion makers and others in closed individual cycles.

The current trend for male cooking, followed by learning courses, the use of physical monitorization equipment by people doing jogging or other physical activities, support to humanitarian activities, are behavior changes supported by the diffusion of social, scientific and technical knowledge through society.

The preferred innovation tools used to develop products which may create cultural value, in any of the above types of cultural innovation process, are Neuro-Linguistic Programming (PNL), through the application of meta-programs to answers needs of the targeted consumers, Emotional Intelligence (EI), connecting the product to the emotional profile of targeted consumers, Mind-Mapping, understanding the connections of cultural values of targeted consumers to the product, Heuristic Ideation, to decompose the cultural values of targeted consumers, Scramper, to redefine the cultural values of the product, Lateral Thinking, looking for ideas "out of the box", Delphi and Focus Group, to evaluate and validate new ideas, and TRIZ, using the following sub-tools: "time and scale" (9 boxes), 6 properties (substance, space, time, field/energy, structure, and information/regulation), "size – time – cost" (extreme solutions), and "trends of (technical) evolution".

To deliver the highest possible value to the main interested parties involved (consumers/users/clients and organizations/investors/workers), it is fundamental that these concepts will be applied during the development of new products or the improvement of existing ones. For that purpose, it is essential that organizations create multi-disciplinary teams inside themselves that can apply the concepts previously illustrated and the methods and tools made available (ex.: DynamicMAP) to implement systematic and targeted management actions that can lead to the desired market share and business success.

Note: to know more about the tools and the methodologies for their application, contact the author to manuel@telesfernandes.net . Visit also www.telesfernandes.net for more information and downloads.

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