Proposal of an Easy Value Evaluation Method by Means of TRIZ

- Taking the Proposal for a New Life Style of the Elderly People as an Example - (Part 1)

The 10th Japan TRIZ Symposium
Intellectual Property Creation Research Subcommittee

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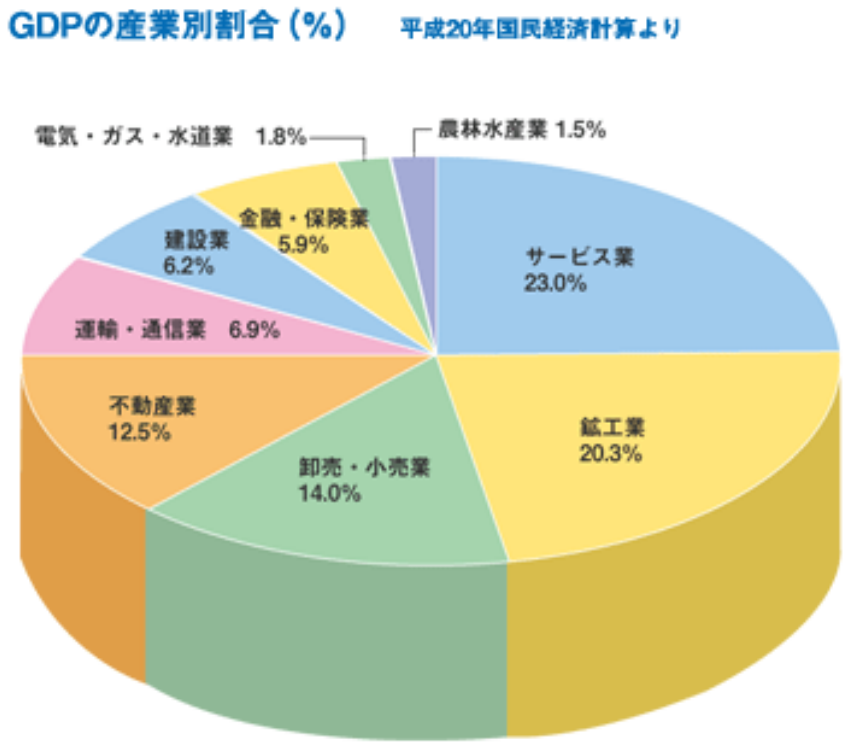
Examination of Topics of Research

It is more abundant that innovation understands as “Technical improvement”. However, when the value of GDP (gross domestic product) that matches mining and manufacturing to the construction industry thinks about the fact of 26.5% of the overall industry (The system of national accounts in 2008: Ministry of Public Management, Home Affairs, Posts and Telecommunications Statistics Bureau), this has the feeling of the anachronism.

To begin with, the past is an economic terminology in an economic activity in the word innovation defined to unite by a different method as for the production method, the resource, and manpower, etc. by Joseph Schumpeter, an economist, in 1911.



According to Drucker, the lead time of Technical innovation by invention discovery is long. Reliability and certainty are low regret most, he said.

Drucker said “To make the innovation succeed, discovery at chance that exists in industry, external factor of market, and internal factor, strategy that effectively uses chance and system of management of organization that promotes it are required.”

The technology that develops with TRIZ is used as a new item and service, and the role as the innovation can be played.

Innovation by market-oriented and intention at chance

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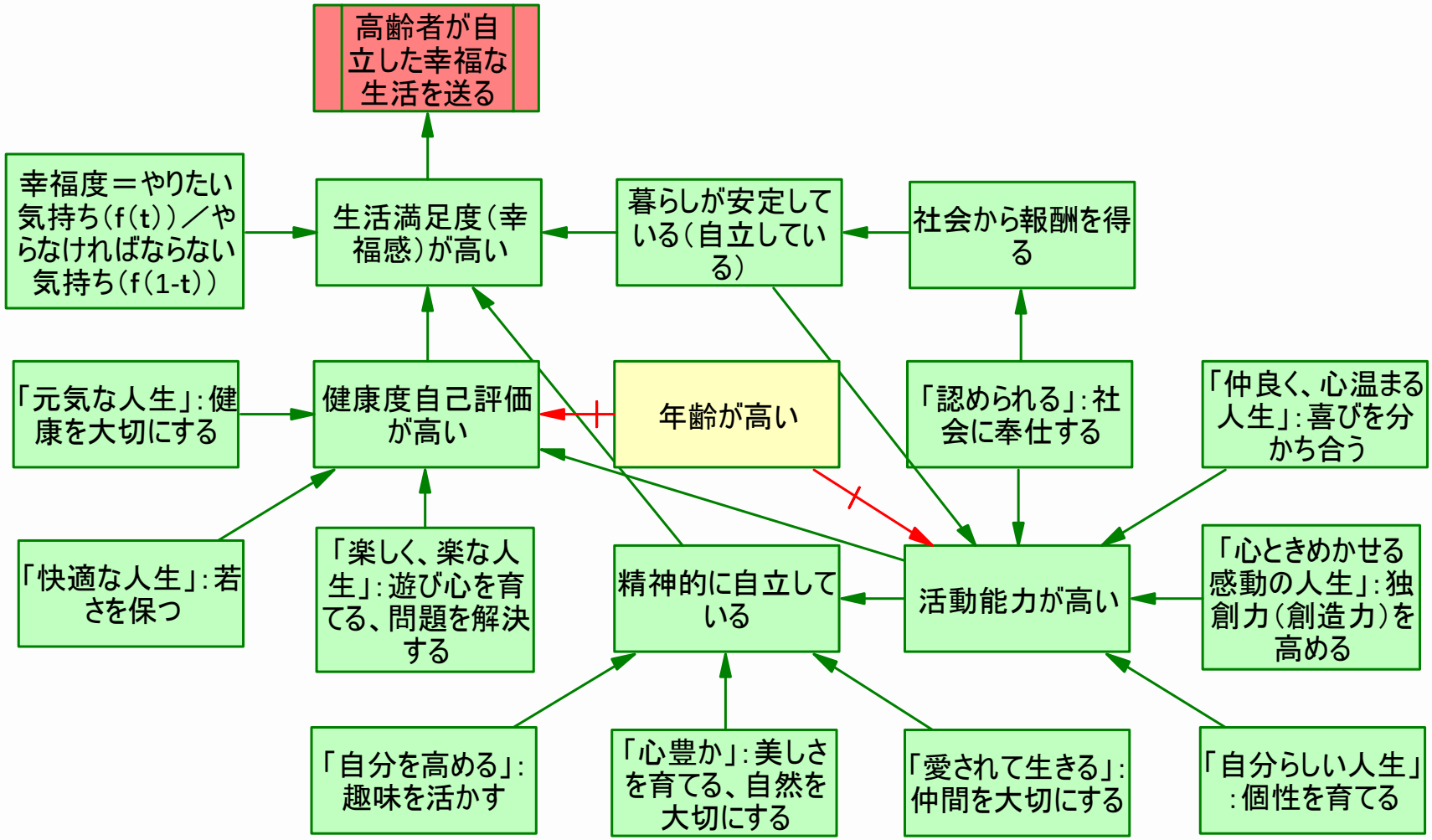
Senior Citizen's Life Satisfaction (Sense of Well-being) : Analysis of Present State



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The Senior Citizen's Cross SWOT Analysis

Internal environment / External environment	Strength	Weakness
	・A lot of knowledge and experiences of the forte are possessed ・A lot of knowledge and experiences of the life are possessed ・Savings are possessed	・Physical strength has weakened ・Exchange with others decreases ・Only few friends of same age group
Opportunity	**The strength is made the best use of, and the chance is made the best use of**	**The weakness is overcome, and the chance is made the best use of**
・Recognition to aging society has infiltrated ・Manpower shortage of able engineer and skilled person ・The legend of the technology and the skill has discontinued	・My problem is solved for myself ・It proposes the project that adds wisdom to abundant knowledge and the experiences ・It contributes to the young people' creativity educations	・Information on the life of the site (animation, etc.) is obtained from young persons ・It participates in the innovation creation activity by an energetic senior citizen ・A new business is done in cooperation with opposite sex
Threat	**The strength is made the best use of, and the threat is avoided**	**The weakness is overcome, and the threat is avoided**
・Living alone has increased ・Time where it can live is a little ・The value of knowledge that has it decreases in the age	・It grapples with the problem that can be thought even by oneself ・The idea with high realizability is created ・The method of changing knowledge into wisdom is acquired	・The young person is used as my one's double ・The environment that is immediately appreciable of the idea is obtained ・It willingly works on new

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Problem Definition that Uses the Ideal Solution

1. What is the final purpose of the system?
   →It proposes the lifestyle that achieves the living of senior citizen's ideal.
   →A society that can live as the senior citizen laughs energetically is achieved.
2. What is the one that comes out from an ultimate ideal solution?
   →Happy life independent of the senior citizen is spent. The senior citizen feels the sense of well-being and satisfaction.
3. What is it that disturbs the achievement of this ultimate ideal solution?
   →It concentrates only on "- is offered to the senior citizen". Service to the senior citizen is supposed to shut the road to the contribution to society of the senior citizen.
   →It is social system that uses an energetic senior citizen/that not is few.
4. Why does it disturb achievement?
   →It is supposed to plunder of senior citizen's independence desire and independent activity time.
   →It doesn't become energetic if there is no place that can be active of the senior citizen.
5. How is the one to disturb achievement eliminated?
   →An energetic senior citizen positively contributes to the society.
   →It thinks about the measure that makes the senior citizen energetic.
   (Example:An energetic senior citizen nurses and supports the senior citizens.)
6. What resource can you use to create such a surrounding situation?
   →Event(Events, stamp rally, festival, and flea market etc. of every season)
   Talent(Retiree and trainee at social welfare school and vicinity resident's volunteers, etc.)
   →Energies at labor production age to attempt new business creation
7. Can someone else already solve this problem?
   →A part of advanced nations(For instance, the Netherlands), Leaf business of Kamikatsu-cho, 70-years old active service assistance center in Fukuoka Prefecture, etc.

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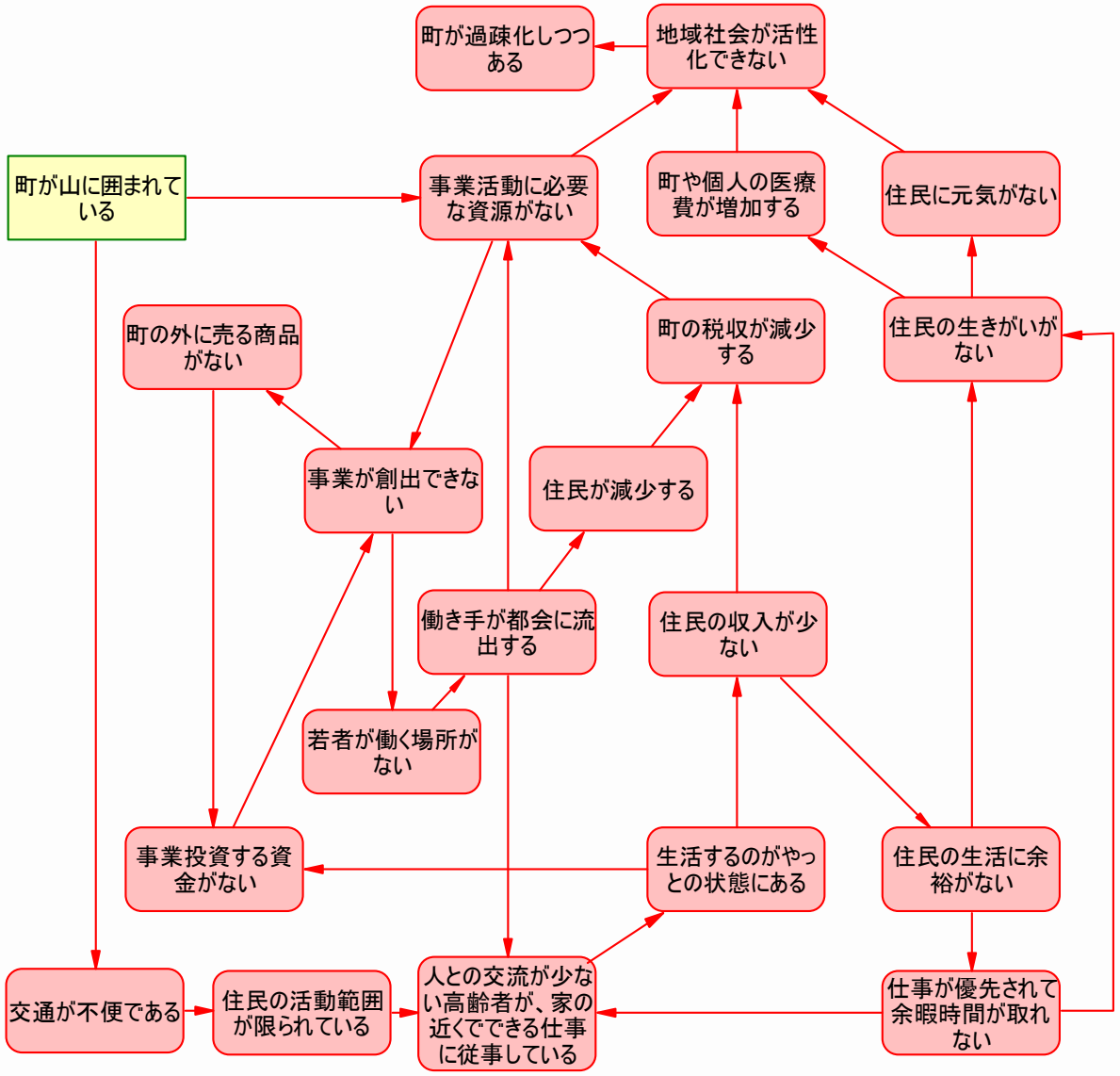
Situation of Early Kamikatsu-cho

http://www.irodori.co.jp/

http://www.irodori.co.jp/



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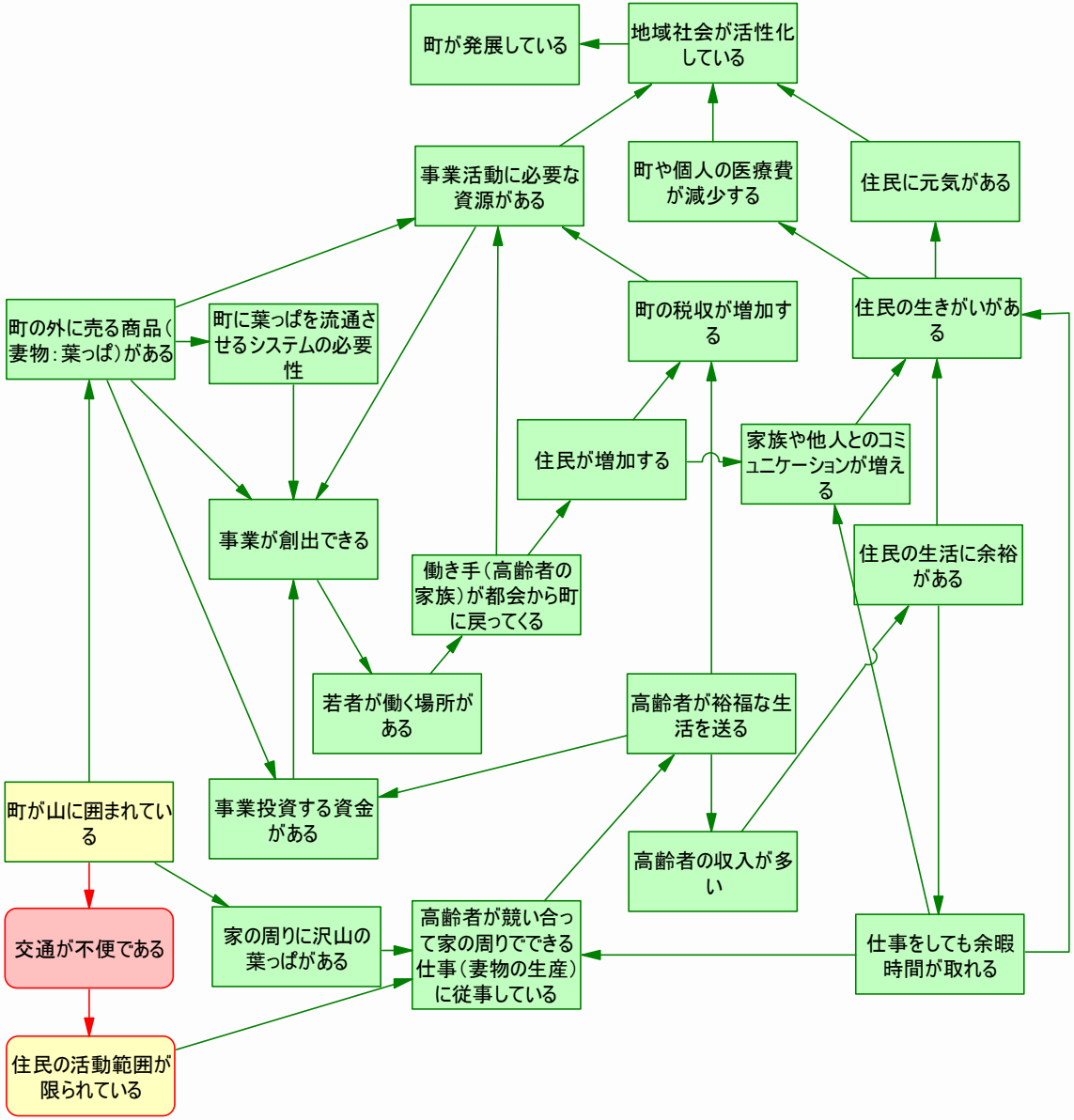
Situation of New Kamikatsu-cho

http://www.irodori.co.jp/

http://www.docomo.biz/htmlmail/20120914/

http://www.docomo.biz/htmlmail/20120914/



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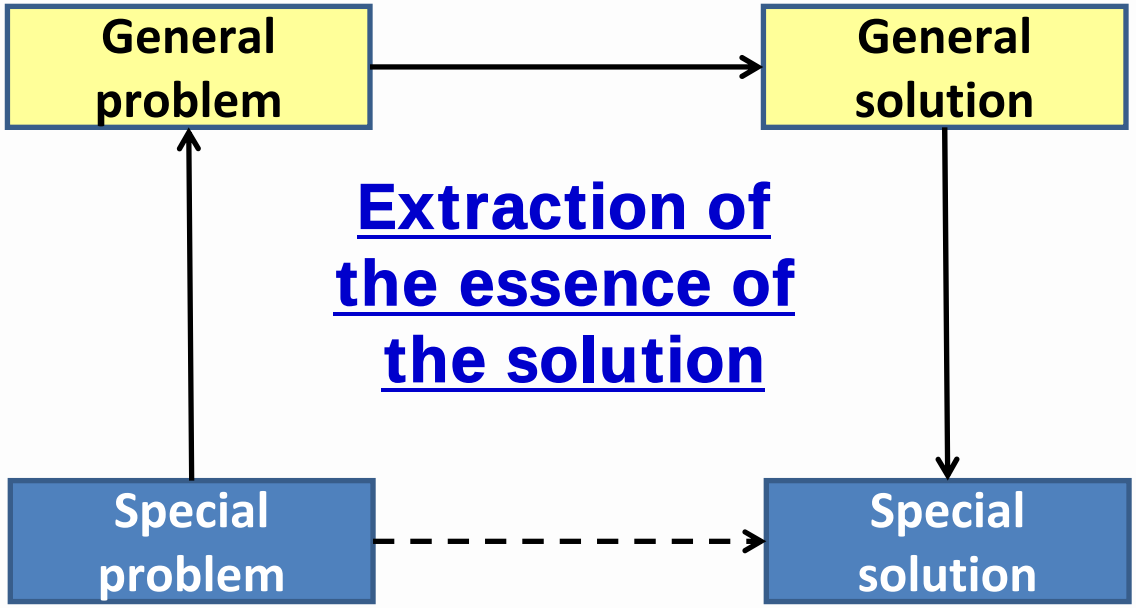
Essence of Solution of Kamikatsu-cho

"I want to achieve a society where the senior citizen and the parties concerned can spend a happy life"

"The senior citizen does work useful for others and a self-supporting life is spent"



“Half of the residents in the ravine wants to enrich advancement by depopulation of senior citizen and the victory town"

"By producing and selling Tsumamono (leaves) used at Japanese restaurants, the senior citizens convert their pension life to independent life obtaining annual income"

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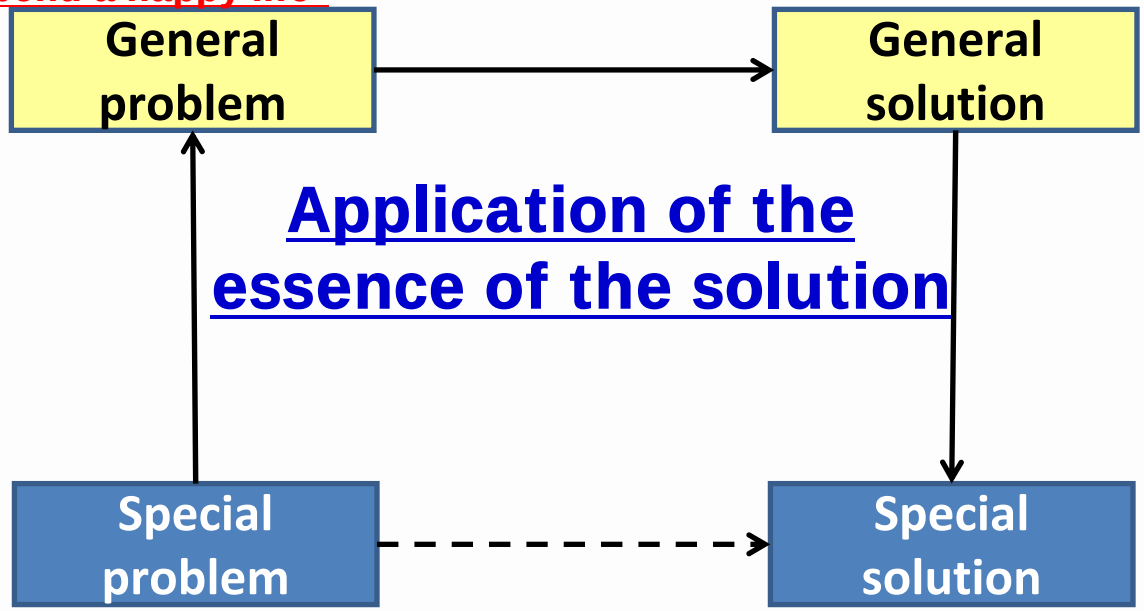
Application of the Essence to Senior Citizen's Lifestyle

"I want to achieve a society where the senior citizen and the parties concerned can spend a happy life"

"The senior citizen does work useful for others and a self-supporting life is spent"



"I want to spend a life where a researcher or an engineer who faced the retirement age has something to live for"

"My problem and others' problems are solved for the purpose to achieve my vision"

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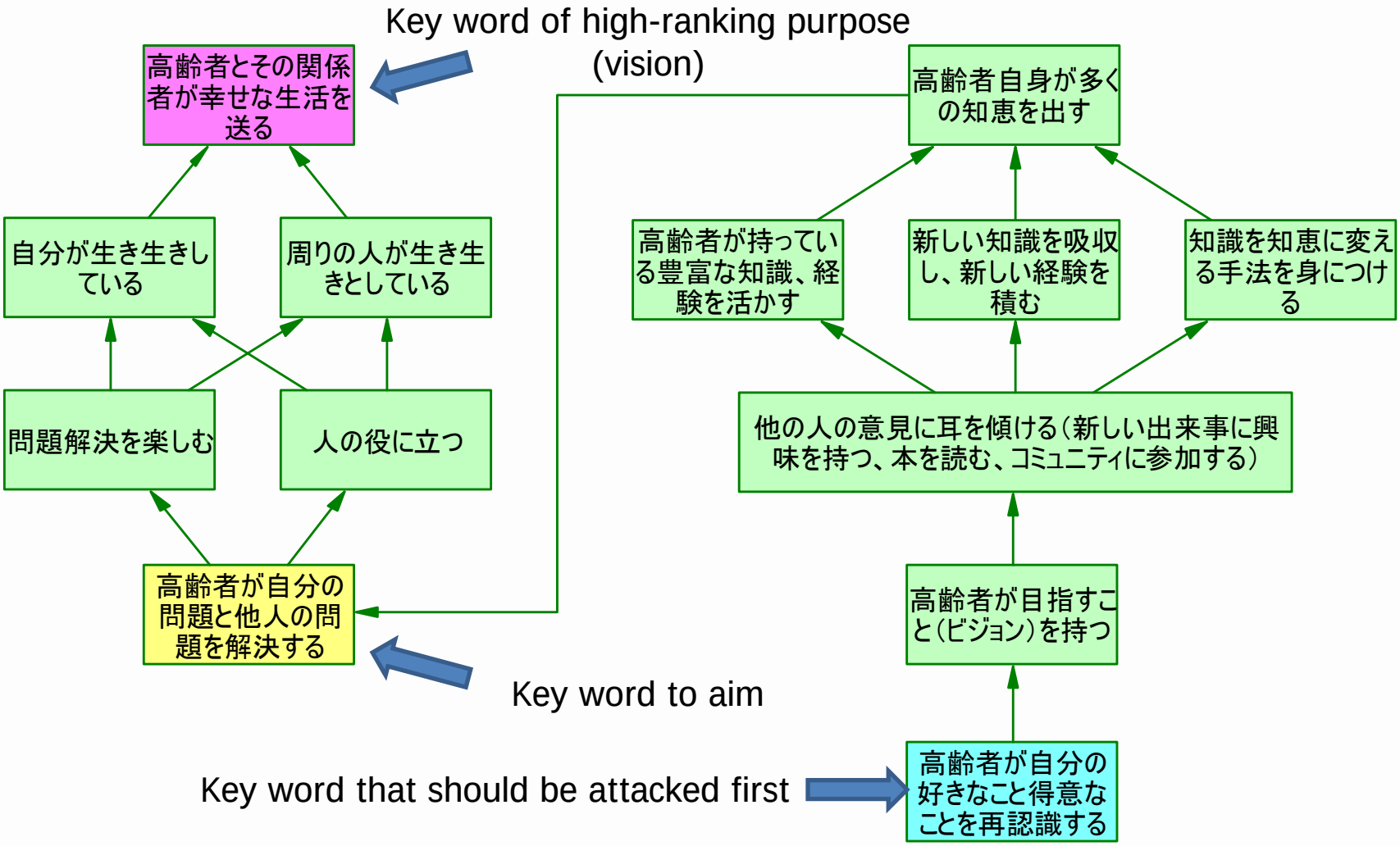
Goal Image of the New Lifestyle



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Proposal of Solution Criteria

TRIZ Criterion

$$\text{Ideality} = \frac{\text{Sum total of profitable functions}}{\text{Sum total of harmful functions}}$$

Engineering Criterion

$$\text{Elegance} = \frac{\text{Purpose achieved by the solution}}{\text{Complexity of solution}}$$

Realistic criterion of TRIZ

$$\text{Local ideality} = \frac{\text{Purpose achieved by the solution}}{\text{Complexity of solution}} \times \text{Resource used}$$

Resource usability

Here, (1) "Purpose achieved by the solution" is determined by the expectation degree of the new system
（considerably high：10, high：8, normal：6, low：4, considerably low：2）
(2) "Complexity of solution" is determined by the number of components and the number of their relations
（considerably high：1, high：2, normal：3, low：4, considerably low：5）
(3) For "Resource used", different values are adopted according to the exiting places of resources and the necessity for changing the resources
（system：3, sub-system：2.5, super-system：2, surrounding of system：1.5, derived resource：1）

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Expansion of Origin of Resource (Line of Evolution)

From Directed Evolution Software（Ideation International, Inc.）

1. Inside the system itself

↓

2. Sub-system, or an element included in the system

↓

3. Super-system, which includes the system as a part

↓

4. System surrounding

System environment or another system located around
Easily-obtainable low-cost resources
Another system without direct relationship
A system quite far away

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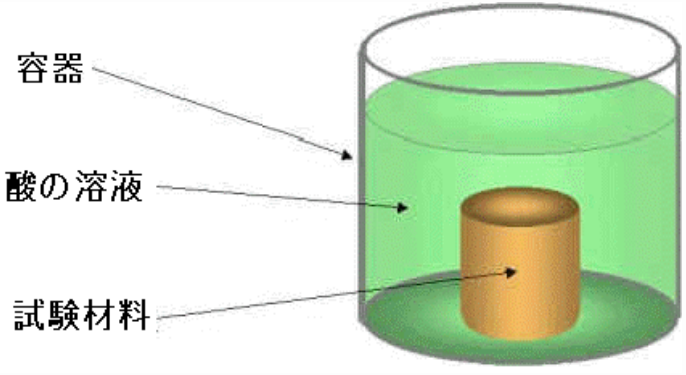
Example of Evaluating a Creative Solution

from IBS Software（Ideation International, Inc.）



【Situation of problem】

To examine the acid resistivity of various alloys, a sample is put into the acid filled in the container.

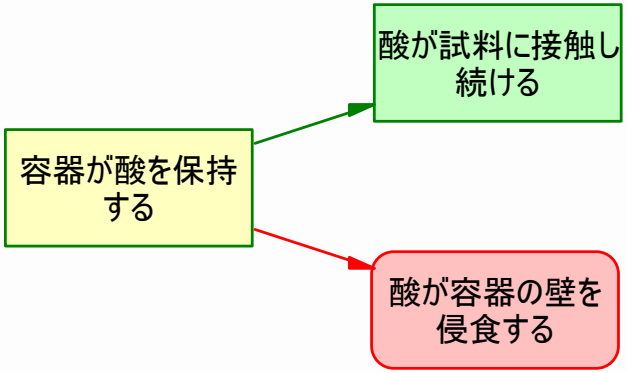
If you make the testing condition severer by raising the acid density or lengthening the soaking time, the problem that the acid invades the inner wall of the container while examining is caused.

【Solution example】

1. Coating the inner wall of the container with an acidity-proof material
2. Making the container itself from an acidity-proof material such as glass
3. Making the container from the sample itself
   (A hole is made in the sample and the acid is put in)

【Evaluation of solution】

1. Elegance = (6/3) x 1.5 = 3
   → **Covering with a protective surface film (external resource) to prevent invasion is common**
2. Elegance = (6/4) x 1.5 = 2.25
   → **A secondary problem that the glass container (external resource) is easily broken will be caused**
3. Elegance = (10/1) x 30 = 30 (full points)
   → **By solving only with an internal resource, gives birth to a new value that the container becomes unnecessary**



$$\text{Elegance} = \frac{\text{Expectation}}{\text{Achievement power}} \times \text{Resource usability}$$

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Example of Platinum Design・Evaluation Sheet

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	Before	After
図面	フライパン  オーブンレンジ 	「ノンフライヤー」フィリップス製 
要約	【構成】家庭でフライ料理を作る場合には、フライパンに入れた食用油をガスコンロで加熱し180℃位の高温に熱した所に、食材を投入して所要時間経過後に高温の食用油の中から食材を取り出していた。油の温度管理や加熱時間は人間が調節していた。 また、オーブンレンジでは、ヒーターで庫内の温度を高温にし、熱で全包囲から包み込むように加熱する方式。 【問題点】 フライパンを使用する場合は、食用油は調理を重ねると劣化するため、その全量または一部を廃棄し、新鮮な食用油と入れ替える必要があった。劣化フライ油の廃棄作業は手間がかかるうえ、高温状態のフライ油を廃棄する場合には火傷などの危険を伴う。 オーブンレンジを使用する場合は、調理済みのフライを再加熱するときに使用するが、加熱後のフライの表面には当初の加熱調理時の油が浮きだしてきて、おいしそうな感じがなくなってしまう。	【構成】最高温度200℃にもなる熱風を上から下へ高速に対流循環させる技術で、食材全体を一気に過熱する。揚げ物がサクサクの食感に仕上がる。食材を収納するトレイの底面にヒトデ型の凸部を形成し、熱と空気の対流を加速する。油は一切使用せず、食材自身の油で表面を均一に加熱することで旨味を閉じ込め、調理時間も短縮する。 【効果】 元々食材が持っていた脂を上手に利用することで、余計な油を使わずに揚げ物ができるので、従来の油を使った揚げ物に比べて、80%も脂肪分をカットしたヘルシーな揚げ物ができる。

2. ユニバーサルデザイン

1. 見守り(WiFi)　　コミュニケーション
2. ユニバーサルデザイン
3. 知恵の見合い　教育・学習、頭脳系(達成度)、夢の具体化
4. 第2の人生(生涯現役)
5. 経済活動への参加　新たな収入があって→支出
6. その他(健康　　)新たなカテゴリー名の提案

エレガント性の評価方法

$$\text{エレガント性} = \frac{X}{Y} \times Z$$

X = 10　Y = 2　Z = 2.5　エレガント性 = 12.5

マズローの欲求(5段階)における位置づけチェックボックス

生理的 ☐	安全 ☑	社会的 ☐	尊厳 ☐	自己実現 ☐

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Evaluation Items, Point Allocation and Comments

Elegance（Overall judgement） 12.5 = $\frac{X\ 10}{Y\ 2} \times Z\ 2.5$

	Expectation：X		Achievement power：Y		Resource usability：Z	
Mark	considerably high	10	considerably high	1	Resource of system	3
	high	8	high	2	Resource of sub-system	2.5
	normal	6	normal	3	Resource of super-system	2
	low	4	low	4	Peripheral resource	1.5
	considerably low	2	considerably low	5	Derivation from various resources	1
Remarks	【Judgment comment】 Because oil is not used, a healthy deep-frying thing that cuts the fatty ingredient by as much as 80% can be done. It is possible to cook safely even by a senior citizen without failure.		【Judgment comment】 Only it is to make the hot wind circulate in the airtight container, the structure is easy.		Judgment comment Because the enclosed unit and the heat source exist, it only has to add the cycling mechanism of the hot wind.	
	【One-point for a better one】 Able to cook fry-ups like tempura, etc., where the ingredients themselves don't contain oil					

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Targeted Value Setting for Research Themes

Target numerical value

(1)Among people retired from the front line of their main work, the number of people who try to achieve their own vision doubles compared to the current status
(2)More than half of the people of (1) above don't rely on others and spend vivid life
(3)In order to achieve (1) and (2) above, the organization that proposes by us to achieve the above-mentioned and manages it is useful from the society in Japan

Restriction numerical value

【Stage in the first half of project】
Feb., 2014: (1) Goal setting (decision of ideal solution)
Apr., 2014: (2) Resource grasp (systems approach)
Jun., 2014: (3) Resource element analysis and meaning arrangement
Aug., 2014: (4) Operation of resource and combination (direction and outline decision that should be aimed)
Sep., 2014: (5) Acceptability investigation (Third party's opinion is heard).
【Society member】 Seven people

Targeted value for research theme

◆ About the content of the project stage, it announces to the symposium in September and the acceptability is investigated
(1) The number of people who try to achieve an own vision doubles more than the current state among people away from the first line of the main work
(2) Person's above more than half doesn't rely on others and vivid life is spent
◆ The result of the acceptability investigation is received, and it shifts to the latter half of the project thereafter stage based on the concept that adds a necessary correction
【Stage in the latter half of project】
Oct., 2014: (6) Decision of lifestyle modification (Proposal how life changes)
Nov., 2014: (7) Incentive setting (Making of mechanism of continuing use)
Feb., 2015: (8) Making of emotional story
Apr., 2015: (9) Making of composition of the entire service idea
Jun., 2015: (10) Making of road map (Development team organization)
Aug., 2015: (11) Project proposal and adjustment
Sep., 2015: (12) Project approval (Approval that you may advance to development phase)、The 11th Symposium

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