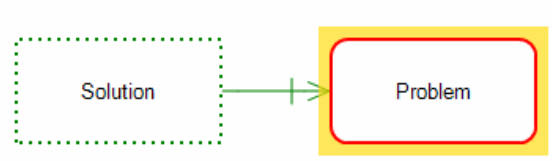
Southbeach Notation
Improve Everything Always

H. Smith, M. Burnett, C. Young



feedback@southbeachinc.com

This paper introduces a new visual diagramming style and notation. We call it Southbeach. The notation, and its associated methodology, has many applications in business, design and technology, including change management. We hope that it appeals to both management consultants and engineers alike.

Southbeach is an extension of typical TRIZ notation and has been developed to support a variety of new contexts and applications where TRIZ methods[1] are valuable. One of those is P-TRIZ[2] which provides business process analysis, improvement, design and change.

The core applications of Southbeach will be described in future articles.

This document (May 2008) presents Southbeach version 0.8.

Why the name?

The early ideas for Southbeach were conceived and drawn in the sand on South Beach, Miami, June 2005:

[1] Summary of TRIZ methodology "Do you have problems?", H. Smith, M. Burnett, Leading Edge Forum, http://lef.csc.com/foundation/library/journal/06_05/433D6B413A68404C52484D575442.pdf
[2] Series of ten articles published at BPTrends, H. Smith, 2007 (search "triz") Also collated at http://trizmethods.blogspot.com

Introduction

What distinguishes a brilliant leader from a conventional one?

Leaders have the ability to hold two opposing ideas in their minds at once, and then reach a synthesis that contains elements of both, but improves on each. Most managerial decisions, by contrast, are made by examining the simplistic pros and cons of presumed alternatives.

Conventional thinkers focus on obviously relevant features, break problems into pieces, work on them separately and then settle for compromise. Truly successful leaders try not to make these "either-or" decisions – they practice integrative thinking[3]. By seeking factors that are not immediately obvious, considering relationships among many variables, and seeing the problem as a whole from multiple perspectives, they are able to resolve tensions among opposing ideas and generate innovative outcomes.

Finding creative solutions to seemingly intractable problems is a challenge. Accepting unpleasant trade offs can be hard. A few exceptional people work intuitively, tackling areas of high uncertainty or ambiguity in their head. The rest of us need a method, especially when solving hard problems in business and in society: Southbeach is such a method.

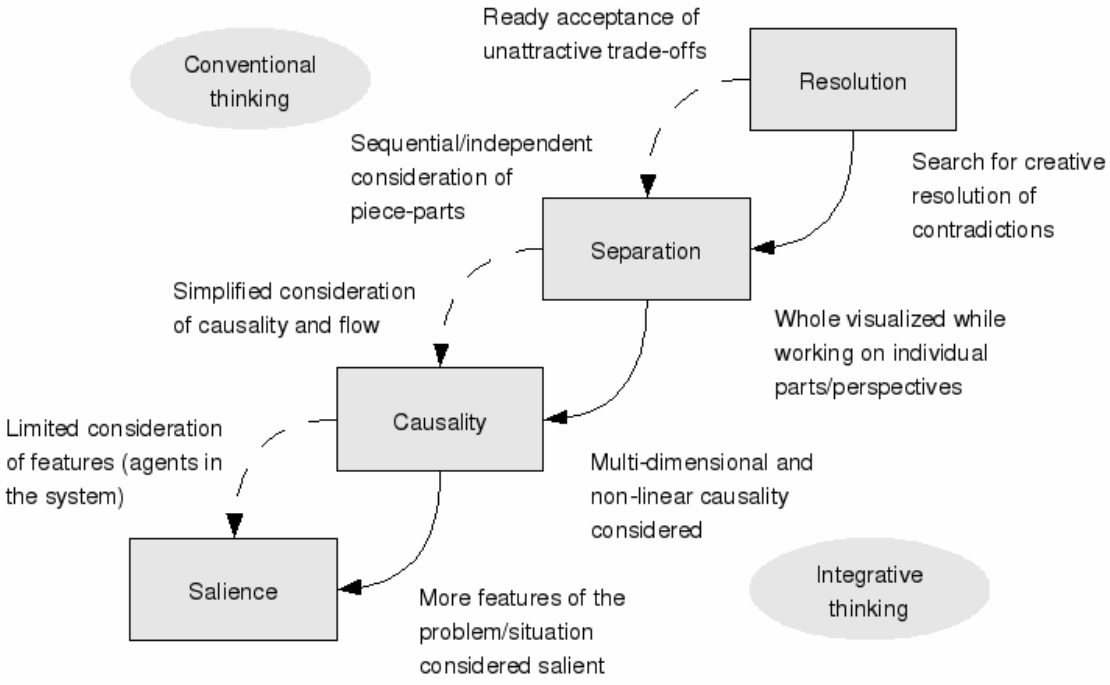


Figure 1 - Southbeach is an "integrative" thinking methodology

We encourage you to share and publish Southbeach Notation models. If you find the notation helpful, spread the word, reference Southbeach and ask colleagues to improve on your models. Develop models from different perspectives. Integrate opinions and agree on models among stakeholder groups. Seek solutions, and, if you find them, document them and pass them on in Southbeach Notation.

[3] *The Opposable Mind*, R. Martin, 2007, HBR Press

Feedback

We welcome all feedback – particularly ideas to improve Southbeach or to highlight areas where you believe we may have made a mistake or omitted important ideas. Please write to:

feedback@southbeachinc.com

Software for Southbeach notation

A free software tool that allows experimentation with Southbeach will shortly be released at:

www.southbeachinc.com

This reference release of the notation will be accompanied by an article illustrating the potential applications of Southbeach.

To be informed when the software becomes available please write to:

software@southbeachinc.com

Move your problems to the beach

During the period while we are introducing Southbeach, we offer to help draw and understand your first Southbeach model.

Send any models you develop, together with text or Web references explaining the problem you are attempting to solve, or the situation you are trying to understand or improve, to:

clinic@southbeachinc.com

Best endeavors apply.

Examples of Southbeach diagrams

Figure 2 shows a typical Southbeach visual model. It illustrates that proposed planetary engineering projects to cool the planet could backfire quite spectacularly. New research shows that a "sulphate sunshade" would punch huge holes through the ozone layer above the Arctic. To make matters worse, it would also delay the full recovery of the Antarctic ozone hole by up to 70 years.

Key: Red boxes are considered harmful (problems). Green boxes are considered useful (solutions). A dotted line signifies something proposed for the future. The various arrow types signify different effects and influences between agents in the diagram, e.g. star (magic wand) means 'creates'.

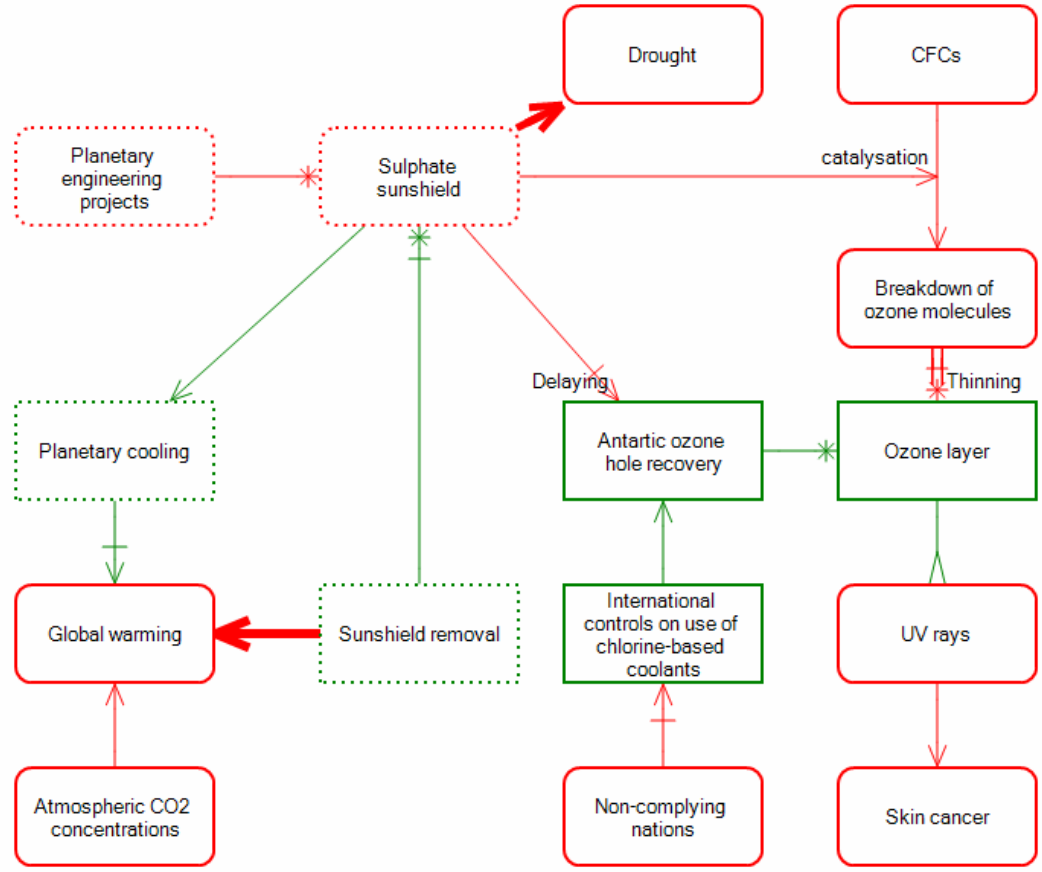


Figure 2 – Effects of planetary engineering projects to create a sunshield

The model is based on the work of Simone Tilmes of the National Center for Atmospheric Research in Colorado, US. Tilmes used computer models to see how a sulphate sunshade (potential + harmful) would affect the ozone layer (useful), which protects us from harmful UV rays. She says it could have "a drastic impact".

Sulphate particles catalyse the breakdown of ozone molecules by chlorine atoms. Western economies have almost entirely stopped using chlorine-based coolants called CFCs, thanks to the Montreal Protocol. However, such substances are increasingly being used in Asia and the atmosphere is still full of CFCs emitted during the 20th century.

To add to our understanding of the situation illustrated in the diagram, Ken Caldeira of the Carnegie Institution of Washington, found that if a sulphate sunshield were deployed and then removed - for instance because of a change in governments - the effects of global warming after the removal would be far worse than before the sunshield.

The model illustrates the salient features of the integrated situation. For example:

- The impact of drought and the impact on global warming of attempts to remove the sunshield are marked with strong effects.
- A special symbol is used to signify that the ozone layer 'consumes' UV rays.
- The breakdown of ozone molecules has an 'overloaded' destructive effect on the ozone layer (thinning).

This process of elaboration aids understanding and provokes creative thinking. For any given model, the reader can then ask questions to improve understanding, or improve the situation directly. For example:

Is there another way to create a sunshield? (Avoiding harmful sulphates)

Exactly how does catalysis breakdown the ozone molecules?

Why is sulphate needed? Can we take sulphate out of the system? Etc.

Figure 3 illustrates another, more complex, model. The situation illustrated shows the effects of increased shipping in the Antarctic:

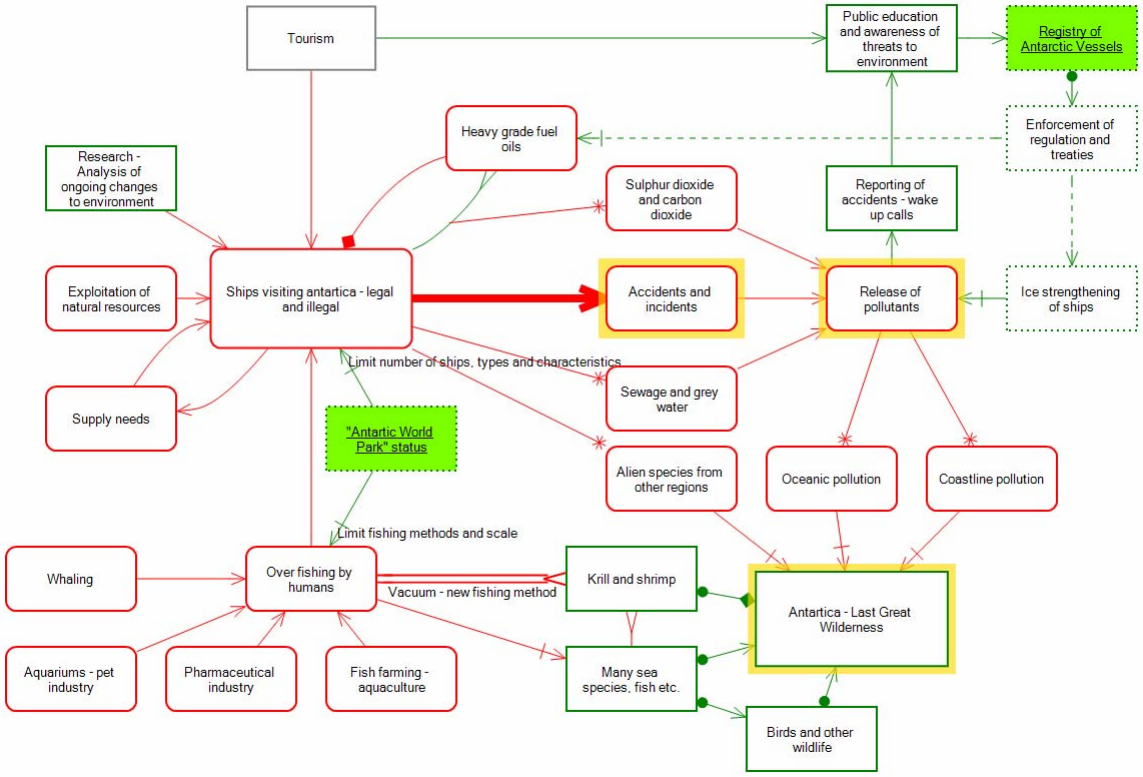


Figure 3 – Increased shipping visiting the Antarctic threatens the environment

The model shows how the combined effects of fishing, the exploitation and hunt for resources, tourism and research exploration are contributing to an increase in shipping in the area.

Overcrowding is leading to accidents. The ships traveling these distances have supply needs, and this brings more ships (feedback loop).

The ships store heavy fuel oils and this poses a risk. The oil and other cargo can be released during accidents – the frequency of which is increasing as the number of ships rises. Ships also consume the fuel, a process which releases both sulphur dioxide and carbon dioxide. This, coupled to the potential accidents, is releasing increased pollutants in the Antarctic.

The ships have other polluting effects. Notably, they create sewage and grey water waste, and also carry alien species into the region from their points of origin.

Over fishing of the region is another major negative factor. It arises from multiple causes – whaling, the pet industry and the pharmaceutical industry etc. This is driving a new form of fishing, an aggressive *vacuuming* of krill from the sea. This consumption of krill and shrimp is itself a danger because other fish depend on krill in the food chain. Birds and other wildlife in turn depend on the fish.

As a result of this situation, it has therefore been proposed that the following goals are pursued. The goals are indicated in the model:

- To give to the Antarctic a “world park status”. This would counteract both the number of ships visiting the area and limit fishing by humans.
- To create a register of Antarctic vessels. This record would be required in order to enforce any treaty, such as the potential introduction of requirement and regulation governing the strengthening of ship’s hulls. These measures would counteract the impact of accidents when they occur, since there would be less chance of the release of oils and other pollutants carried onboard the ships.

The model shows that there is a useful side effect of accidents, which is to raise public awareness, leading to a strengthening of lobby groups which could bring the necessary regulations into being. Additionally, tourism brings more ships to the region, but also helps to educate and raise awareness.

Southbeach comprises a set of visual idioms to illustrate situations of this kind. The semantics allow for exploration and improvement of the situation.

A quick guide to Southbeach follows.

A quick guide to Southbeach

Southbeach notation comprises elements such as 'agents' and 'effects'. They have attributes, such as 'useful' and 'harmful'. Synonyms can be used to stretch meanings. For example 'useful' can be thought of as 'valuable', counteracts can be thought of as 'limiting'.

Attributes can be combined, for example, a harmful goal is a risk. The combinations create new concepts. For example 'creates' plus 'insufficiently' could mean 'in the process of being created – incomplete'. It could also mean 'completed incorrectly – limiting function'. Interpretation can never be completely precise. Southbeach allows for such ambiguity.

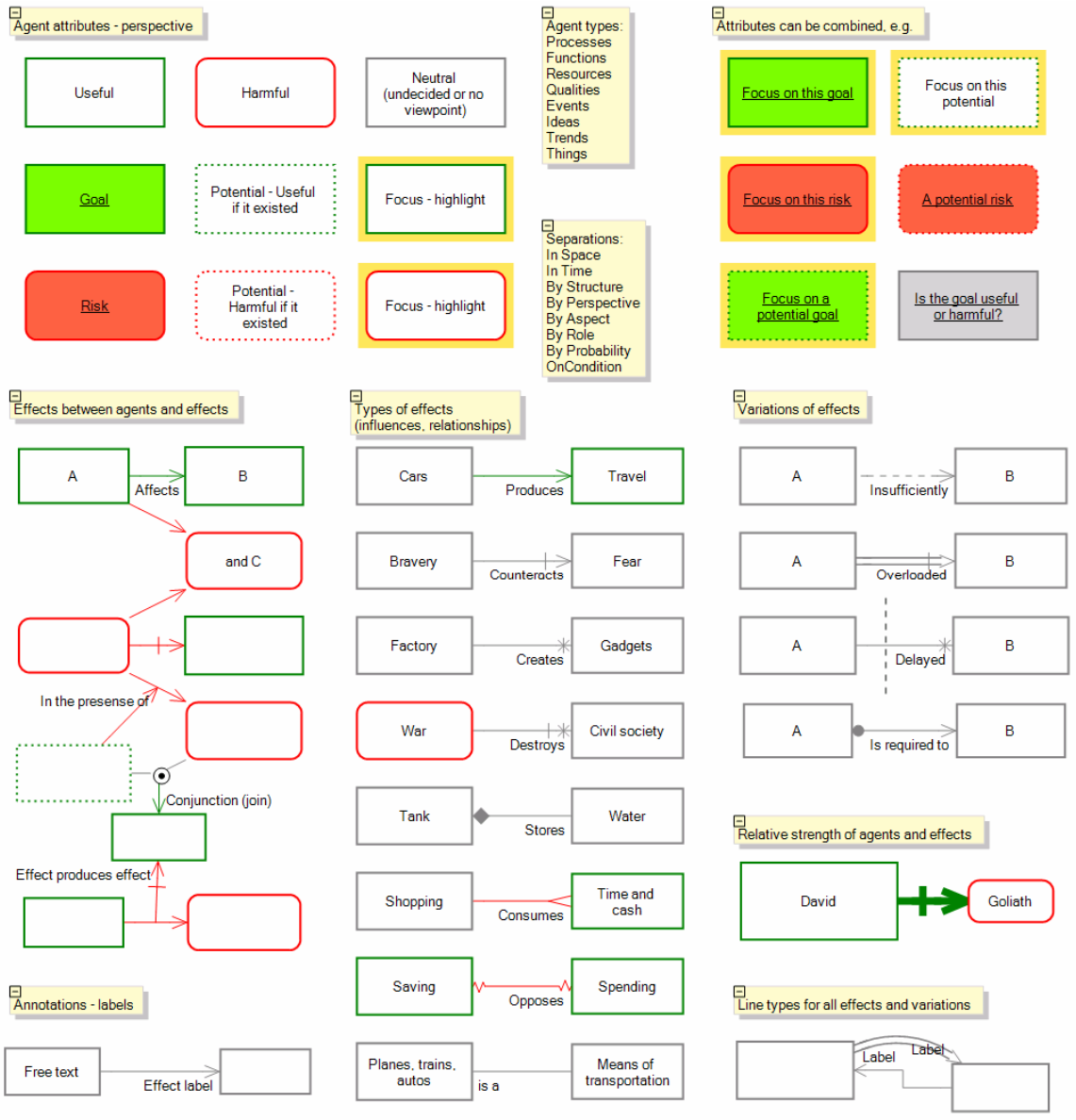


Figure 4 – A quick guide to Southbeach visual idioms

Modeling perspective in Southbeach

Every Southbeach model is drawn from one or more perspectives. For example, a problem arising from the globalization trend would look very different modeled by an anti-globalization activist or modeled by an industrial analyst working for the World Bank.

A perspective is a set of viewpoints, belief, opinions or positions.

Each model has an attribute to capture the perspectives from which the model was drawn. It may be the opinion of the author or authors, or that of a 3rd party whose view is illustrated in the model. As well as this overall perspective, each element of a model can be marked with a perspective, allowing for a mix of view to be shown by the model. Thus, Southbeach supports the modeling of the effect of one opinion on another.

As well as specifying the perspective, model elements can be laid out on a grid, with each cell representing a different dimension of the situation or problem. Agents inherent attributes from the cell in which they are placed.

Figure 5 shows a Southbeach model of the subprime crisis drawn in two dimensions:

1. From the perspective of the role of the participants in the financial system that created the subprime crisis: homeowners, the housing market, financial institutions etc.
2. The separation of conditions arising in terms of causes and effects, response actions, etc.

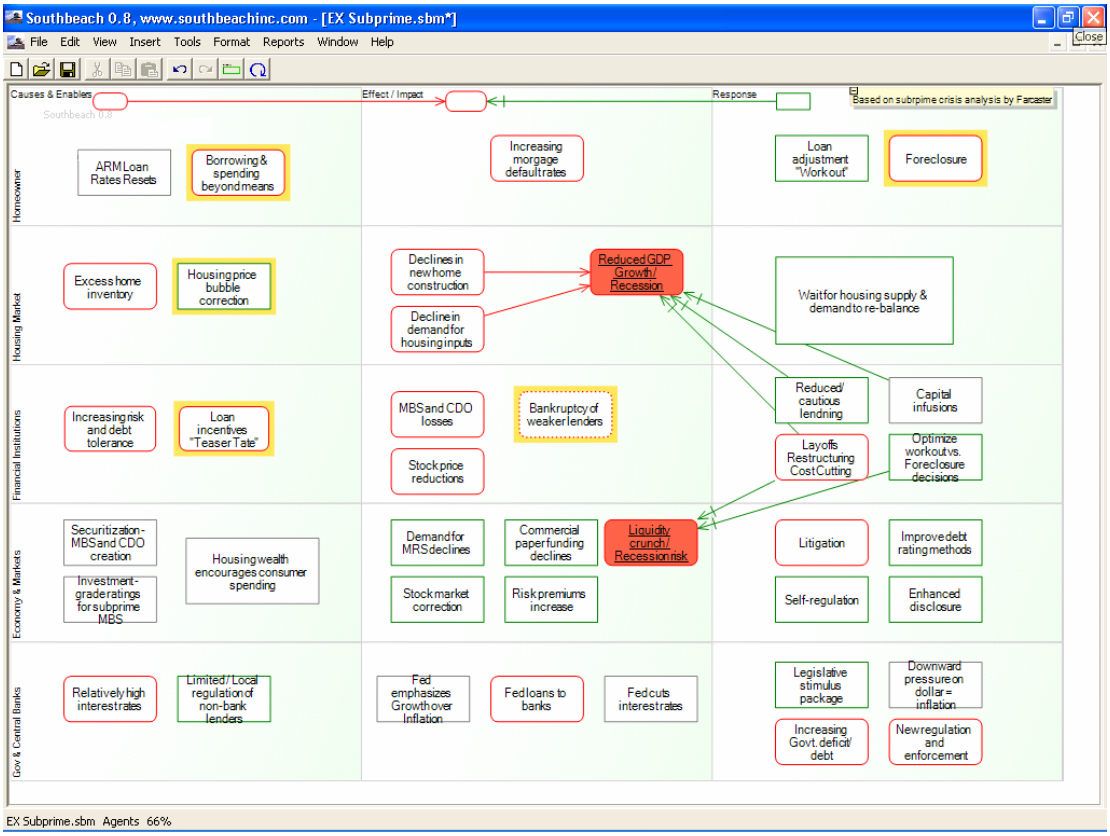


Figure 5 – A two-dimensional grid showing perspectives on the subprime crisis (adapted from Wikipedia article)

Embracing existing intellectual property

Often, while developing models, existing intellectual property is used as a reference source, for example, a magazine article, blog post, web reference, research paper, etc. This leads to the idea of "marking up" existing documents with the Southbeach semantics. Figure 6.

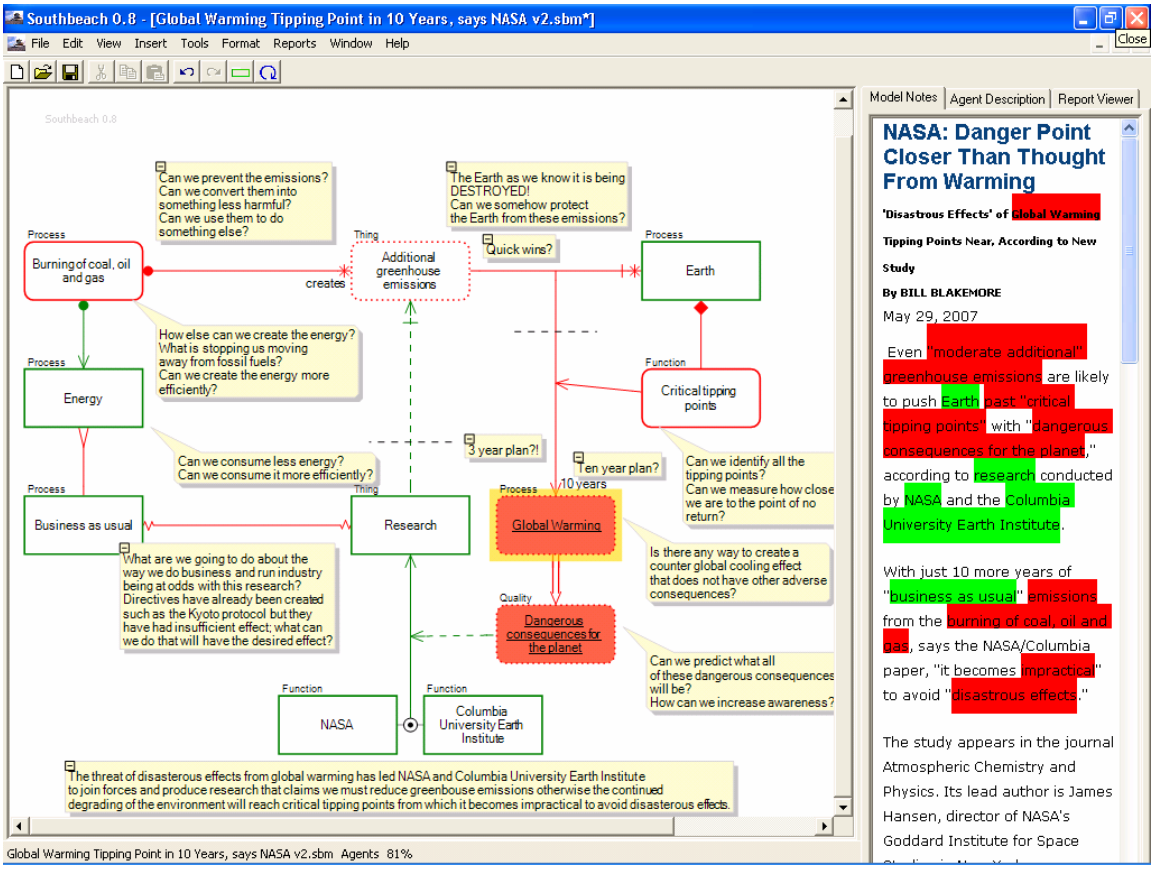


Figure 6 – Screenshot of Southbeach editor

Each of the examples provides a taste of Southbeach. We believe that Southbeach:

- Is expressive
- Is easy to draw and to understand
- Can be used in real time in workshops
- Can capture knowledge from domain experts
- Can integrate and resolve differing perspectives
- Can be printed on black and white paper without significant loss of meaning
- Can be drawn by hand as well as via a software tool
- Draws on existing notational ideas where possible

The remainder of this document is a compendium and definition of all Southbeach elements. Example models/diagrams are given for each element.

A Southbeach Compendium
Examples and Synonyms

May 2008
Southbeach 0.8

feedback@southbeachinc.com

Table of Contents

What is Southbeach?

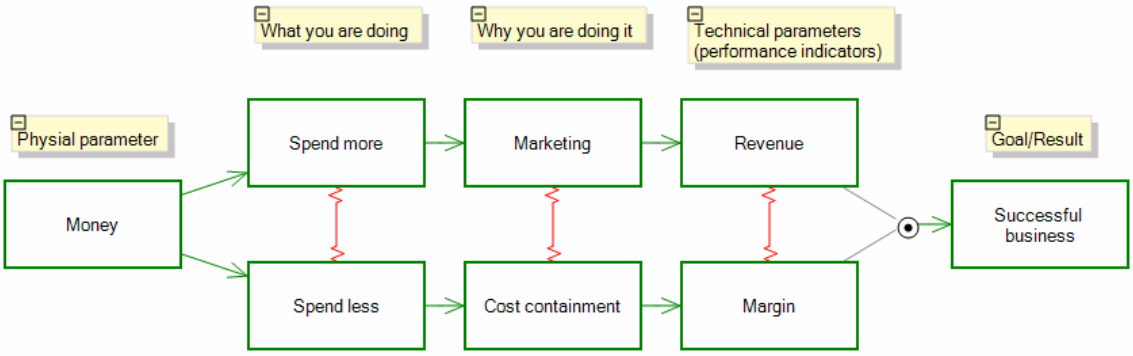
Southbeach notation has been designed to be useful in a wide range of contexts and across many fields of endeavor. While we mostly give business examples, Southbeach is domain independent. It can be used in fields such as organizational design, business management, process engineering, problems in society, the design of service systems, planning, engineering and scientific research.

A Southbeach model is a visualization of a situation or system from some perspective, for example, how the company works according to the finance officer. As we all know, that's not how the company really works!

Southbeach models are drawn for many purposes including enhanced understanding of function; continuous improvement; problem solving; failure analysis; exploration of design alternatives and perspective alignment.[4] We refer to these as Southbeach "applications".

A Southbeach application assists an analyst or team to explore a Southbeach model in terms of desirable outcomes. Asking the right questions drives improved understanding. Considering all the options helps find a way forward. The Southbeach methodology provides techniques for both improving models (better models) and improving the situations they represent (system evolution).

Ontologically speaking, all Southbeach models are descriptions of processes, although not in the sense of execution for automation. Southbeach models are never executable. Rather, they express beliefs and viewpoints about how systems work – for the purposes of exploring change in the system (improvement, risk mitigation, change of perspective etc.). For example, here is a small description of how a company needs to balance various useful activities so that it can make money:



The tension lines between the boxes are called 'oppositions' in Southbeach. See later section.

Agent

Southbeach models consist of a collection of agents.

Agents interact through effects. An effect is an influence from one agent on another. For example, a factory agent creates car agents. A business process agent produces useful output. Agents can produce many effects, some useful, some harmful. In a very real sense, agents express 'change' in a system or situation.

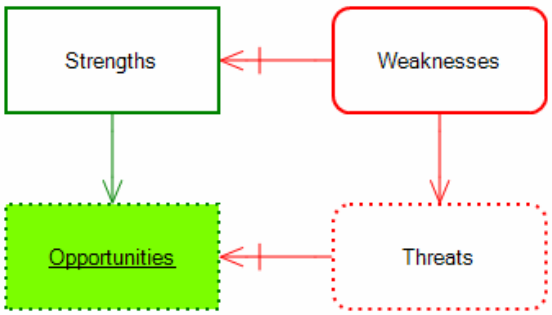
An agent in Southbeach can be anything you want it to be. It has meaning based on its effects on other agents. Agents are labeled with free text.

[4] "The Trouble with People", H. Smith, Sept 2007, BPTrends.com

Each agent can be viewed as useful (a solution), harmful (a problem) or neutral. They may also be one or more of the following:

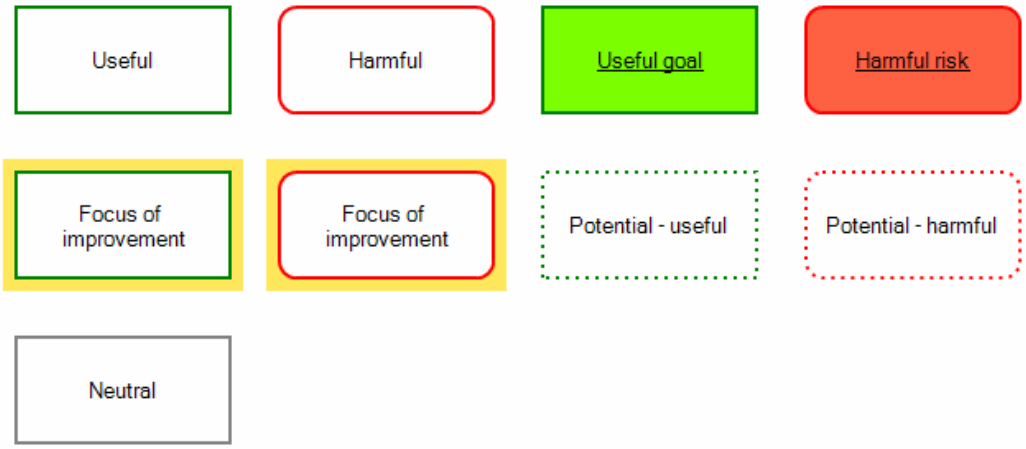
- A goal or risk
- Hold potential (in the future)
- Act as a focus (of attention)

Here is a Southbeach description of a typical SWOT analysis:



This model says that strengths are useful, but they are counteracted by weaknesses (harmful). Weaknesses lead to potential threats, and these potential threats could undermine the potential opportunities which are our real goals. This of course is just one interpretation of how people think about SWOT analysis. Other interpretations are possible.

The various agents are described in the following sections. They are:



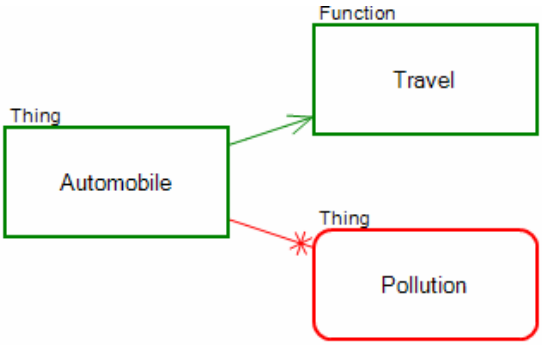
Useful agent

A useful agent is something you want more of in a system so that the system can be improved. This of course depends on your perspective. For example, a cost agent is useful to the seller, and harmful to the buyer. A model of the impact of the oil industry on the environment would look very different if drawn from the perspective of an oil company. One person's solution is another person's problem, and vice versa.

Harmful agent

Flip side of useful. A harmful agent is something you want less of in a system.

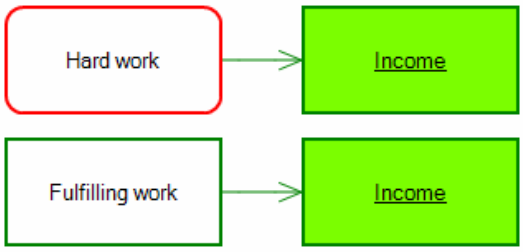
Everything in life is both useful and harmful from some perspective or in terms of its composite qualities or effects. For example, an automobile is useful in providing travel, but 4X4s are harmful in polluting the environment.



Whether an automobile is considered useful, or harmful, depends on your point of view, and whether you are willing to countenance questions such as:

> Is there another way to provide the travel without the use of the automobile?
>
> If automobile transport is useful and required: Is there a way to prevent the necessary automobiles from polluting the environment? Is there a way to counteract the harmful pollution of the environment by the automobiles?

Of course, harmful agents (viewed from some perspective) don't always create harmful agents:



Neutral agent

A neutral agent is an agent for whom usefulness or harmfulness is either undetermined or irrelevant. The agent may become, or be viewed as, useful or harmful at a point in the future.

Questions prompted include:

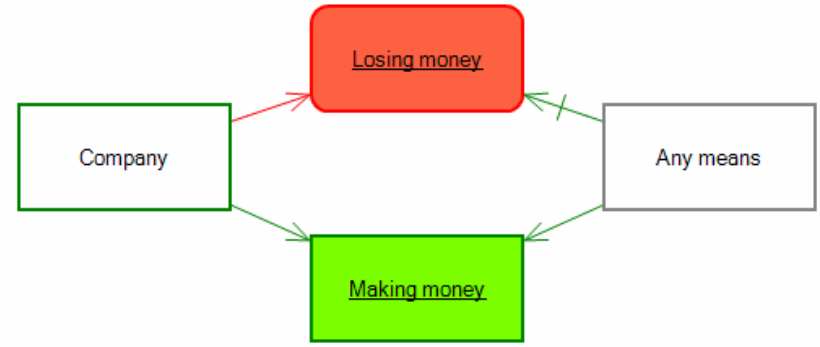
What happens if A becomes useful in this situation?

What happens if A becomes harmful in this situation?

Should you take a viewpoint (perspective) on A and would this help you to understand the situation or to resolve the problem?

Goals and risk

While we always want more of all useful agents, and less of all harmful agents, some agents may be explicit goals, for example: profit is a goal of a company. How a company provides profit is less important than the goal.



Goals are considered useful. A harmful goal is a risk. Here are some risks:

Focus

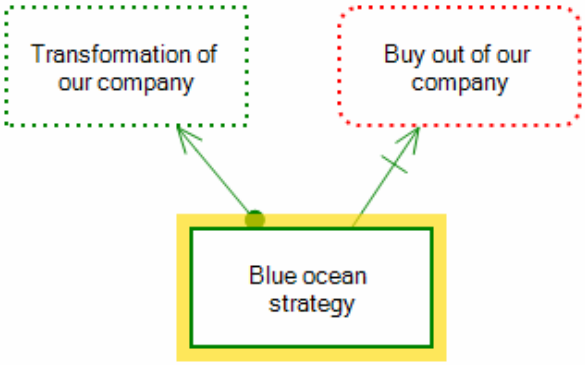
Agents can be marked as a focal point for attention and improvement. For example – a department might be marked for reengineering (Hammer). A goal or risk may also be marked as a focus. (Highlighter pen metaphor)

Potential agent

A potential agent is an agent that does not yet exist (or act) in the model, but could exist (or act). For example, a proposed new department, a potential goal, a possible focus for improvement, a risk, solution not yet brought in, etc. Toothpicks and pollution are real and now. Bio fuels and World War 3 are yet to be.

'Potential' is interpreted loosely. It is not always about the future. For example, something may exist in the environment, but brought to bear by bringing it inside the system. Thus, potential also means latent. Southbeach uses synonyms in this way for all of its concepts.

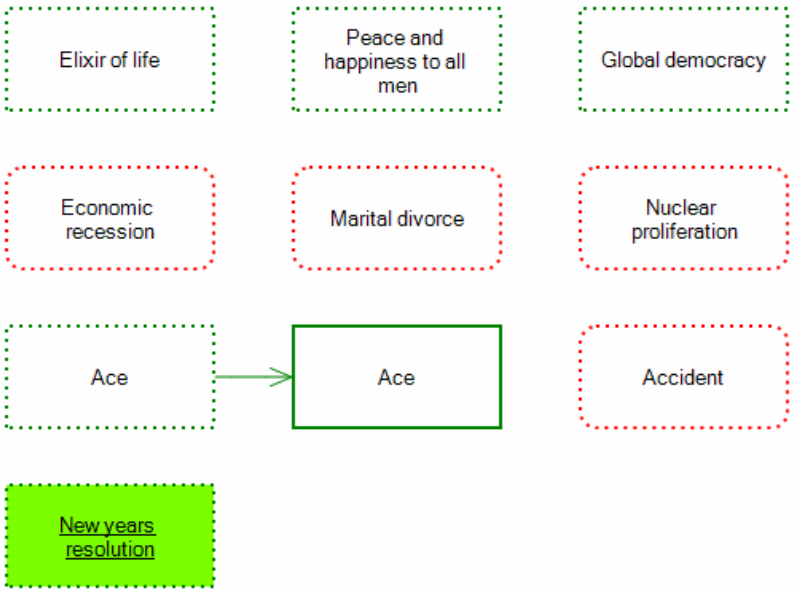
The potential attribute can be combined with other agent attributes.



This model says: There is a potential transformation of our company. A Blue Ocean strategy[5] is 'required' and should be our focus in order to achieve the transformation (potential to actual). Such a strategy could avoid a potential buy out.

Here are more potential agents:

[5] *Blue Ocean Strategy – How to Create Uncontested Market Space and Make the Competition Irrelevant*, W. Chan Kim, R. Mauborgne, 2005, HBS Press

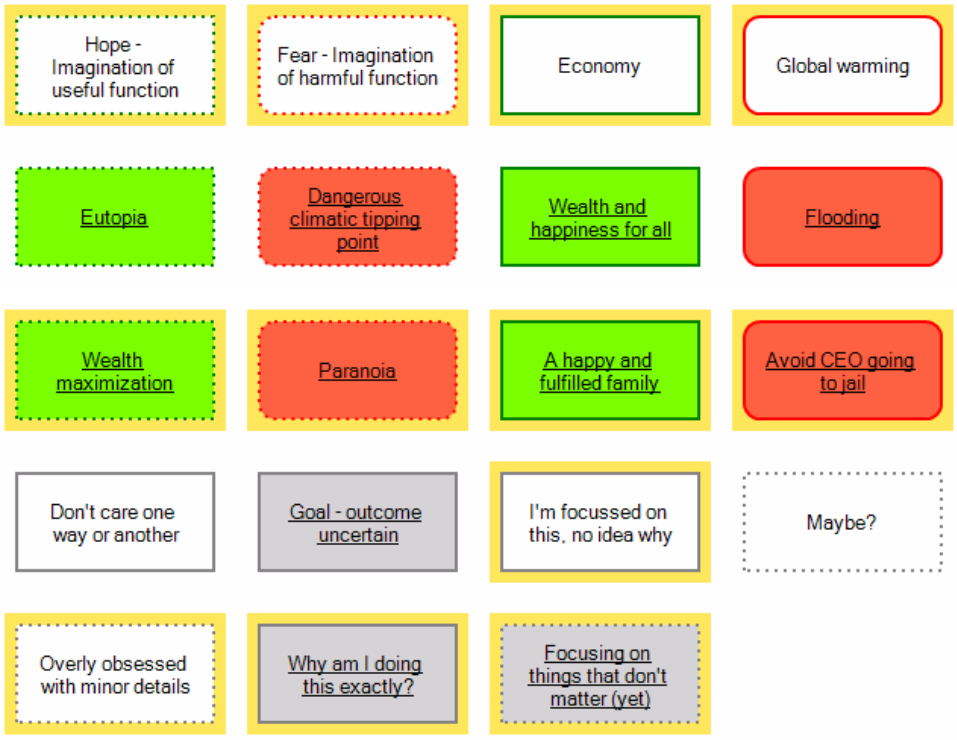


Do you see "An accident waiting to happen" and "An ace up the sleeve"? A potential ace becomes a real ace. And aren't all New Year resolutions goals that are always "potential"?

Combinations of agent attributes

All agent attributes can be used in combination. For example, the concept of "hope" could be expressed as a potentially useful agent. Fear could be expressed as a potentially harmful agent. A happy and fulfilled family life is always a goal, and it should always be our focus.

Here are more examples:



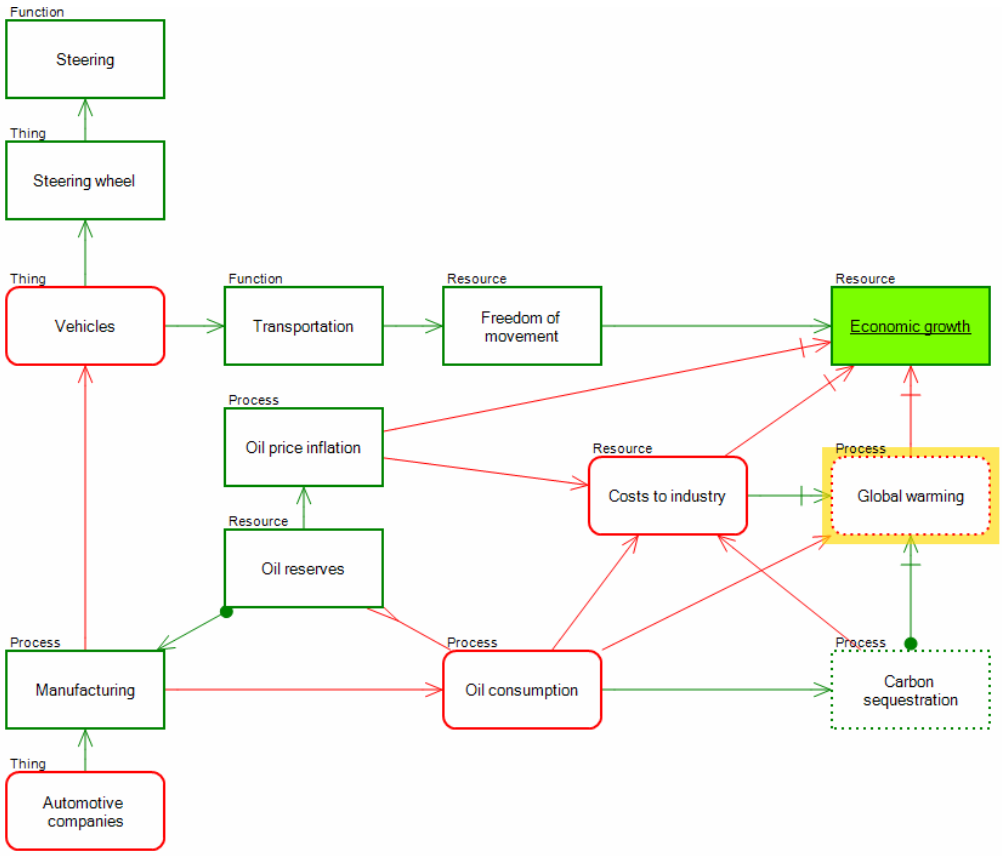
Combinations of agent attributes

Agent, type of

Agents can represent anything – concrete or abstract.

Southbeach carves the world into agents of types: process (mechanism), function (purpose), resource (used by), quality (attributes), event (time, conditions), idea (statement), trend (over time) and everything else (thing).

Agents are labeled with their type. (Tools should be able to turn annotations on and off.)



Process

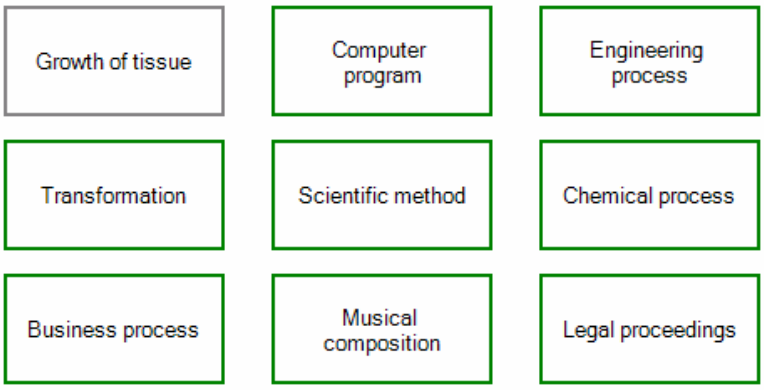
An agent can be a ‘process’.

A process agent is a mechanism in the model, for example, the manufacturing process of a business or the design process of an architect.

The function of a process, in the absence of any other knowledge, is the effects it has on other agents.

Process ‘A’ ‘has effect on’ process ‘B’. For example, the design process leads to the manufacturing process which has the function of providing the supply and distribution process.

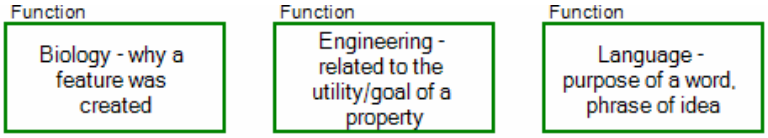
Some processes:



Function

An agent can be a 'function'.

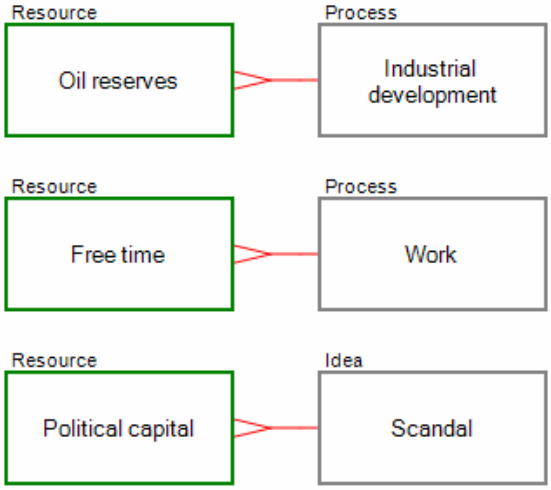
A function represents a purpose of the system (model) or of another agent, i.e. ('A' process produces a function 'B'). For example, the function of the manufacturing process is to produce output.



Resource

An agent can be a 'resource'.

A resource is something used by an agent in order to fulfill its function ('A' produces 'B' by consuming 'C'). Resources may also be produced by agents ('A' produces resource 'B')



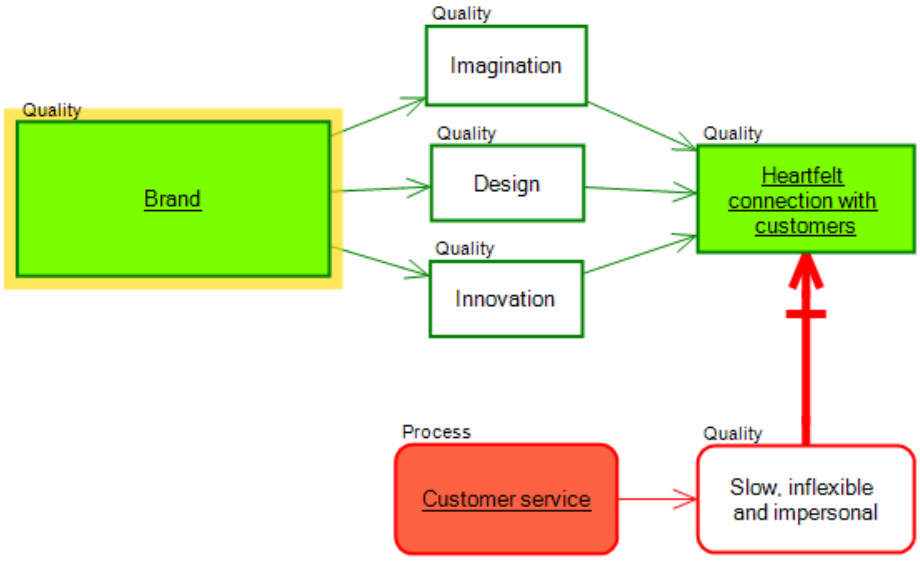
The special line type signifies 'consumes'. Thus, industrial development consumes (take out of the world) oil reserves. It does not just counteract them: it really removes them from existence so

that their effects no longer exist. Similarly, a scandal can consume political capital built up over decades.

Quality

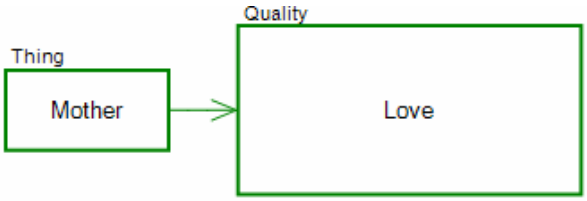
An agent can be a 'quality'.

Qualities are agents which represent attributes of the system or of other agents, for example the brand 'quality' of a product. Agents often exhibit qualities. For example, the customer service process is regarded as too slow, inflexible or impersonal.



The model says that the company's over focus on brand, to the exclusion of customer service, poses risks to the relationship with the customer. The slow and impersonal service clashes strongly with the necessary goal of a connection with the customer.

Here is another very human example of a quality:



Event

An agent can be an 'event'.

An event is an agent representing an occurrence or happening at a given place and time – a special set of circumstances or conditions. An event follows and is caused by some previous agent or effect. For example:

A process may give rise to a delivery event whose function is to create inventory.

The effect of producing the annual report is to raise awareness of the company's success which causes a raise in the share price, which may be temporary.

A tipping point (Gladwell) (event as result of an inexorable trend)

Idea

An agent can be an 'idea'.

Every Southbeach model is, in effect, an 'idea' – the perspective of the individual who created the model. The model describes the 'idea' by enumerating the agents it comprises, whether they are viewed as useful or harmful, and how they interact.

Southbeach also allows individual agents in a model to be labeled as 'ideas'.

Ideas are full agents in the sense that they exist in the world and have effects – just like processes, functions or qualities. They are not just ideas in the sense of brainstorming. For example, a company's employees may hold a belief which characterizes the way the company operates, in other words, a culture (or idea). This culture may, for example, counteract a style of behavior (harmful) but also bolster another style of behavior (useful).

Ideas in the model are statements by the model author, either from their perspective or from that of a 3rd party. The ideas may be true, or not true. Ideas include thoughts, opinions, views, sentiments, schemes, theories or persuasions.

Ideas can be used without pre-judgment in true brainstorm style. They may or may not be considered useful or harmful. For example:

"Customer service may be the cause of the problem" (neutral, undecided)

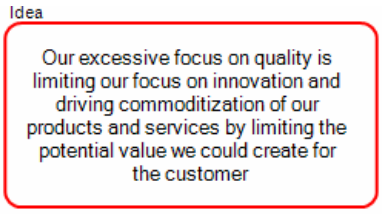
"George believes that we need a blue ocean strategy" (potentially useful)

"Staff do not like the new mission statement" (simple true - harmful)

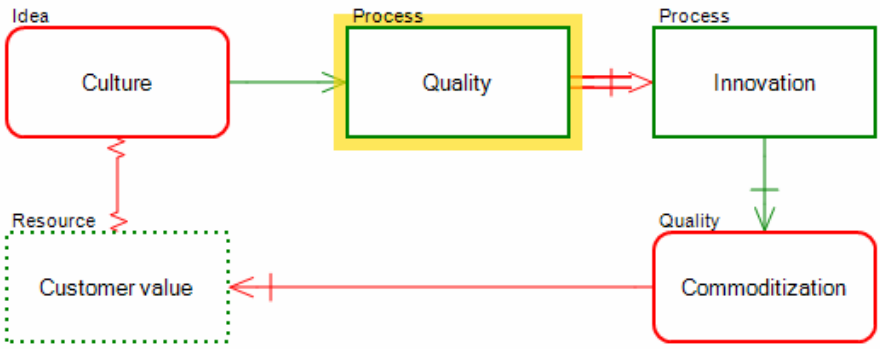
"If X is true, Y might happen" (neutral – don't know either way)

Like all other Southbeach agents – ideas can also be goals, or a focal point of discussion (attention to an important project), or hold some potential, for example, a belief we don't yet hold but may in the future (a need for a change of culture).

In elaborations of the model, ideas are typically decomposed into explicit agents and effects. For example, the phrase:



would be decomposed to become the model:



The model says: The organizational culture is in tension with customer value. All industries experience commoditization, and unless a shift from quality to innovation can be achieved, a focus on quality only serves to accelerate a descent to commoditization – fighting over low margin business.

Note the importance of perspective once again. In the model, commoditization is marked as harmful. In some markets commoditization is very useful, for example, to drive economies of scale. The benefits of commoditization however, only accrue to those that can connect with mass markets as opposed to pursuing a one to one, customer intimate, strategy. What this illustrates is that solutions (useful) such as 'innovation' or 'commoditization' are only available and useful within a context governed by the perspective from which they are applied.

It is common in Southbeach workshops to use 'ideas' to capture ideas for solutions or avenues to explore for solutions or actions agreed about how to improve the situation described in the model. This leads to functionality that supports the ideation process.

At the point an idea is accessed, it, or its parts, may change their attributes. For example, the idea may become a goal. The idea may change from being useful to harmful, or change from potential to actual, etc.

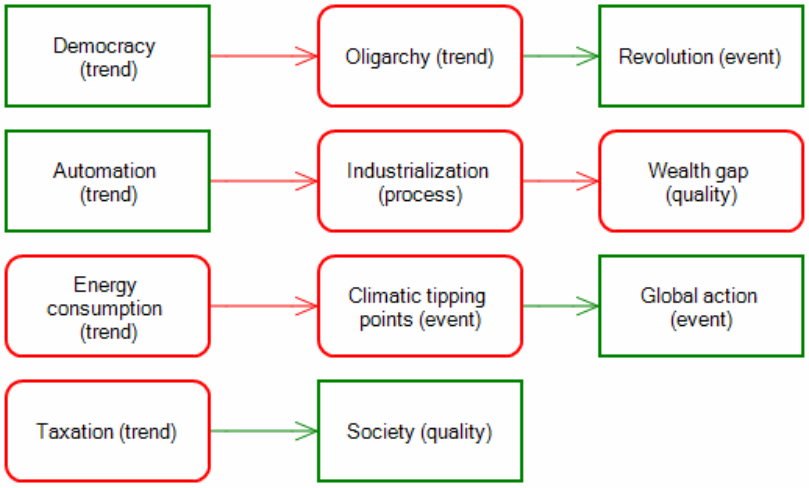
Trend

An agent can be a 'trend'.

A trend is something occurring over time – that is, it gets stronger over time and thus its effects are felt more strongly over time.

Trend agents are processes with time associated with them. Combining trends with effects and other agent types leads to a wide range of possible statements. For example, a trend may lead, over time, to the creation of a new process (e.g. industrialization), an event (e.g. catastrophe), more of a resource (power) or even trigger another trend.

Some trends:



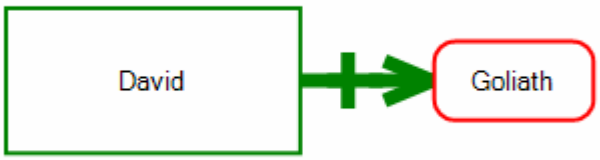
Thing (not typed)

Agents can be marked as just 'things' (abstract or concrete). For example, departments, people, costs, profits, intangibles, love, mother.

'Thing' is generally used when you don't want to say an agent is of another type such as a process or a function.

Agent, strength of

Agents are relative to one another in terms of their significance within the model. For example – one goal might be more important than another goal. One useful function may be more useful than another:



Effects

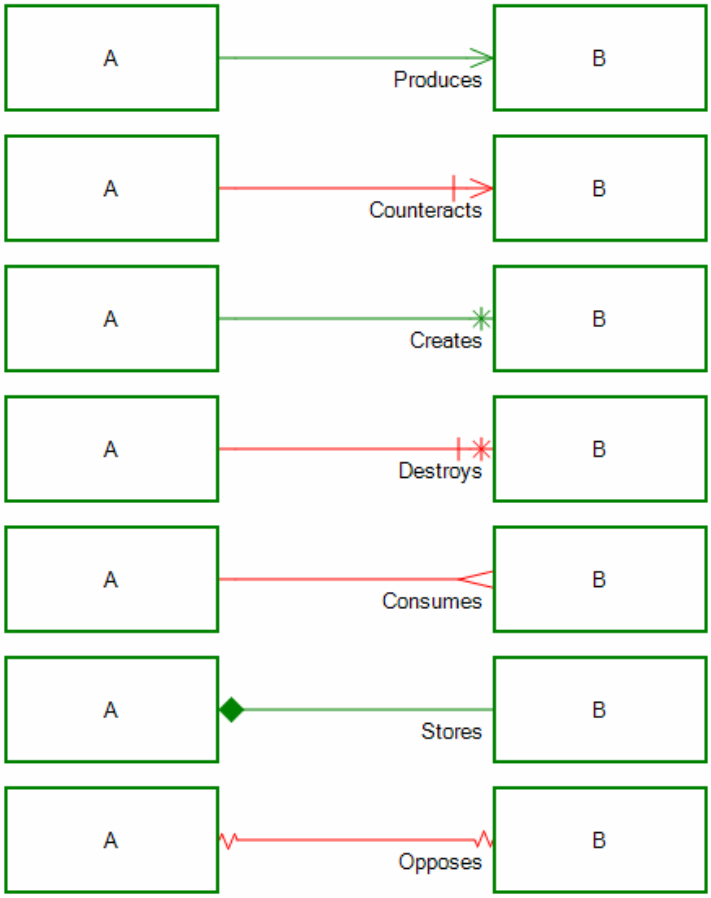
Agents influence one another through effects, for example, this department is having a harmful effect on profit. This effect, in term, can influence other agents, for example, the effect of the department limiting the profitability of the company limits shareholder value.

Effects can also influence each other, for example, the effect of limiting shareholder value limits the ability of the company to engage in activities that raise capital.

Agents can have any number of effects on other agents.

Southbeach provides several effect types, allowing for a rich expression of solutions and problems in the model. Effects can, in addition, be labeled with free text.

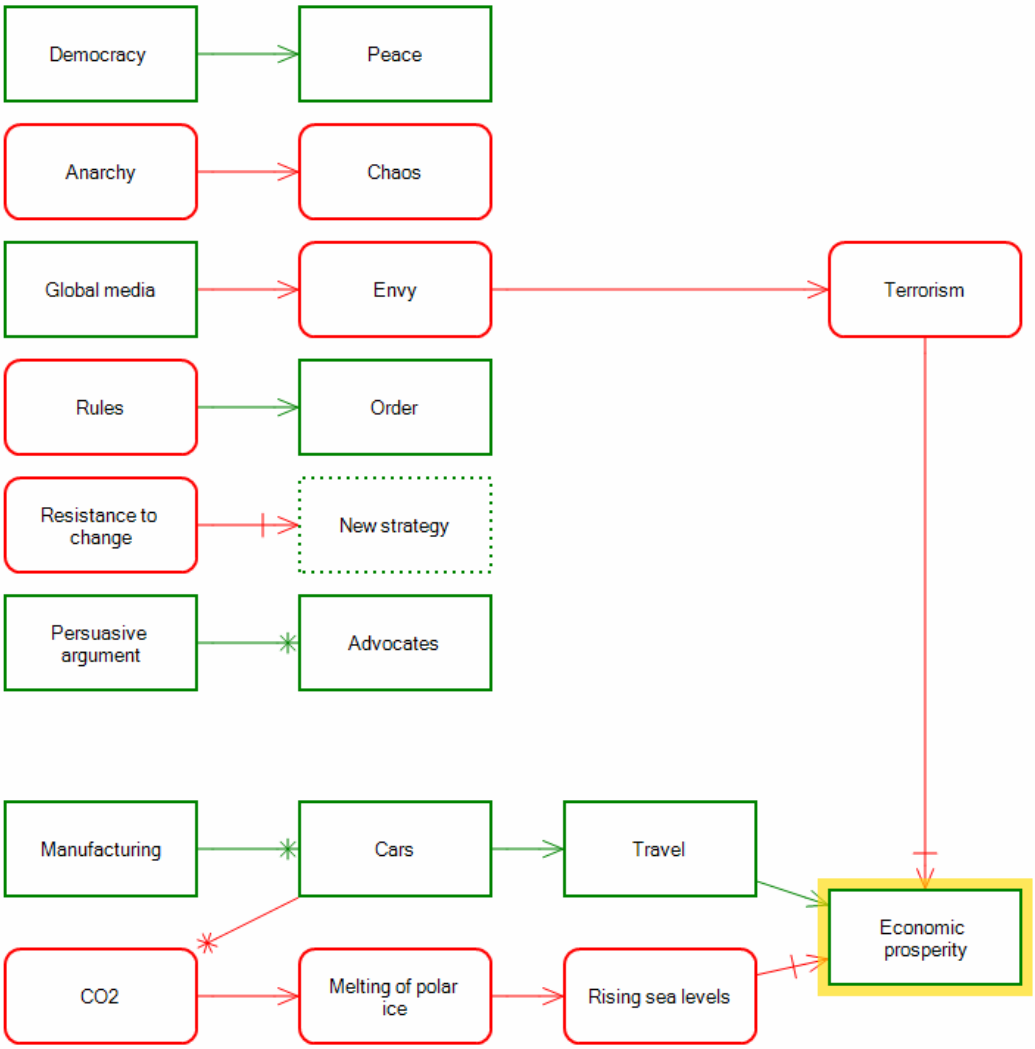
Types of effects:



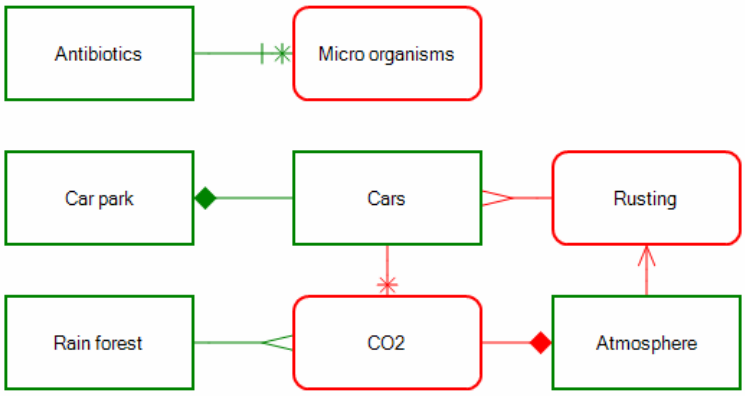
Southbeach effects

Whether an effect is viewed as useful or harmful in its own right depends on the type of effect, and the 'use' or 'harm' of the agents or effects it connects. For example, a useful agent, counteracting another useful agent, is clearly a harmful effect.

Here are some examples:



Here are more combinations to ponder:



Produces

A type of effect.

If 'A' produces 'B', then more 'A' leads to more 'B'. Less 'A' leads to less 'B'. Note – 'A' or 'B' could be useful or harmful. For example, a harmful business process could, nevertheless, be producing useful output.

'A' and 'B' need not be quantitative; 'increase' could be used in the sense of improved quality rather than quantity, e.g. improving service management improves customer service.

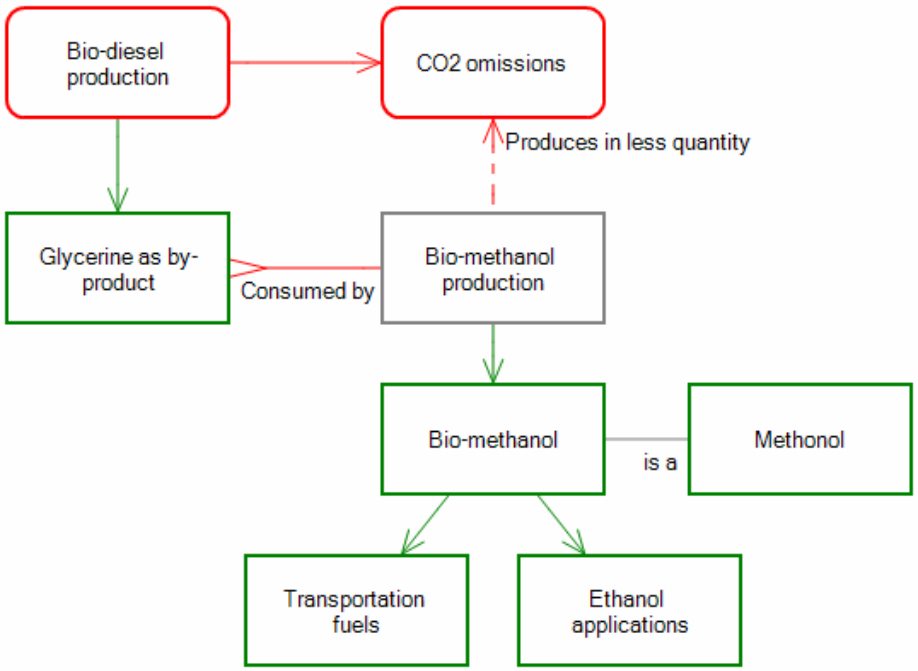
As for all effects – 'produces' can be used between agents of any type – for example, a business process agent producing a quality such as inflexibility to change, or an event such as end of production.

Counteracts

Flip side of 'produces'.

If 'A' counteracts 'B', then more 'A' leads to less 'B'. Less 'A' leads to more 'B'. Once again, 'A' or 'B' could be useful or harmful. For example, a useful process in the company could, nevertheless, be counteracting the work and output of another department.

Here is a model showing both 'produces' and 'counteracts' effects:



Produces and counteracts effects

Creates

'Produces' and 'counteracts' model the causes and effects between agents. 'Creates', by contrast, models an ability to bring more of something into existence, for example, a factory creates cars or a chemical process creates chemicals. 'Creates', and its counterpart 'destroys',

help to bridge between the world of TRIZ and the world of System Dynamics and Systems Thinking.[6]

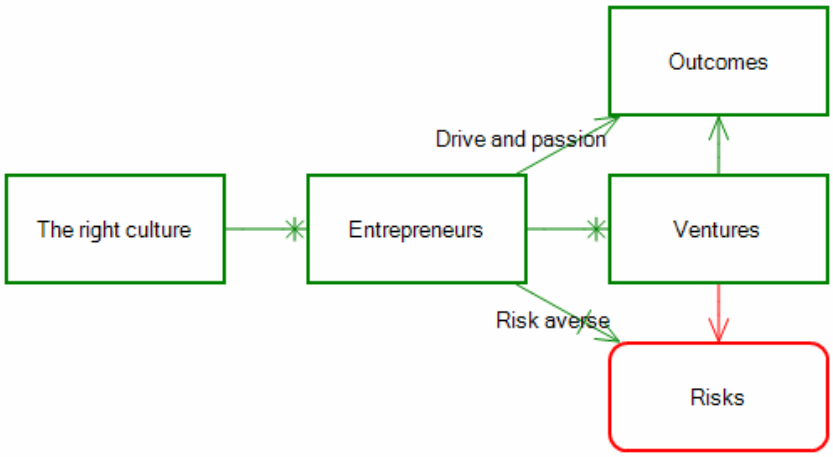
The use of the 'creates' effect, as with other effect types, can express subtle concepts when combined with agents of different types:

Creating more of a thing in the world, e.g. more entrepreneurs

Creating more of a function in the world, e.g. more ability to travel

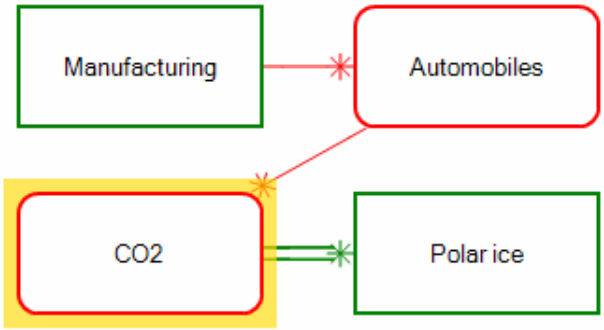
Creating more of a process in the world, e.g. greater farming capacity

Creating more of a quality in the world, e.g. affluence



This model says: the right organizational culture creates entrepreneurs. Entrepreneurs create ventures. They do so by driving and passion focused on outcomes, but also they manage risks. Contract to popular believe, they are not risk takers.

Here is another 'creates' model:



Destroys

Flip side of 'creates'.

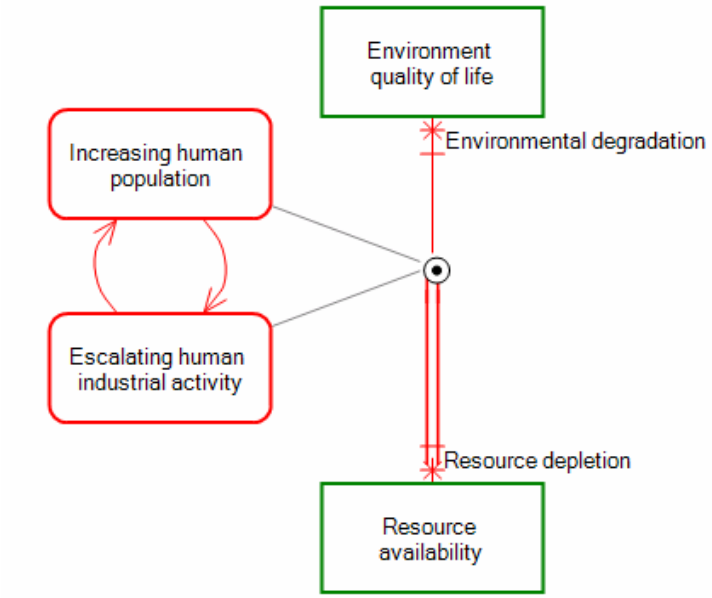
[6] http://en.wikipedia.org/wiki/Systems_dynamics
http://en.wikipedia.org/wiki/Systems_thinking

Companies going out of business

Less ability to travel (removal of travel opportunities)

Reducing land resources (destruction of fertile land – soil erosion)

Credit crunch – destruction of financial capital

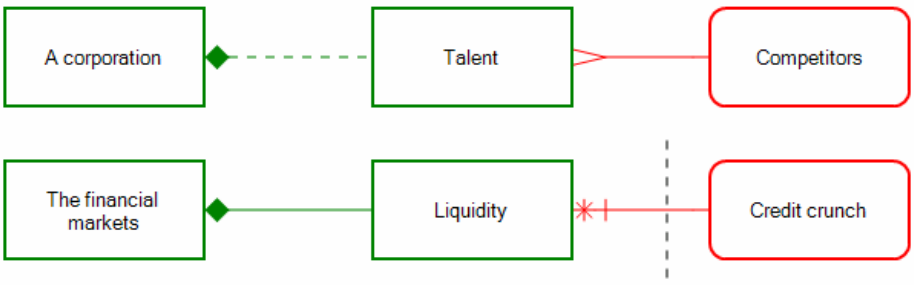


This example says: The feedback loop between human population increase and the associated industrial activity creates a combined effect, which is the destruction of both the environment, and a severe overloaded impact on the availability of useful resources.

Stores

Accumulation is modeled with ‘stores’ and ‘consumes’.

‘A’ stores ‘B’ means that ‘A’ accumulates ‘B’ over time. For example, a company is a store of talent – which is consumed by competitors; a financial market stores liquidity – which is destroyed by a credit crunch.



The dashed line means ‘insufficient’, signifying that a corporation is always on the look out for talent.

The dashed barrier across the credit crunch effect means ‘delayed’, in this case, coming as a surprise (stored up trouble).

Once again – subtle meaning can be expressed by combining the effect with different types of agents:

Storing a thing, e.g. warehouse provides useful inventory

Storing a function, e.g. access to agency staff able to supply skills on demand

Storing a process, e.g. contract manufacturing (availability to manufacture)

Storing a quality, e.g. innovation center (concentration of quality)

Whether or not a store inherits the attributes of the agents it is storing is a matter of perspective. Here are two examples:

Example 1

A warehouse stores inventory (useful). If it inherits the attributes of stored inventory that would imply that the warehouse is becoming more useful the more inventory that is stored in it. But stored inventory is a cost – harmful. The company wants its warehouses to be as small as possible because they represent a massive backlog of unrealized sales and sunk investment. On the other hand, unless there is a store of inventory, the business cannot fulfill orders on demand. Therefore, the use or harm of the warehouse is, like all other statements in a Southbeach model, stated from the perspective that supports problem solving.

If the warehouse is stated to be harmful, we want less warehouse capacity. If the inventory is stated to be useful we want a greater inventory capacity. In reality, warehouses and inventory are both harmful (typically). What is useful is for there to be sufficient inventory to supply demand without delay. Thus, in this case, only the person modeling the situation can state whether the warehouse itself is harmful, or useful, depending upon the problem they are trying to solve.

Example 2

Uric acid is a useful selective antioxidant capable of removing harmful radicals from the human body. However, when stored in excessive quantity or crystalline form it is a cause of Gout, or worse, kidney failure.

There is therefore no general rule for deriving the use or harm of a store based on what it is storing. It must be explicitly stated in the model. However, it is possible to ask questions of the model based on the flow of agents through the model. For example:

Would the warehouse become more useful if it were storing more inventory items?

Can you find another way to accumulate the inventory so that it can fulfill its function of providing sufficient supply of items?

Consumes

Flip side of stores. An accumulation is used up.

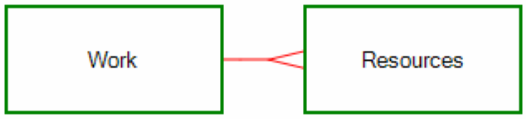
Consuming credit (no more loans)

Consuming all resources of a department

Consuming capacity of a process (no more output)

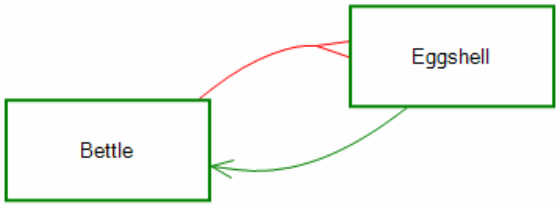
Cash flow crisis

All useful work consumes useful resources

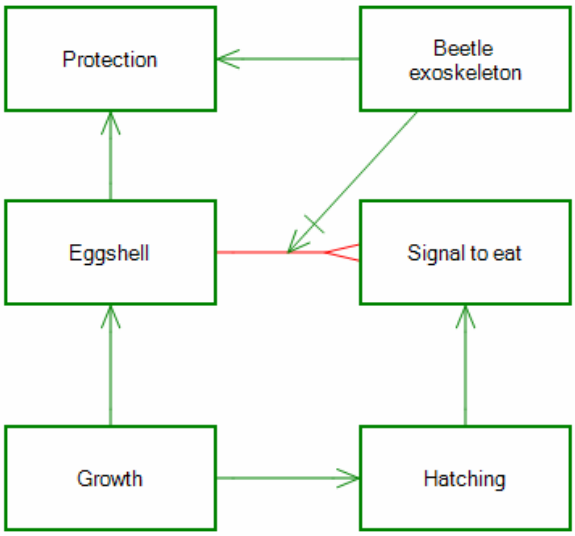


Like ‘stores’, ‘consumes’ intuitively is a 2-way effect. When a child eats an apple, the apple is consumed, but the apple also ends up in the child. Consuming itself has an effect, on the agent doing the consuming.

Often, these situations are modeled in terms of the flow of causes and effects. Take the example of a species of beetle. It has a curious relationship with its eggshell. It protects the beetle until hatched. At that point, the eggshell provides food (consumes).



Looking at this in more detail:



Note how the solution of the beetle’s early stage exoskeleton counteracts the consumption of the eggshell at birth which would otherwise provide the protection. So what has been modeled is a system of mostly useful elements, but with a time-based effect - consumption - which disturbs the original protection requiring a new protection to emerge.

This is the essence of ‘stores’ and ‘consumes’. These effects lay a time dimension over the model, in addition to the questions that can be asked about causes and effects between elements. (See later on the role of time in Southbeach)

Oppose

Two agents, or two effects, can 'oppose' each other in Southbeach. For example, north/south, push/pull, standardized/customized, rigid/flexible, cost/value, us/them.

'Oppose' is a relationship between two opposite attributes or tendencies. This is when the features cannot 'coexist' and the use of the system, or the attempts to tune the system, reveal the contradiction (or false assumption, design flaw, misconception etc.).

As with all Southbeach elements, the concept is generic and can be used to model a wide variety of such situations such as:

Engineering: Improve one parameter, and another worsens

Adaptability: Between incompatible design alternatives

Keep burning fossil fuels? Stop burning fossil fuels?

Selfishness and altruism: The individual versus society

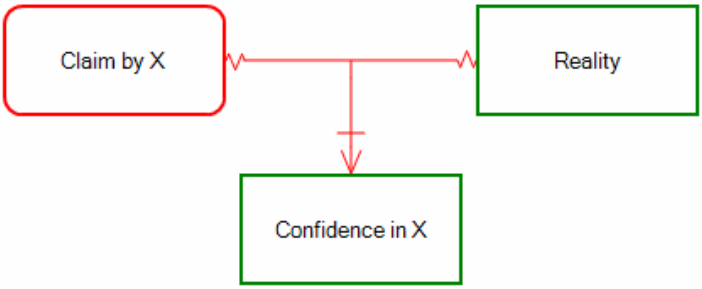
Review: Critical analysis or encouragement?

Logical argument: Dialectic

Opposed elements are found in many business scenarios leading to tensions (polarities[7]) between teams, departments and leaders – often resulting in poorly designed business processes that exhibit undesirable compromises and trade offs. For example, all companies must find ways to execute on incompatible goals such as maximizing profit by selling more products which requires spending more on marketing which reduces profit.

Opposed relationships often lead to compromise. Another way to think about this is that the elements in the relationship are in equilibrium (metaphor: liquid in a U-tube). The opposition reveals itself most strongly when one or the other changes for better or worse. Conflict arises when change is introduced to the system – for example, focusing on one side of the opposition to the detriment of the other. Oppositions can lead to inherent contradictions, dilemmas and even paradox.

Here is an example in the field of human relations:



When an opposition is deemed important, the business analyst or the engineer needs to find out exactly how the two factors are in opposition and so resolve the contradiction. Finding the root cause, or the multiple causes and effects that lead to the opposition, nearly always reveals important information about the relationship between the opposing elements.

[7] "There are Solutions in Polarities", H. Smith, May 2007, BPTrends.com

Key questions include: Are the two opposing concepts really in direct opposition, or is there a third factor? Can the two opposing factors be separated through a design change or are they the same? Insights of this type can often lead to a solution.

When an opposition is identified in a Southbeach model, the analyst may or may not have identified the root cause. The opposition, like other effects in the model, may be direct or indirect. Questions are asked about the diagram to reveal missing salient information.

Oppositions are very common. They are always a signal that more analysis is required. Here are more examples of oppositions:

Suitability: this way now, that way at other times

Work/Home life balance

Motivation and persuasion: words and deeds, "Walk the Walk"

Inertia: stability and change

Equilibrium: everything is OK unless this happens (Status Quo)

Love-Hate relationship (tense relationship)

Capitalism versus communism (battle of ideas)

Personal relationships: John and Bill are just not able to work together

Organizational tension: Two parts of the organization need to work together to achieve organizational outcomes, but find it difficult due to contradictions they have yet to resolve

Decisions and choice: A need to make centralized decisions in a decentralized organization (difficulty)

Politics and Social Systems: Rule of Law, Human Rights, Freedom of the Individual

Avoidance and painful decisions: "I need the solution" "I don't want to hear about the solution". "Do you have problems?" "Of course not!"[8]

A dilemma is a type of opposition.

The dictionary would define a dilemma as a state of uncertainty or perplexity when requiring a choice between equally unfavorable options. It applies therefore when two agents or effects, each considered harmful (if 'increased'), are in opposition with each other and therefore taking either path is harmful. For example: I don't know whether to stand my ground or to give in? Equally, one could face a choice between two desirable (useful) courses of action, where choosing one cuts you off from the other.

Paradox can also be modeled as an opposition.

A paradox is either a self-contradiction ("I always lie") or a statement that is necessarily false ("We are in profit and we are not in profit").

Resolving an opposition

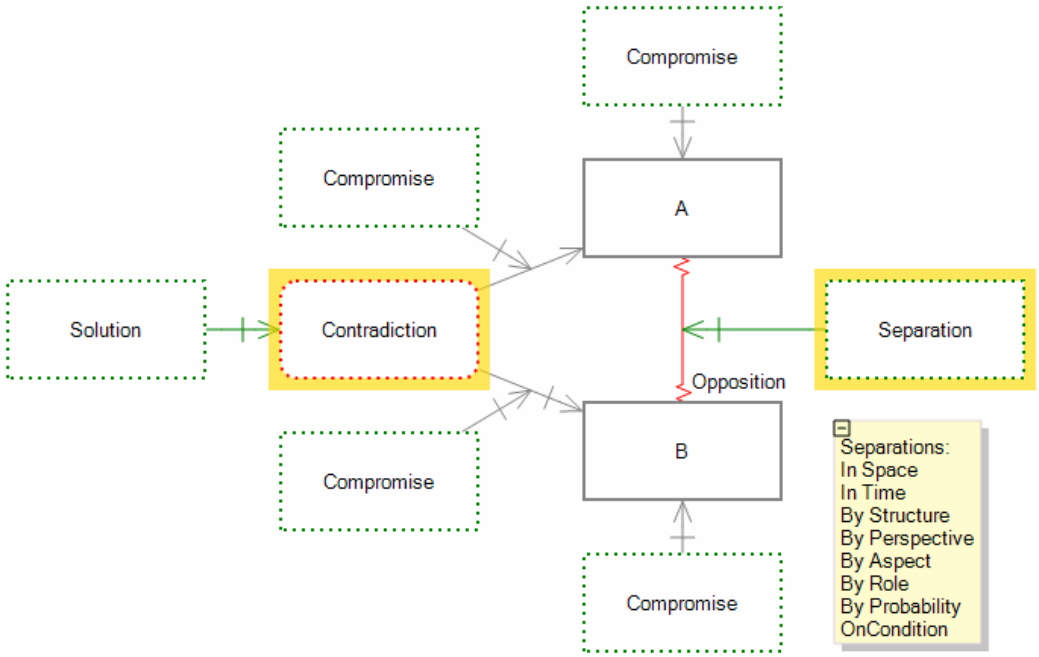
There are only certain ways of resolving an opposed relationship. Either the root cause contradictions are found, and a solution is introduced to counteract the contradiction, or, the inherently opposed elements are separated in some dimension pertinent to solving the problem.

[8] "The Trouble with People", P-TRIZ 7, H. Smith, Sept 2006, BPTrends.com

As a result of Southbeach agents being of many types (processes, functions, events, ideas, etc.), the many different types of possible oppositions lead to many viable separations. For example:

> A dilemma over competing ideas may need to be resolved through a change in perspective.
>
> A clash between events may need to be resolved through a separation in time.
>
> An idea raised at the wrong time may have to be delayed until it becomes acceptable or relevant.

The following model shows the potential solution injection points that can be added to an opposition:



Breaking contradictions

It is easy to fall into trap of believing that an opposition is real, when it is not. It is equally easy to believe that beneath all oppositions lie an inherent paradox, when there may be none. All of the techniques in traditional root cause analysis can be brought to bear to find a solution, as well as methodologies such as Southbeach, TRIZ and those practiced by management consultants and engineers. The opposition is, in effect, obscuring a factor which, if only we could pin it down, would reveal how to separate that element from others to solve the problem.

Annotating possible oppositions is always helpful. Annotating them visually tells people more about what is going on and how tightly bound different agents really are to each other. It also highlights the need to focus on specific problem areas and helps stimulate specific solution approaches regarding resolving the technical contradiction and potentially also doing the root cause analysis - and getting to the underlying physical contradiction.

Opposition in Southbeach forces the need for more analysis and model elaboration.

A note on TRIZ contradictions

The ‘oppose’ relationship in Southbeach will create a debate among TRIZ practitioners.

TRIZ distinguishes between two types of contradiction. Definitions published in books vary in details, so what follows next is one interpretation:

A TRIZ 'technical contradiction' (or compromise) is a situation in which two agents in a system are desirable, but improving one worsens the other. Improve the quality and it increases the cost. Increase the efficiency and it reduces the performance… This is the proverbial "trade off" or compromise. If something good gets better, something else gets worse. A classical TRIZ tool from engineering uses 2 axes in a contradiction matrix to define combinations of benefits being at odds with each other. Each node in the matrix is contradiction, and the matrix suggests possible abstract solutions in each case.

By contrast, a TRIZ physical contradiction (or paradox) is a situation in which one element must have two opposite properties. A pointer needs to provide reach across the chart on the wall and also needs to be convenient to carry. The object simply cannot be long and short at the same time. Yet we need it to be long during presentation and short during transportation.

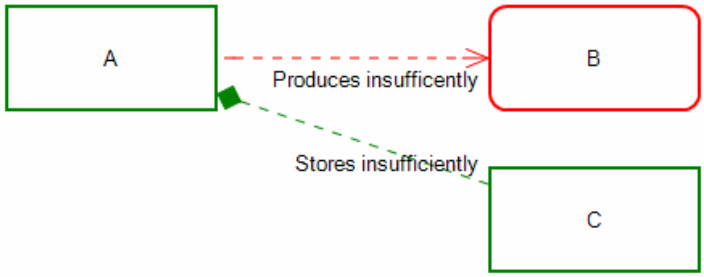
The TRIZ physical contradiction is sometimes called an **inherent** contradiction in that it lies in one element, often expressed as a requirement of the system.

TRIZ teaches us how to convert apparent technical contradictions to physical contradictions so that a separation principle can be used to seek a solution. In the pointer example above, TRIZ employs a "separation in time" principle, coupled to a "nest of dolls" solution, making the pointer collapsible for transportation by storing its extensible parts inside itself.

Insufficient effect

Southbeach effects can be modified to add additional meaning – just as agents are useful or harmful. An insufficient effect is a weak effect – which introduces uncertainty as to whether it is having the desired effect. An insufficiently useful effect needs to be improved. An insufficiently harmful effect poses a risk that needs to be mitigated.

All effect types can be 'insufficient'.



Here are two more examples:

More evidence is required is the current evidence is insufficient to create belief. A potential commitment to action is insufficient to speak and act decisively. Real commitment is required.

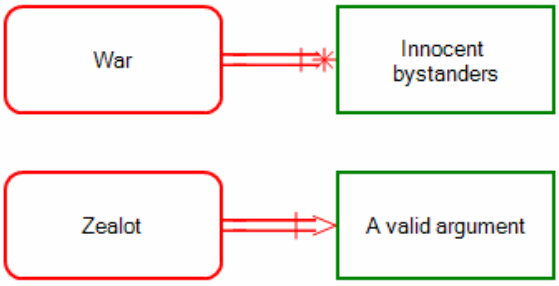
Overloaded effect

Flip side of 'insufficient'.

An overloaded effect is an excessively strong effect which introduces a degree of uncertainty in outcome – i.e. the result can be harmful, even if the effect is normally useful. (Too much of a good thing can be harmful). Applies to all types of effects:

An overloaded war would kill (destroy) innocent bystanders

A zealot can counteract the effectiveness of their own arguments



For a useful overloaded effect, you want less of the effect. For a harmful overloaded effect, you also want less of the effect, since the impact could be severe.

Required

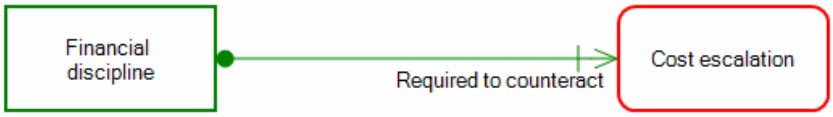
Example: 'A' is required to produce 'B' means that there may be limits on other ways to produce 'B'. Some examples:

Financial discipline is required to control costs

Good design is required in today's consumer marketplace

Sustainability measures are required if population continues to rise exponentially

All effect types can be modified to be 'required'. Here is an example:



Delay

An effect can be delayed, for example, due to the passage of time – or other type of hindrance. That is, 'A produces B delayed' means that the increase of 'A' causing the increase of 'B' is delayed compared to other non-delayed effects in the model.

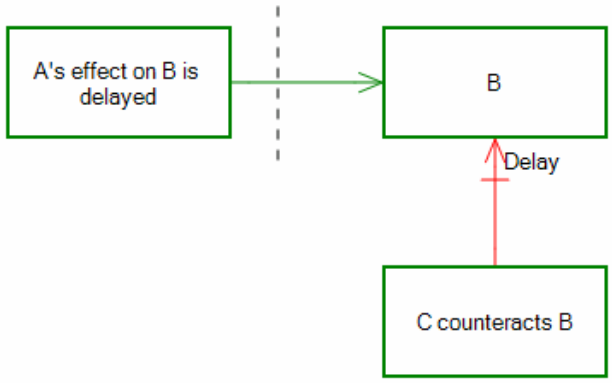
If ‘A’ and ‘B’ are events, then this means that there is a delay between ‘A’ occurring and ‘B’ occurring. For example: there may be a delay between making an investment in shares and being able to sell those shares for a profit.

Delay is often a time delay, but other types of ‘delay’ can be envisaged. For example, a semi-permeable membrane may delay the effects of ‘A’ on ‘B’. Other examples include:

Physical or Psychological inertia

Chain of command – order to action

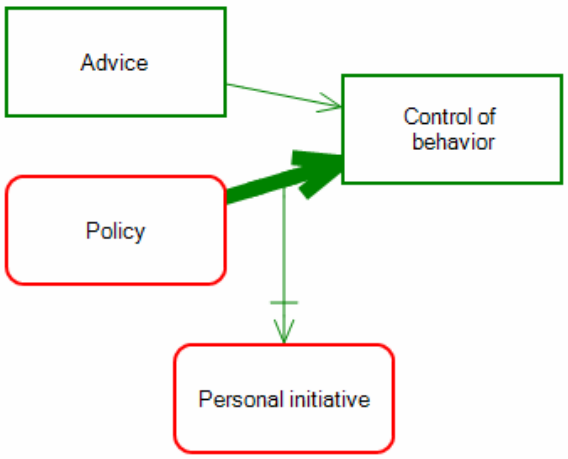
Performance produces pay rise (after a delay)



Effect, strength of

Just as agents are relative to one another in terms of their significance in the model, effects can be stronger or weaker. For example – corporate policy is stronger than advice in business. But, the strong application of policy can, as a side effect, counteract personal initiative.

As a model:



In the presence of (effect on effect)

Agents can have effects on effects, as well as on other agents. This is interpreted as “in the presence of”. For example, a company produces quality goods in the presence of a quality control system. A company produces quality goods but this process is degraded (counteracted) in the presence of poor quality control.

Each of the different Southbeach effect types can be used in this way. For example:

Produces (amplifies strength of) the effect (occurring between two agents)

Counteracts (diminishes strength of) the effect (occurring between two agents)

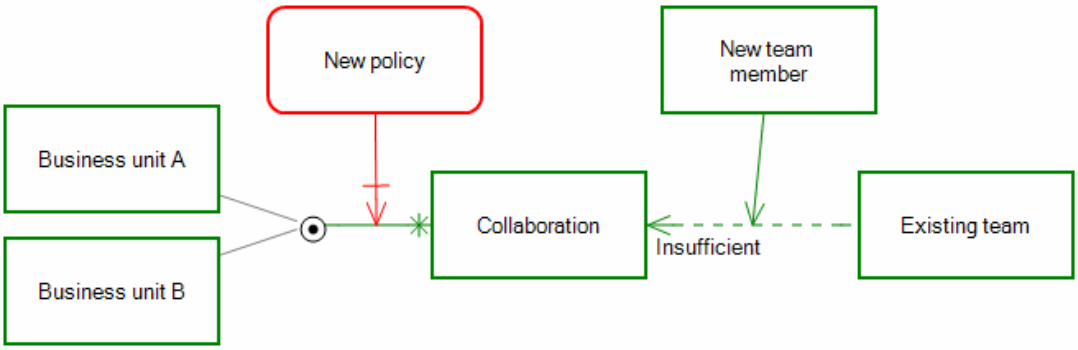
Creates (more and more instances of) the effect (between two agents)

Destroys (removes instances of) the effect (occurring between two agents)

Consumes (uses up over time) the effect (occurring between two agents)

Stores (accumulates for later use) the effect (occurring between two agents)

Here is model containing two real world examples of "in the presence of":



This model says: Adding someone new to a team produces the change needed to overcome insufficient collaboration between other team members. At the same time, a new policy is introduced, its effect being to make it harder to build internal collaborations between different business units – silos are created removing valuable possible collaborations.

Here are other examples:

A team is working well, but a new manager with different goals has a negative impact on processes that continue to need to work well

A knowledge management system creates more and more examples of reuse occurring across the company

A team is working together well – but the effect of the collaboration (the output) is consumed by an organizational structure and value set that does not recognize the value of innovation that occurs outside of top down planned projects

A marketing program for innovation success stories stores the effects of innovation in a way that creates momentum for further investment in the innovation program

Effects having effects

Effects can also have multiple effects. For example: the effect of the new CEO on the organization has had the effect of encouraging a greater engagement of staff in the management agenda. And his presence has the effect of greater financial discipline.

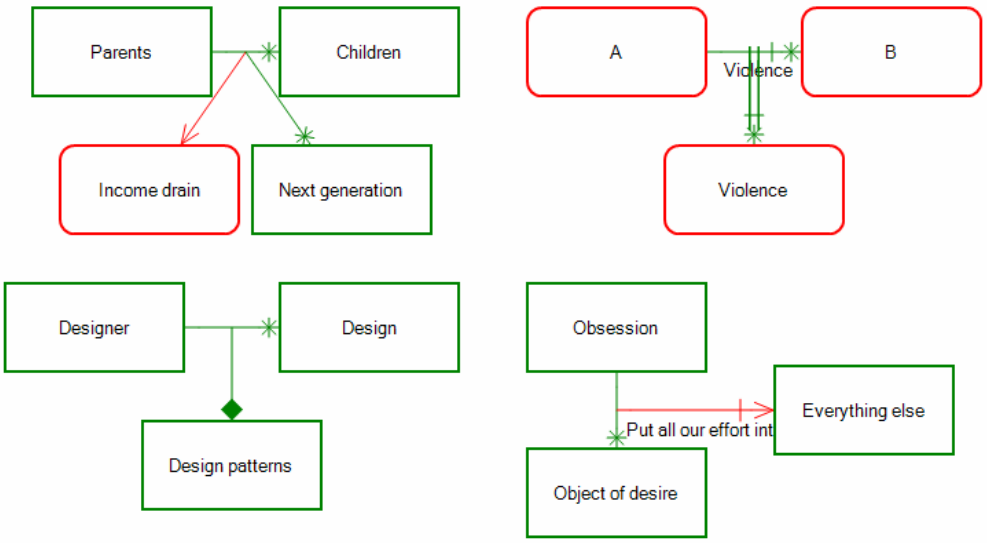
The combinations, once again, give rise to a powerful ability of Southbeach to express different ideas: The effect of producing something has a useful side effect. Examples are:

The act of creating something creates something else. (Benefit)

The act of destruction leads to other acts of destruction (Violence breeds violence)

Producing this counteracted our ability to do something else. (Consequence)

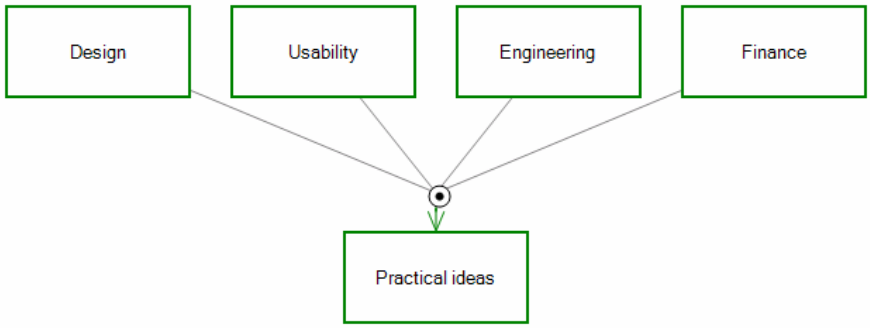
As the designer created, we noted the process and design pattern she used, and stored it for use in future projects (storing an effect for later reuse)



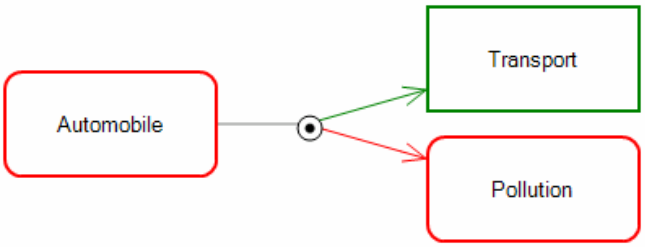
Conjunction (join)

Southbeach provides a conjunction operator. It can be used in two ways. For example:

'A' and 'B' (and 'C' …) together create an effect. For example, a multidisciplinary team is needed to create practical new ideas:

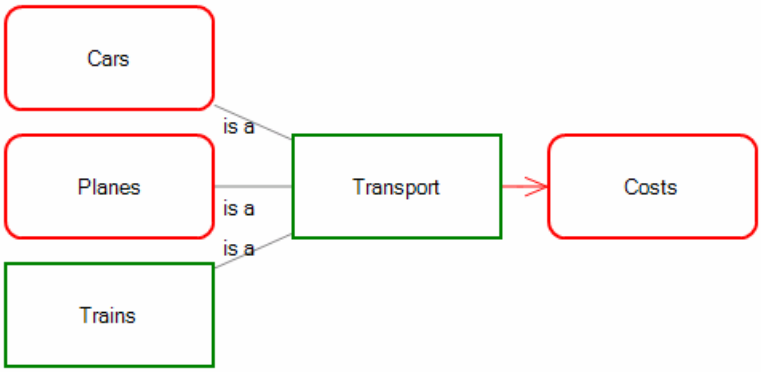


An agent produces multiple effects at the same time which must all exist. For example: a car cannot produce travel without also polluting the environment:



'Is A'

Southbeach provides support for limited knowledge modeling, for example, an automobile 'is a' type of transport. This permits Southbeach to map knowledge from one field to another. Knowledge about transport is inherited by automobiles. This also means that questions or approaches applicable to one model can be replicated from abstract agents (means of transport) to specific agents (automobiles, planes, trains). For example, all these modes of transport produce costs.



Note: It is not the intention of Southbeach to replicate features of process modeling, architecture modeling or software engineering modeling. Rather, we see Southbeach being used in other software tools, in order to support the process of improvement and exploration of those design alternatives and artifacts.

Separation

Modeling in Southbeach is always a matter of perspective. When an agent is marked as useful or harmful, the business user (or an analyst/consultant working on their behalf) is taking a decision based on their perspective and/or they are encoding their knowledge of the perspective of a third party.

For example: an environmentalist developing a Southbeach model will have a very different view of the usefulness of the oil industry than a shareholder in that company. The agent "oil industry" would be harmful to the environmentalist, and useful to the shareholder. A business leader may develop a model to illustrate their perspective on how to improve the business. His colleague up the corridor may disagree completely.

Understanding and resolving differences in perspective, by identifying root areas of agreement and disagreement, is just as important as identifying the root causes of contradictions in engineering problem solving. For example, both the environmentalist and the shareholder could be persuaded that the employment provided by the oil industry is useful – allowing them to explore improvement strategies for the oil industry to move into adjacent or emergent markets.

These differences of perspective occur at the model level, and at the agent level.

A model can be drawn from multiple perspectives. That is, the knowledge in the model represents the combined views of the persons holding those perspectives. It is also valid to provide, in one model, the same agent, viewed from differing perspectives – such as cost useful to the seller and cost harmful to the buyer. All agents inherit the perspectives of the model, unless they are modified.

Modeling perspectives in this way creates separations. A model or an agent within a model is separated from another model or agent, which may be trying to describe the same situation, based on the differing perspectives at play. This is valuable, since differing models can be

compared, leading to insight. Models from different perspectives can be combined, a process called perspective alignment, which has powerful psychological effects on those involved, leading to greater common understanding of problems and greater buy in to the actions necessary to be taken and the solutions that need to be implemented to resolve the problems. Unifying models from multiple perspectives lies at the heart of the Southbeach methodology.

Dimensions of separation

Perspectives are only one of several ways to separate and partition models into sub-models and viewpoints. Southbeach supports a variety of separations that map to real world concepts and which are relevant to the objectives of continuous improvement and the exploration of design alternatives.

For example, a model may be developed to explore the branding aspects of a product, and how this relates to its design engineering constraints. An integrated model from these aspects would assist the brand manager to work more effectively with the director of engineering. Multidisciplinary innovation of this type is one of the goals of the Southbeach. Southbeach attempts to create a lingua franca across disciplines, each of whom are engaged in bringing new products, services, processes and ideas to market.

Southbeach explicitly supports the following separations:

Dimension of separation	Examples
In Space	Above, beneath, up, down, to the left, inside, outside, near, far etc.
By Time	Past, present, future, near future, before, after, during, planning horizons etc.
By Structure	System, subsystem, super-system, organizational structure, this component, that component etc.
By Perspective	Buyer, seller, CEO, finance director, employee, government view, concerned citizen, by strength, by weakness (SWOT), De Bono Six Thinking Hats (colors), Barriers and Aids, etc.
By Aspect	For example of a product: brand, usability, design, serviceability, finance, business model, etc.
By Role	Participant in a process, role in an organization, in a team etc.
By Probability	Low, mode, high, certain, rare, 2nd quartile, etc.
On Condition	Catch all – any conditions – specify

Grids

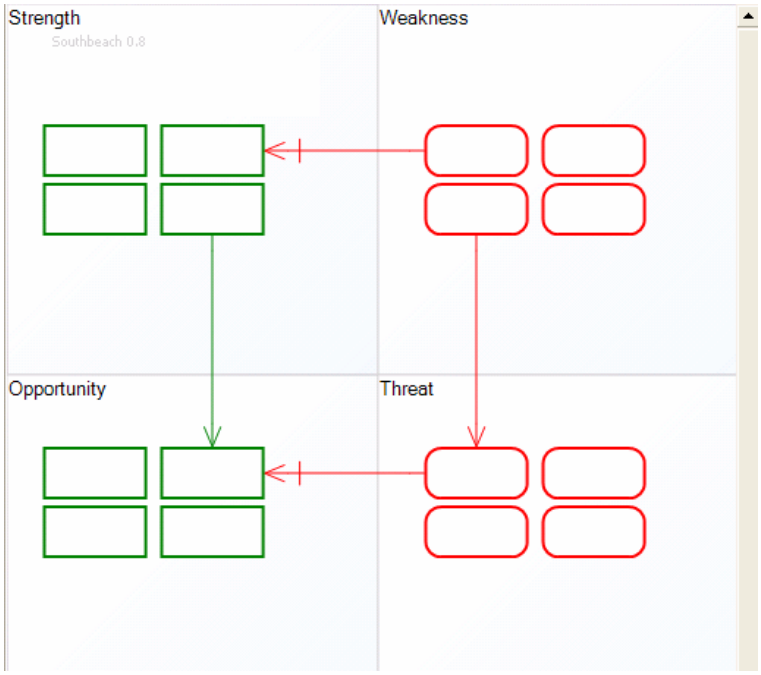
Grids are a visual tool in Southbeach. They are used to develop separated or partitioned models using the dimensions listed above.

Agents are drawn over the grid, and inherit separation attributes off the grid. Consultants often do the same on flip charts. Grids are powerful, since they opens up new directions in which improvements to the model, or the situation or system, can be explored.

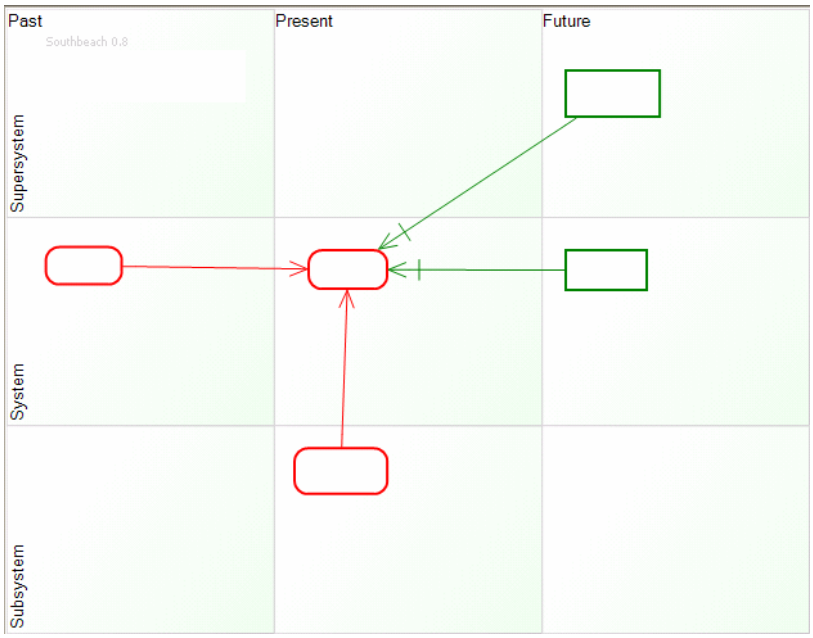
Two types of grids are supported:

Single separation: This is laid out as either a row of cells (horizontal), a column of cells (vertical) or a table of cells (n x m). For example, a SWOT chart, much beloved of management consultants and of which there are many variations, contains four 'perspectives' for looking at a company: its strengths, weaknesses, opportunities and threats. This type of chart is normally laid

out in the typical management consulting 2x2 fashion even though the four boxes refer to the same dimension:



Dual separation: This is laid out in a two dimensional table of cells. Any combination of two dimensions of separation can be used. For example, TRIZ teaches that to solve a problem you should look at it in all combinations of two dimensions: time (past, present and future) and structure (the system, its subsystems and the super-system or environment in which the problem exists. (TRIZ calls this 9-box modeling.)



A wide range of grids can be imagined, allowing Southbeach to capture best practices which can help in the early stages of model development. For example, a Barriers and Aids chart commonly used in Six Sigma methods is a three cell grid: the barriers, the aids, and the desirable change.[9]

The grid is therefore a useful tool which can emulate a wide range of business diagrams. However, we have no objective to try to emulate every type of business diagram. Rather, we provide a common tool (a general purpose grid). For everything else, we intend to support the "mark-up" of other diagram and text forms. See later.

Meta models

Every grid can have an associated meta-model. This is a model that describes the relationships (effects and influences) between the cells in the grid – as opposed to the agents placed in those cells. For example, in a SWOT chart, strengths counteract weaknesses.

When a grid has an associated meta-model, the elements placed on the grid naturally inherit knowledge about the grid. For example, placing an agent in the 'strength' cell not only inherits the attribute 'Aspect=Strength', but the knowledge that, as a strength, it counteracts weaknesses.[10]

Meta-models are an advanced feature of Southbeach that will be described in more detail in other articles and papers.

Southbeach mark up language

It is viable to consider adding Southbeach elements to other tools, allowing for existing intellectual property, in any form, to have additional information added that helps with improvement and the exploration of design alternatives. For example, Southbeach could be added to process modeling tools, architecture modeling tools, etc.[11]

Southbeach "mark-up" is an advanced application of Southbeach that will be described more fully in future articles and papers.

Models are really just agents

Models contain agents. Agents can be modeled. Everything is really an agent.

Every model defines a new agent, and introduces new agents. Thus, models have the same attributes as agents. They are:

Useful (the model represents a solution)

Harmful (the model represents a problem)

Neutral

A goal and/or a focus and/or holds potential (future problem or solution)

Describing a: process, function, resource, quality, event, idea, trend, thing …

Can be separated from other models (in multiple dimensions)

The scope of all agents is as follows:

- The model in which it resides;

[9] "Thinking visually in TRIZ and Six Sigma", H. Smith, June 2006, BPTrends.com
[10] "Beyond SWOT and towards Change", H. Smith, July 2006, BPTrends.com
[11] "P-TRIZ in the history of Business Process", H. Smith, April 2006, BPTrends.com

- In respect of the model perspective, aspect, or other separation principle;
- The solution models in which it resides in respect of world problem-solution knowledge sets.

Just as solution agents can be added to a model to counteract problem agents, solution models can be matched against models of problems, and vice versa. This is another advanced application of Southbeach that will be described in future articles and papers.

The role of time in Southbeach

Southbeach models express the passage of time in various ways.

All Southbeach models are about change. The statement 'Useful A produces useful B' implies, in some sense, that increasing 'A' produces an increase in 'B' and that a decrease in 'A' produces a decrease in 'B'. This is taken to be interpreted loosely, for example, there may not be a quantity. 'A' produces 'B' also means that 'A' causes 'B' or leads to 'B'. Therefore, you can consider a Southbeach model as undergoing change as time progresses.

Southbeach agents of any type can also be stores or accumulations of some other agent or effect. Thus, 'A' stores 'B' means that, over time, a build up of 'B' occurs at 'A'. In this sense, the model accumulates as time progresses.

These time effects can be used to ask questions of the model, leading to improvement strategies. For example, the question "What could be done to increase 'A' more?" is relevant only because the model states that 'B' is useful and it is produced by 'A'.

Other time elements of Southbeach include:

Effects in Southbeach can be 'delayed' relative to other effects in the model. This also introduces time based effects, allowing questions to be asked about accelerating or decelerating the impact of effects.

Agents can be explicitly typed as 'events'. The events are more likely or less likely to occur in response to the effects stated in the model. Thus, there area relationships in time between events in the model, and these are set against the backdrop of how the agents interact. The events play out relative to one another in time.

Agents can be explicitly typed to be Trends. Trends are viewed as occurring all the time if being produced or created – and their impact is stated according to the effects they have on other agents. Thus, trends overlay the time nature of the model.

Southbeach provides a time separation dimension. Thus, different agents in the model can be placed in different time zones relative to one another.

What next for Southbeach?

We do not intend to allow Southbeach to stray into areas of visual notation already covered by existing notations, for example, executable process modeling, architecture and software modeling. Rather, Southbeach complements these notations by allowing existing content to the "marked up", to support improvement, problem solving and the exploration of design alternatives.

Software will shortly be released that will allow you to experiment with Southbeach notation.

The reference release of the notation will be accompanied by an article illustrating the potential applications of Southbeach.

If you wish to be informed when the software becomes available please write to:

software@southbeachinc.com

If you are interested in applying Southbeach or have views about the direction of its development, please write to:

feedback@southbeachinc.com

Appendix A – Southbeach ontology

The following figure summarizes the elements of Southbeach:

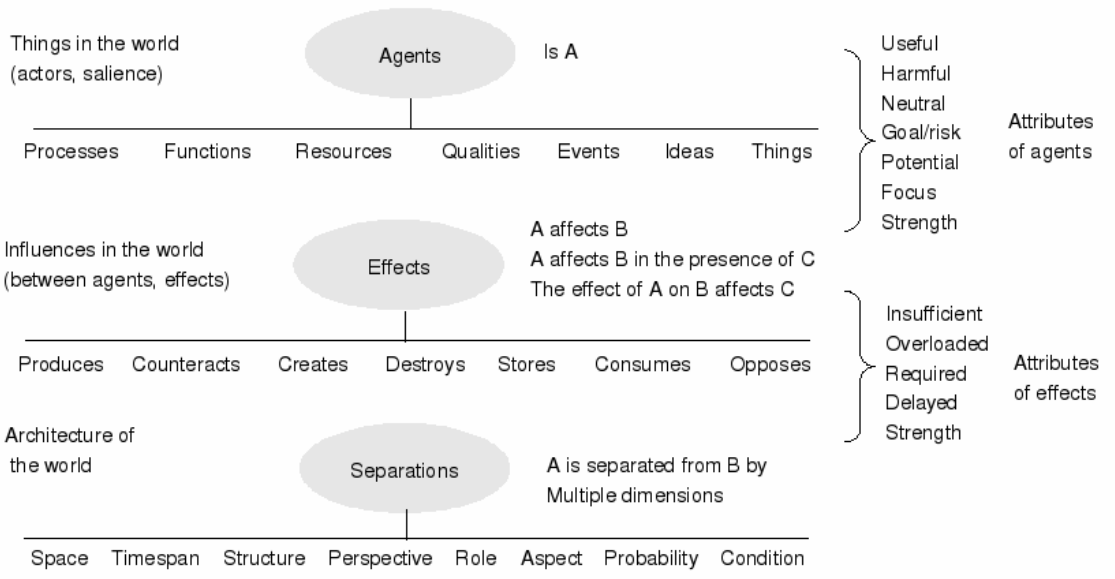


Figure 7 – Southbeach ontology summary

Southbeach views the world in terms of interacting (influencing) agents or actors. When an agent affects another agent via an effect, the effect itself becomes an agent in the world, able to influence other processes.

Everything is considered useful or harmful or neutral.

Agents can be actual or potential. Agents can be goals or risks. Agents can be a focal point for improvement or risk avoidance. Agents can be strong or weak.

Effects can be insufficient or excessive (overloaded). An agent may be required for an effect to be manifest. An effect may be delayed – with respect to other effects. Effects can be strong or weak.

Agents exist in multiple dimensions. They may be separated in those dimensions for the purposes of understanding potential solutions. Each dimension acts as a secondary perspective, for example, from the perspective of inside the company, outside the company (structural separation).

Appendix B – Southbeach synonyms

The power of Southbeach lies in the generality of the modeling concepts and the care with which they have been chosen to map to the widest range of real world concepts. Synonyms play a large role in Southbeach modeling. A good knowledge of language and vocabulary will allow you to draw effective Southbeach models.

In Southbeach, synonyms and related meanings play two roles:

- Using a Southbeach term, for example, 'useful', allows you model similar concepts, for example, 'valuable'. Close meanings will be found in a thesaurus.
- Southbeach also allows more distant terms to be used, for example, metal "rusting" may be modeled using the Southbeach "consumes" effect.

The following is a list of close meanings for Southbeach core elements. Your imagination will allow you to find more distant meanings.

Agent	An active and efficient cause – capable of producing a certain effect A substance that exerts some force or effect A representative who acts on behalf of An entity that causes things to happen Cause, moving force, power, means, elements, factor Reagent, doer, actor, mover, practitioner, performer, operator, worker, promoter, organizer, developer, inventor Representative, middleman, go-between, intermediary, negotiator, envoy, messenger, broker, functionary, operative
Useful (Solution)	(agent attribute) Positive Being of use or service Capable of being turned to use or account Having a useful function All opposites of harmful plus: Serviceable, advantageous, helpful, good for, applicable, employable, usable, functional, of use, enabler, convenient, instrumental, conducive, worthwhile, gainful, profitable, rewarding, contributory, productive, paying, valuable, beneficial Efficacious, effective, expedient, practical, handy
Harmful (Problem)	(agent attribute) Negative Causing or capable of causing harm Constituting a disadvantage, contrary to your interests Able or likely to do harm Involving or causing danger or risk, liable to hurt or harm All opposites of useful plus:

	Dangerous, risk, detrimental, pernicious, hurtful, damaging, ruinous, destructive, unhealthy, unwholesome, noxious, poisonous, toxic, virulent, corrosive Bad, evil, malign, corrupting, subversive, undermining, seditious
Neutral	(agent attribute) Undecided use or harm Neither a solution nor a problem Not supporting or favoring either side in a dispute Having no preference Not active Having no net effect either way Of no distinctive quality or characteristic Lacking distinguishing features or interest Made neutral Not associated with any faction or cause Not having or expressing opinion or view Non-participating, uninvolved, disengaged, not fighting, peaceful Impartial, non-partisan, unbiased, without favoritism, unaligned, uncommitted, unaffiliated, free, disinterested, indifferent, objective, detached, withdrawn, removed, remote Indefinite, indeterminate, indistinguishable ordinary, average, everyday, bland, uninteresting Non participant, non interventionist, unaligned state, isolationist
Goal	(agent attribute) State of affairs that a plan is intended to achieve – and that, when achieved terminates behavior intended to achieve it A place designated as the end (race or journey) Intended to be attained (and which is believed to be attainable) Aim, purpose, intent, aspiration, ambition, ideal, end, objective, target, destination, terminus, home, pay off, finish
Focus	(agent attribute) Concentration of attention Special emphasis attached to something Direct one's attention on something Center, focal point, core, kernel, middle Hub, axis, pivot, meeting place, center of attraction Bring into focus, concentrate, zero in on
Potential	(agent attribute) Capacity for coming into being Latent, inactive Existing in possibility

	Not presently evident or active Expected to become or to be, in prospect Capacity, capability, potency, possibility, prospect, likelihood Possible, probable, prospective, likely, expectation, hope, promise Conceivable, imaginable, unrealized, undeveloped Latent, dormant, quiescent Passive, inactive, covert, hidden, concealed, undisclosed, implicit, unexpressed Dormant, quiescent, veiled, hidden Unseen, invisible, indiscernible, imperceptible Idle, inactive, passive Becalmed, resting, slumbering, hibernating Inert, lifeless, motionless Inoperative, nonfunctioning, nonperforming, unused Suspended, deferred, postponed, in abeyance, pausing, waiting
Process	(agent type) A particular course of action intended to achieve a result A sustained phenomenon or marked by gradual changes through a series of states Subject to a process or treatment – with the aim of readying for some purpose, improving, or remedying a condition Procedure, operation, action, work on Prepare, treat, refine, convert, compute, transform, change Handle, deal with, manage, care for, attend to, organize, systematize, classify, categorize, grade, rank, screen, sift
Function	(agent type) What something is for or used for The actions and activities assigned to or required or expected Perform as expected when applied (correct function) Serve a purpose or a role Use, purpose, role, operation, duty, task, assignment, mission, job, occupation, business, profession, work, vocation, calling Affair, concern, interest, matter, post, position, situation, capacity Act, work, operate, perform Serve, act as, perform as, function as, work as, play the role of, have the function or job or mission of
Resource	(agent type) Available source of wealth A new or reserve supply that can be drawn upon when needed Something useful or valuable in one context – even if harmful in another

	Anything of material value or usefulness Support, backing, help, aid, reinforcement, reserve, source, cache, storehouse, hidden supply, money in the bank Collective wealth, natural resources Assets, property, goods, possessions, holdings, income, revenue, profits, gains, inventory Ability, capability, capacity, aptitude, skill, know how, knowledge, experience, prerequisites, edge, advantage, selling point
Quality	(agent type) Individual nature of something A distinctive property Having a desirable or positive quality – suitable for a thing specified Having undesirable or negative qualities Characterized by ... (attributes) Characteristic, property, attribute, distinction, feature, trait, virtue, idiosyncrasy, singularity, eccentricity, peculiarity, quirk, oddity Character, nature, kind, grade, condition, complexion, tone, timbre, mood Detail, particular, element, personality, temperament, disposition, tendency, bias, leaning, propensity, proclivity, proneness, predilection, predisposition, innate attribute Gift, talent, genius, faculty, knack, ability, capability, specialty, stock in trade, earmark, forte Strong point or suit, talking or selling point, merit, asset, advantage
Event	(agent type) Something that happens at a given place and time Or a special set of circumstances or conditions A phenomenon that follows and is caused by some previous phenomenon (process) A natural phenomenon involving the physics of matter and energy Occurrence, incident, situation, occasion, affair, happening Episode, action, deed, act, experience Case, matter, circumstance, an eventuality Feat, accident, chance, happenstance Outcome, result, consequence, upshot, sequel, subsequence, aftermath
Idea	(agent type) The main thing you are thinking about The perspective Your intention – what you intend to do A personal belief or judgment – that may or may not be founded on proof or certainty

	Conception, concept, construct, thought, abstraction Understanding, perception, apprehension, awareness, notion, inkling Observation, impression, inference, assumption, surmise, guess, suspicion Opinion, view, viewpoint, position, sentiment, feeling, notion Belief, conviction, persuasion, culture, creed, doctrine, philosophy, outlook Tenets, principles, teachings, policy Plan, design, scheme, dream, vision Theory, hypothesis, postulate, supposition, conjecture Conceit, concoction, fantasy, daydream, fiction, flight of fancy
Trend	(agent type) A general direction in which something tends to move A general tendency to change Tendency, drift, course, bent, career, progress Inclination, bearing, heading, orientation Tack, aim, way, track Style, vogue, fashion, taste, mode Incline, lean, veer, dispose, bias, warp, swing toward
Thing (not typed)	(agent type) Concrete or abstract Un-typed For example: A separate and self-contained entity A man-made object taken as a whole A statement regarded as an object A special abstraction – a concept or idea not associated with any specific instance A vaguely specified concern Object, article, something, anything Substance, element, stuff, matter, unit, particle, entity
Strength	(of effects and of agents) Relative strength - Having strength or power greater than average or expected Capacity to produce strong effects The property of being physically or mentally strong The power to induce a course of action or the embracing of a point of view by means of argument or entreaty The energy transmitted Permanence – by virtue of the power to resist effects

	Power, force, might Vitality, energy, dynamism, robustness, toughness, resilience Courage, fortitude, backbone, will power, nerve, tenacity, determination, persistence Greatness, magnitude, immensity, largeness Sway, control, dominance, seriousness, gravity, import, urgency Efficacy, effectiveness, efficiency, potency Weight, solidity Cogency, validity, soundness, stability, reliability, trustworthiness Durability, toughness, impregnability, imperviousness, resistance Intensity, concentration, richness Fervor, ardor, excitement, enthusiasm, eagerness Clarity, brightness, vividness, sharpness
Effect	(of an agent, or of an effect) A phenomenon that follows or is caused by some previous phenomenon An outward appearance Perform an action Act so as to bring into existence Take effect, go into operation, begin to function, start to work Consequence, result, outcome, conclusion, issue, end, upshot, event, sequel Aftermath, outgrowth, turnout, after effect, fallout, backwash, wake Side effect, by-product, offshoot, repercussion, reaction, feedback Impact, influence, impingement Impression, sensation, feeling Execution, accomplishment, fulfillment, realization, success Achievement, performance, production, operation Purport, meaning, tenor, bearing, implication, significance Intent, intention, purpose Cause, bring about, make happen
Produces	(type of effect) Bring forth or yield Cause to occur or to exist Come to have or undergo a change of (features and attributes) Cause, make, bring about, bring to pass, set off, give rise to Effect, occasion, generate, engender, sow the seeds of Spark, initiate, start Create, compose, originate, invent Formulate, draw up, draft Shape, frame, design, fashion, work out Manufacture, construct, weave, fabricate, build

	Bear, give birth to, bring forth, bring into the world, bring into being or existence Provide, supply, furnish, give, yield, render Deliver, come through as promised, perform as desired Propagate Bring forward, present, set forth Disclose, make plain, reveal Manifest, bring to light, bring before the public Show, display, exhibit, bring out Yield, product, production, result, outcome, outgrowth, output Crop, harvest, returns, proceeds
Counteracts	(type of effect) Inhibit, prevent or reduce Oppose or check by a counteraction Mitigate the effects of by contrary actions Destroy property or hinder normal operations Act against, act counter to, contravene, run counter to Cross, antagonize, thwart, obstruct, block, undermine, frustrate, impede, hinder, interfere with, annul, nullify, cancel Check, repress, restrain, diminish Clash with, conflict with, work at cross purposes with Counterbalance, offset, counterpoise, neutralize, destroy the effect of, undo
Creates	(type of effect) Make or cause to be or to become Bring into existence Pursue a creative activity Manufacture a man-made product Generate, beget, father, spawn, procreate, bring into being, give life to, call into existence, cause to exist Originate, invent, innovate, coin Make, produce, fashion, fabricate, frame Design, contrive, devise, develop, construct, build, erect Shape, form, mold, forge Imagine, conceive, dream up, visualize Invest, constitute, install, elevate Found, establish, initiate, give rise to, break ground Bring about, arrange, inaugurate, start, launch, incept Start the ball rolling, take the first step, make the first move
Destroys	(type of effect) Do away with, cause the destruction or undoing of Destroy completely, damage irreparably (process and function)

	Defect soundly Cause to die, put to death Demolish, wipe out, pulverize, wreck, knock to pieces Raze, gut, fell, level Pull down, tear down, take down, bring down, cast down, knock down Shatter, crash, smash, batter, break Fracture, splinter, crack, split, rend, tear apart Explode, burst, fulminate, implode, blast, blow up, bomb Mutilate, mangle, maim Damage, spoil, mark, spot, stain Disfigure, scar, deface, blemish Devastate, desolate, lay waste, ravage, wreak havoc on, ruin, annihilate, exterminate Ruin, bring to naught, despoil, rob, plunder, gut, ransack Vandalize, waste Quash, crush, subdue, quell, stifle, suppress, squelch, vanquish Put the kibosh on, nip in the bud Terminate, check, put an end to, dissolve, stop Overthrow, overwhelm, overturn, overcome Subvert, topple, cause the downfall of, upset, defeat, conquer, damn, seal the doom of Erase, efface, eradicate, expunge, obliterate, blot out, wipe out, rub out, cancel, strike out, scratch out, delete, cross out, mark off Undo, unmake, dismantle, dissemble, take apart
Stores	(type of effect) A supply or accumulation of something available for future use Accumulate, heap, pile, amass, hoard, stock, stockpile, supply, fund Treasure, holdings, savings Commodities, staples, wares, goods, provision Assets, inventory, reserve, capital, backlog, nest egg Cache, to warehouse, deposit, reservoir Abundance, volume, plenty Quantity, profusion, plenitude, plethora In readiness, in reserve Valued, prized, appreciated, credit, count on, depend on, rely on, trust in, have faith in, bank on Deposit, keep, old, preserve, conserve, retain, husband
Consumes	(type of effect) Use up (a store) Expend, use up, exhaust, drain, deplete, empty Finish, finish off, polish off, dispose of, get rid of

	Devour, eat up, absorb, shallow Waste, dissipate, squander, fritter or fool away, lose, throw away, lavish, misspend, misuse, blow, spend foolishly Absorb, engross, take up, draw in Disintegrate, wear out, decay, spoil, rot, go bad, fail, quit Waste away, fade away, ebb, weaken, tire, melt Dissolve, disappear, vanish, perish, evaporate, disappear into thin air
Oppose	(between two agents or effects) A relation between opposed entities Set in opposition or rivalry Incompatible states, inverted Moving or facing away from each other The other one of a complementary pair Altogether different in nature or quality or significance Characterized by opposite extremes; completed opposed Unlike in nature or quality of form or degree Acting against each other Have an argument/debate about something Opposite Contrary, reverse, inverse, converse Other side of the coin, opposite number Counterpart Pole, antipode, antithesis Complementary to, as partner to Resistance, counteraction Disagreement, confrontation, conflict, contradiction, antagonism Contra position, antithesis, contrast Opponent, adversary, rival, competitor, opposer, antagonist, enemy Contradiction Contradiction and self contradiction Inconsistency, variance, discrepancy, disparity, ambivalence, antithetical, incongruous, inconsistent, irreconcilable, negation Conflict Clash, collide, jar, disagree, differ, diverge, be at variance, be at odds, contravene Contend, contest, argue, spar, cross swords, squabble, feud, wrangle Struggle, battle, encounter, engage, meet Fight, combat, dual, tussle, come to blows Collision, meeting, encounter, engagement Controversy, infighting, feud Argument, altercation, dispute, row

	Contention, friction, enmity, antagonism, ill will Equilibrium Balance of forces – disturbed by changes State of affairs, situation Counterpoise, counterbalance, counterweight Compensation, offset Equalize, poise, stabilize, steady, match Tension Tautness, tightness, elongation, pull, tug, strain, stretch, traction Anxiety, uneasiness, disquiet, worry, trouble, concern Pressure, stress, heat, burden, cross Excitement, agitation, perturbation, suspense, anticipation, expectation, apprehension, fear Polarity Duality, ambiguity Extremity, extremes, limits Poles apart, at opposite ends, worlds apart Different, dissimilar, distinct, separate, incompatible Paradoxes and dilemmas Predicament, difficulty, tight spot, catch-22, vicious circle Squeeze, pinch, cul-de-sac, blind alley Impasse, standstill, stalemate, deadlock Difficult choice, tough question, hard nut to crack, puzzle, complicated problem, knot, entanglement, intricacy Quandary, perplexity, uncertainty, confusion, bewilderment, muddle, enigma, riddle Absurdity, nonsense, impossibility, unthinkable Dialectic Discussion, debate, argument, polemic, war of words, search for truth
Insufficient	(effect attribute) Of a quantity not able to fulfill a need or requirement A weak effect Deficient, inadequate, lacking, wanting, needful, in short supply, at a premium Meager, scant, scarce Too little, too small, not enough, too little too late In want of, short of, shy of, missing Impoverished Incomplete, imperfect, unsatisfactory, unequal to the task, incapable, unqualified, unable

	Undermanned, understaffed, underpowered
Overloaded	(effect attribute) Loaded past capacity, excessively strong, harmful Fill to excess so that function is impaired Place too much a load on Beyond normal limits Undue stress Unrestrained force, excessive, unreasonable, inordinate Exceed, surmount, go past, transcend, overstep Overburden, overtax, weigh down, strain
Required	(effect attribute) Necessary Required by rule Need, necessity, imperative, must, essential, vital Indispensable, basic, standard Called for, demand, directive, mandate, condition, policy, obligatory
Delay	(effect attribute) Time during which some action is awaited – wait before acting The act of delaying – inactivity resulting in something being put off until a later time Cause to be slowed down Act later than planned, scheduled, or required Slow the growth or development of Hold off, hold back, wait, postpone Stay, check, retard, detain, suspend, table, shelve Holding pattern, cold storage, put on ice, back burner Procrastinate, wait, put off, gain time, prolong, protract, lengthen, extend Impede, hinder, hamper, encumber, retard Confine, arrest, restrict, restrain, slow up Linger, loiter, lag, drag one's feet Adjourn, recess, discontinue, interrupt, break off, pause, take a breather Hiatus, waiting period, interval, intermission Hesitancy, suspension, moratorium, reprieve, respire, stay
In the presence of	(effect on effect) The state of being present Immediate proximity of someone or something The impression that something is present (potential – may be present)
Conjunction	(of effects)

	Something that joins or connects Co-occurrence, coincidence, union, bring together, juncture, unite, link up, relate, associate, tie
Is A	(knowledge modeling) Type of e.g. Automobile *is a* type of Transport
Separation	(to find a solution) Between agents or models The abstraction of distance between things The abstraction of space where a division of parting occurs Independence between An area reserved for some specific purpose Grouping by class of kind, partitioning Dimensionality, property, attribute
Space	(type of separation) The unlimited expanse in which everything is located A defined area or volume reserved for a specific purpose Spatial boundary serving some purpose A point or extent in space Spatial relationships Interior, exterior
Time span	(type of separation) A period marked by distinctive character or reckoned from a fixed point or event Period, interval In relation to, before, after, during, event, date of reference Epoch, era, past, present, future, near past, near future, now Phase, milestone
Structure	(type of separation) Parts of a thing constructed Manner of construction – arrangement of parts People in society or business considered as a structure Pattern of structural relationships The way in which something is composed Hierarchy of structure – system, super system, subsystem Social organization Bodily structure Construction

	Make up, composition Part, parts of the whole, piece, segment Fabric, form, shape, configuration, formation, framework, arrangement, organization Infrastructure, superstructure
Perspective	(type of separation) A way of regarding a situation or topic The appearance of things relative to one another as determined by the viewer or viewer context A personal belief or judgment, that is not founded on proof or certainty Purpose: the phrase “with a view to” means “with the intention of” or “for the purpose of” The range of interest or activity that can be anticipated Outward appearance Opinion, view, viewpoint, standpoint
Aspect	(type of separation) A distinct feature or element A characteristic to be considered A distinguishing quality Identifying (aspect) typical or distinctive (aspect) Indicative of Quality, characteristic, feature, facet, factor Appearance, demeanor, air, features, style Nature, character, quality, property, attribute, characteristic, trait, particularity
Probability	(type of separation) A measure of how likely it is that some event will occur The quality of being probable Chance Frequency
Role	(type of separation) Role in a process The actions and activities assigned to or required or expected Of people, groups, organizations, systems What something is used for, purpose Participant Character in a play, part

On Condition	(type of separation) A state at a particular time An assumption on which rests the validity or effect of something else The way something is with respect to its main attributes Condition, qualification, definition, delimit, delineate, determine, fix, set, particularize, specialize, nail down, narrow, designate, intend, assign, stipulate etc. (catch all)

Appendix C – Summary of visual idioms

Agent	Box containing text [1]
Useful agent	Green outline, square corners
Harmful agent	Red outline, rounded corners
Neutral agent	Grey outline, square corners
Goal/risk agent	Agent text underlined – solid background color (useful or harmful)
Focus agent	Highlighter pen effect
Potential agent	Dotted line for box outline
Process agent	Type of agent can be optionally shown via an annotation.
Function agent	Type of agent can be optionally shown via an annotation.
Resource agent	Type of agent can be optionally shown via an annotation.
Quality agent	Type of agent can be optionally shown via an annotation.
Event agent	Type of agent can be optionally shown via an annotation. (Circle)
Idea agent	Type of agent can be optionally shown via an annotation. (Blue)
Thing (Un-typed)	Type of agent can be optionally shown via an annotation.
Strength of agent	Size of box – relative interpretation
Effect between agents or effect between effects	Line with “arrow” head. Multiple arrow head types to denote effect type. Line color adapts to use of harm of the effect (calculated by surrounding relationships)
Strength of effect	Width of effect line – relative interpretation
Produces effect	Arrow headed line
Counteracts effect	Arrow headed line with tick across line near arrow
Creates effect	Star headed line (a.k.a. magic wand)
Destroys effect	Star headed line with tick across line near star
Stores effect	Solid box at end of line – 45 degree angle across line – accumulating end marked by the box
Consumes effect	‘Drain’ arrow type – consumed end marked by the arrow type
Oppose	Harmful line – with “springs” at each end – normally in harmful color
Insufficient effect	Dashed effect line – applies to all effect types
Overloaded	Doubled effect line – applies to all effect types
Required	Solid circle at “required” end of effect – marking the required agent or required effect
Delay	Dashed line across effect line (barrier)
In the presence of	Effect line converging on another effect line
Conjunction	Circle in circle – neutral lines in from agent – multiple effect types out to multiple agents
Is A	Dark line between agents – labeled “is a”
Separation	No special visual effect
Space	Axis of grid labeled
Time span	Axis of grid labeled

Structure	Axis of grid labeled
Perspective	Axis of grid labeled
Aspect	Axis of grid labeled
Probability	Axis of grid labeled
Role	Axis of grid labeled
On Condition	Axis of grid labeled

[1] Tools may allow icons or symbols to differentiate types of agents and effects.

Appendix D – Related visual notations

The following diagrammatic styles inspired us to develop Southbeach and will no doubt continue to do so in the future:

Cause-effect diagrams
Root cause diagrams (Fishbone)
Fault trees
Multiple cause diagrams
Sign diagrams and causal loop diagrams
Systems dynamics and simulation models
Influence diagrams
Action-effect diagrams
TRIZ
Polarity diagrams
Square of oppositions
Dilemma diagrams
Force-field diagrams
Various kinds of window diagrams
Varieties of SWOT and their ilk
Mind maps
Relationship diagrams
Objective tree diagrams
Learning diagrams
Continue-Stop-Start Chart
Some ring diagrams
Some control flow diagrams
Decision trees
Some process event chains
Scenario matrix
Sankey diagrams
Cycle diagrams
Soft system modeling
Argument slide
Some Toulmin diagrams and maps
IBIS argumentation maps and argument diagrams
Strategy Maps (Kaplan, Norton)
Evocative knowledge maps and some concept maps
Some infomurals, rich pictures and graphic facilitation charts

Table 1 – Diagram styles, aspects of which can be modeled in Southbeach or which can be "marked up" with Southbeach semantics

Note:

Also see the "Periodic Table of Visualization Methods"
http://www.visual-literacy.org/periodic_table/periodic_table.html

Acknowledgments

Southbeach seeks to unify sufficient visual and semantic ideas to be able to develop comprehensive applications.

Notation is adopted through use. Unused notations die. Good notations persist but details change over time. Southbeach extends TRIZ diagrams and draws on ideas in other business diagrams. Both owe a lot to sign diagrams and multiple cause diagrams.

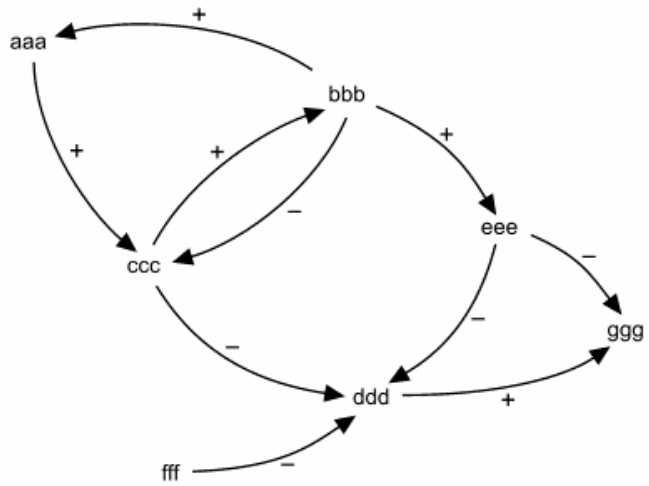
Sign diagrams

Sign diagrams - sometimes called sign graphs - were first used in the biological sciences in the early part of the Twentieth Century. They are used to represent and investigate the relationships between variables in a given situation and in particular to identify positive and negative feedback loops driving the system's behavior. Like Southbeach and TRIZ diagrams they are good for thinking about the likely effects of changes and, in particular, of interventions in systems.

The elements of a sign graph include:

- Phrases
- Arrows labeled with either a plus or minus sign
- A title – illustrating the intent of the diagram as drawn (perspective)

Here is an example:



The phrases refer to variables (quantities) in the model, so phrases like "number of", "cost of" and "level of" are often found in these diagrams. The phrases should not however directly refer to variations, so they should not include 'more/less' or 'increase/decrease' for example. That's the role of the plus and minus signs.

Sign graphs use a minus sign by an arrow where a change in the variable at the tail of the arrow produces an *opposite* change in the variable at the head. So, in the figure above, an increase in ccc will lead to an decrease in ddd, and a decrease in ccc will lead to an increase in ddd.

Use a plus sign by an arrow where a change in the variable at the tail produces a *similar* change in the variable at the head. So, in the figure above, an increase in aaa will lead to an increase in ccc *and* a decrease in aaa will lead to a decrease in ccc.

The TRIZ and Southbeach concepts of 'produces' and 'counteracts' are effectively the same as the plus and minus signs in a sign graph.

Sign diagrams today

Today, sign graphs are the simplest form of diagram used in systems thinking and systems dynamics theory. Originally developed by biologists, they were later adopted in business, engineering and other scientific fields. The diagram is taught in any syllabus on systems dynamics and has been adopted and used in software tools, including continuous simulation.

Many management consultants first became aware of sign diagrams through the illustrations used in the influential book by Peter Senge, *The Fifth Discipline – The Art and Practice of the Learning Organization.* They appeared again in his later work *The Dance of Change – The Challenges of Sustaining Momentum in the Learning Organization.*

Recommended reading

[1] http://trizmethods.blogspot.com

[2] *The Opposable Mind – How Successful Leaders Win Through Integrative Thinking*, R. Martin, 2007, Harvard Business School Press

[3] *Polarity Management – Identifying the Managing Unsolvable Problems*, B. Johnson, 1992, HRD Press Inc.

[4] *Insourcing innovation – How to transform business as usual into business as exceptional*, D. Silverstein, N. DeCarlo, M. Slocum, 2005, Breakthrough Performance Press

[5] *Systematic Innovation – An Introduction to TRIZ*, J. Terninko, A. Zusman, B. Zlotin, 1998, CRC Press

[6] The I-TRIZ Methodology and associated publications and books and tools, Ideation International, www.ideationtriz.com

[7] Creax Methodology, databases and tools, www.creax.com

[8] Invention Machine methodology and tools, www.invention-machine.com

[9] *Simplified TRIZ – New Problem-Solving Applications for Engineers and Manufacturing Professionals*, K. Rantanen, E. Domb, 2002 CRC Press

[10] *The TRIZ Journal*, ed. E. Domb, The Real Innovation Network, www.triz-journal.com

[11] *Hands On Systematic Innovation for Business & Management*, D. Mann, 2004, Lazarus Press

[12] *Hands On Systematic Innovation (engineering)*, D. Mann, 2002

[13] Systematic Innovation, research and writings, D. Mann, http://www.systematic-innovation.com

[14] PQR group, http://www.trizpqrgroup.com

[15] Innovation-TRIZ, http://www.innovation-triz.com/

[16] Gen3 Partners, http://www.gen3partners.com

[17] Innovation On Demand, New Product Development using TRIZ, V. Fey, E. Rivin, 2005, Cambridge University Press

[18] *Matrix 2003 – Updating (expanding) the TRIZ Contradiction Matrix*, D. Mann, S. Dewulf, B. Zlotin, A. Zusman, 2003, Creax Press

[19] 40 Principles – TRIZ Keys Innovation [Extended Edition], G. Altshuller, D. Clarke, 2005, 2nd Ed., Technical Innovation Center Inc.

[20] Proceedings of 'trizcon' (annual TRIZ related symposium) www.aitriz.org

[21] Dictionary of TRIZ Terminology, www.altshuller.ru/thesaur/#t1

[22] TRIZ at IMECHE, www.imeche.org/industries/manufacturing/triz/index.htm

[23] *Thinking Visually – Business Applications of 14 Core Diagrams*, M. Craig, 2000, Continuum

[24] *Inventive Thinking Through TRIZ*, M. A. Orloff, 2003, Springer

[25] *Engineering of Creativity – Introduction to TRIZ methodology of Inventive Problem Solving*, S. D. Savransky, 2000, CRC Press

[26] Wikipedia on TRIZ, http://en.wikipedia.org/wiki/Triz

[27] TRIZ and Biology, http://people.bath.ac.uk/ensab/TRIZ/learn-more.html

[28] Early/rare books on TRIZ (Russian Sources), http://www.trizminsk.org/eng/book.htm

Legal statement

Southbeach notation refers to the consistent body of work that brings together all of the semantic elements of Southbeach methodology into a comprehensive single visual notation, supported by the associated formal specification and reference implementation. These artifacts are maintained by the authors and manifest in the forthcoming software implementation.

Authors

Howard Smith, CTO and author, Computer Sciences Corporation
Mark Burnett, Managing Consultant, BearingPoint
Chrysogon Young, Design and Development
feedback@southbeachinc.com