Chapter 17

Solution Factories

TOMORROW'S LEADING ACTIVIST ORGANI-ZATIONS WILL NO LONGER BE ACTIVIST organizations. They will be solution factories.

An ordinary factory produces *physical products*. A solution factory produces *mental products*. The output of a solution factory is the memes and meme carriers needed to solve a social problem and keep it solved indefinitely. These are created by using a formal process that works so well it's almost like using an assembly line. But, unlike an assembly line, solution factories do not produce physical products. They produce mental products which in turn cause new emergent properties to appear in the social system with the problem. It is these emergent properties that solve the problem.

This chapter explores why solution factories are needed, what they are, and how they can be optimized, in order to serve as *the* leading wedge of the institutions that actually solve the sustainability problem. We start with the question of why solution factories are needed, by asking:

What Can Radically Increase Total Investment in Environmentalism?

Examination of the Transformation Simulation Model shows that if we can find something that could triple total investment, time to solution would fall by 29%. These are not exact figures, because the model is not calibrated. But they do seem to say that if we can radically increase total investment in environmentalism, time to solution would drop substantially. Looking at our various models, what is it that increases total investment? The answer can be seen in the model to the right from page 175.

This model shows that it is higher certification scores that attract additional investment. But what is it that causes higher scores? It is environmental industry results. And what improves that? Quality of effort. And what affects that? This quickly leads to the realization that we have endless loops involved. So what is it that really causes increased investment?

Surprisingly enough, there is a clear and ready answer. First we must differentiate between result variables and value added variables. A **result variable** is an outcome that resulted from process activity somewhere else. A **value added variable** is an activity that adds value to a process. Looking at the model, all eight variables are result variables. The question then becomes

which of these result variables is fronting for the largest value added variable? Study of the model leads to the conclusion that by far the largest value added variable is the activity it takes to increase fitness of problem solving strategies. We know this to be true from the Solution Evolution simulation model presented earlier on page 175, as well as the evolutionary algorithm itself. This is because the chief emergent property of the Solution Evolution model and the evolutionary algorithm is maximization of the fitness of replicators, whether they be memes, genes, robots, or something else we have not yet conceived of.

Thus the problem is not what can radically increase total investment in environmentalism. It is:

What Can Radically Increase the Effect of Effort on Solution Fitness?

The higher the fitness of a solution, the more likely it is to solve the problem. Because we are working on memetic problems here, their solutions are also memetic. Each solution is competing against other solutions to solve the problem by replicating so fast and so well that the solution comes to dominate the system enough to solve the problem. This is identical to the way a species with high fitness can invade a new ecological niche in the blink of an eye.

The Dynamic Structure of Certification
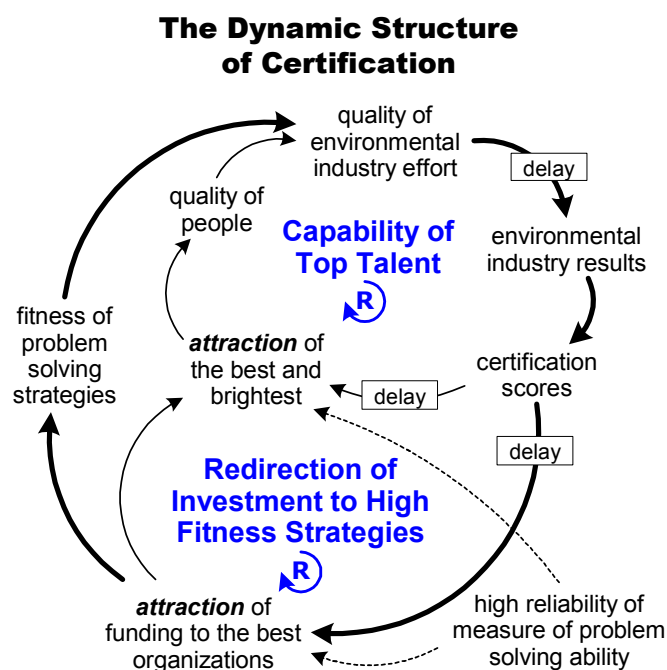
There is no need to look very far for the answer to the question of what can radically increase solution fitness, because we addressed it earlier in the Solution Evolution model. That model demonstrated that the best way to maximize the solution fitness of a collection of solution components (each of which is a meme) was to follow a formal process based on the Scientific Method. There is no other way to solve difficult problems, because the Scientific Method is the only known method of creating new cause and effect knowledge that is sound. Thus the Scientific Method is the only known method for solving difficult problems, unless you can afford to wait long enough for guess number 1,000,001 to finally find the solution.

It follows that we need a new type of organization whose role is to implement the Solution Evolution model. What should we call them? Solution Evolvers? Solution Fitness Maximizers?

I don't think Thomas Edison, the most prolific inventor of all time, would mind at all if we borrowed from a 19th century term that described how he methodically went about his work. It was he who in 1876 opened the world's first *invention factory* in Menlo Park, New Jersey, with the astounding pronouncement that he would "invent some minor thing every ten days and some big thing every six months." And he did it. Out of his invention factory came the first practical incandescent light bulb and the entire electric lighting industry, the carbon button telephone microphone which together with Alexander Graham Bell's work caused the birth of the telephone industry, the phonograph and the recording and music industry, and the first celluloid film strip, camera, and projector, which led to the motion picture industry. By the time he retired, "the wizard of Menlo Park" had accumulated 1,093 patents, more than any other single individual in the world.

Thomas Edison's invention factories produced inventions. We need factories that produce solutions, so why not call them *solution factories*? Instead of inventions, which are solutions to technological problems, a solution factory produces solutions to social problems. Instead of trying to maximize the profit that can be made from inventions, *the goal of solution factories is to maximize solution fitness.*

The Solution Factories Solution Element

A **solution factory** *creates solution components to an important social problem or subproblem, using a well defined manufacturing process. The end product of a solution factory is an interrelated collection of memes that, working as an emergent whole, solve the problem(s) the solution factory is working on.*

What we have discovered is another solution element. All others were discovered during the long tedious engineering and construction of the Strategy Map. They were then incorporated into the design of the Transformation Simulation Model. But this element was totally unexpected. Then again, such surprises are to be expected in an iterative process, where each iteration brings significant improvement, and often the last iterations take the longest strides.
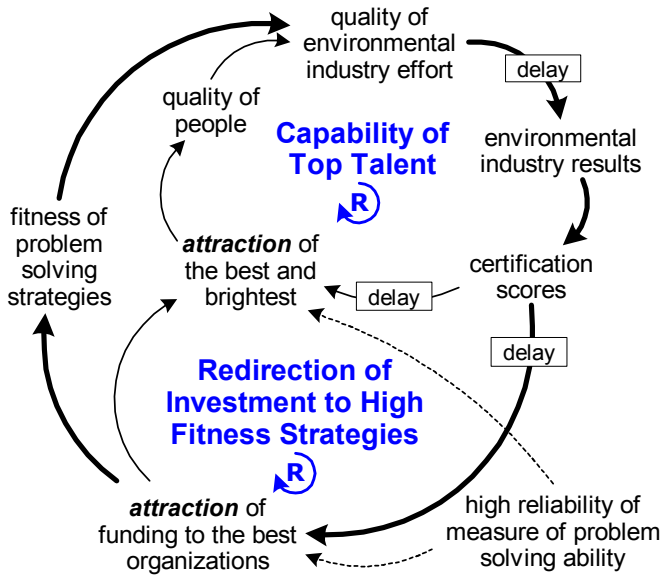
A solution factory is not an ordinary environmental organization. Solution factories manufacture solution components in the form of memes, using a disciplined team of engineering specialists, at a speed and quality that will cause today's typical environmentalists to drop their jaws in amazement. They are the most visible part of the solution. In the eyes of the public they will probably be seen as the leading thrust of the entire solution. In a sense they really are, because they are the armies of problem solvers that, once united and driven by the proper process, will achieve success over the enemy. This enemy, which was previously invisible, has been identified as the New Dominant Life Form, its successful exploitation of the race to the bottom via a torrent of cunning false memes, and the many corrupt politicians that have become incognizant proxies to that life form. What solution factories do is manufacture the memes necessary to turn the tide of the battle in favor of humanists. If we can win that battle the sustainability problem is solved.

Now let's take the concept of solution factories and revisit the certification structure model. For ease of reference it is shown again on the next page.

Solution factories increase the <u>fitness of problem solving strategies</u>. Once they are created, solution factories will allow the environmental industry to vastly increase the funding it receives today, because the industry can now offer funders the one thing they desire the most: *proof their money will be spent wisely*. That proof is certification. Higher certifications will attract more funding to those organizations producing the highest fitness solutions. This will decrease funding to other organizations, which will lead to a swift and harsh shakeout of the industry. Those that remain will spend all that funding much more wisely, because it is not the increased funding that will make the critical difference—it is the increased fitness of solutions.

The goal of the solution factory solution element is to maximize the <u>fitness of problem solving strategies</u> *in the* **Redirection of Investment to High Fitness Strategies** *loop.* This loop was presented earlier with the Certification Solution Element on page 175. Let's

The Dynamic Structure of Certification

quality of environmental industry effort

delay

quality of people

Capability of Top Talent

R

environmental industry results

fitness of problem solving strategies

attraction of the best and brightest

delay

certification scores

delay

Redirection of Investment to High Fitness Strategies

R

attraction of funding to the best organizations

high reliability of measure of problem solving ability

take another look at it, now that its importance has grown considerably.

The redirection loop arrows are bolded. The top tal-ent loop is the upper loop. The driver for both loops is the new constant called high reliability of measure of problem solving ability. The new measure is certifica-tion scores.

The loops demonstrate how high certification scores cause the two *attractors* to increase. More of the best and brightest are attracted, along with more funding. This causes a solution factory to become more efficient in manufacturing solution components, which raises its certification even more, which attracts even more fund-ing and top talent, and so on. This creates two entirely new and very strong reinforcing feedback loops. The result is a new social structure driving the environmental industry to increasingly higher levels of excellence. Without certification and dedicated solution factories there is no such structure, which is where environmen-talism finds itself today.

Solution factories serve as funding and top talent at-tractors, which causes the two loops to grow rapidly. But nowhere in these loops do we see solution factories. This is because solution factories are an *emergent prop-erty* of the many structural changes this book has pre-sented. Emergent properties, such as solution factories, cannot be managed *directly* because they are emergent. They can only be managed *indirectly*, by designing and managing the necessary structures.

Improving the Transformation Simulation Model, with a New Effect of Funding on Fitness Curve

Let's return to run 14 in the Transformation Simu-lation Model on page 175, which discovered that tri-pling total investment in year 2015 reduces time to success from 72 to 51 years. How can the simulation model realistically accomplish this?

Inspection shows that in the factors subsystem, the certification solution element is represented by a chain of variables running from problem solving measure-ment reliability to the fitness of strategies multiplier and the top pay multiplier. This agrees with The Dy-namic Structure of Certification causal flow model. So in the simulation model, certification does not affect total investment directly. To make such a change would destroy the conceptual integrity of the model. It would also disagree with what can be done in the real world, where you cannot stand on the beach as the tide is coming in and proclaim that "Certification shall increase total investment" and expect to see it happen.

Let's preserve the conceptual integrity of the simu-lation model by working with it as cautiously as possi-ble, starting with a look at the two lookup tables used to calculate the two multipliers mentioned. Can either of the curves in these tables be realistically changed to reflect the much greater fitness of problem solving strategies that solution factories cause?

Shown below is the lookup table used in the simula-tion model's effect of top pay on multiplier variable. The model uses this to calculate the top pay multiplier using the percent top pay to top talent, which is the same as problem solving measurement reliability if the fund-ing attraction delay is ignored. Before the Top Talent Package is activated, measurement reliability is 20%. The curve translates this into a top pay multiplier of 1%. After the Top Talent Package is activated, reliability rises to 80% due to the introduction of certification. The curve translates this 80% into a top pay multiplier of 74%.

The lookup table for effect of top pay on multiplier

100%

top pay multiplier

0%

0%   20%   measurement reliability   80%   100%
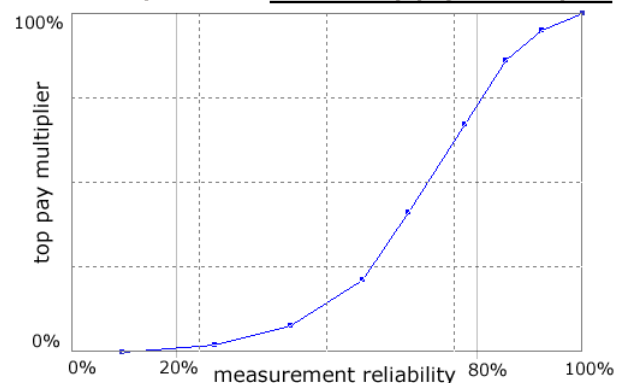
This curve cannot realistically be changed significantly, because it is already increasing the top pay multiplier from 1% to 74%. That is extravagant enough. Let's turn to the other lookup table.

Below is the lookup table used for calculating the effect of funding direction on fitness strategies. Like the other table, its input is problem solving measurement reliability. But its output is the fitness of strategies multiplier. When measurement reliability is 20% the fitness multiplier is 75%. When measurement reliability rises to 80% the fitness multiplier rises to 100%.

The lookup table for effect of funding on fitness
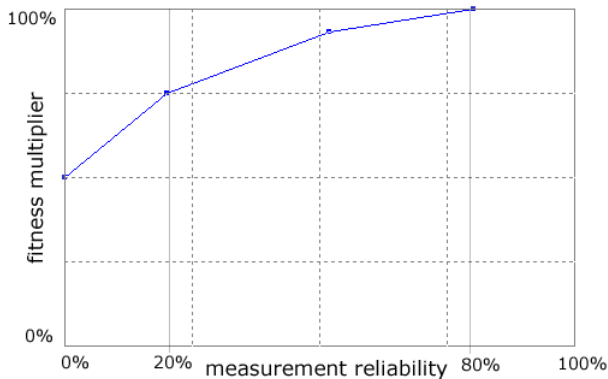
This curve was designed so conservatively that it has plenty of room for change. The fitness multiplier rises only 1/3 when measurement reliability rises from 20% to 80%. Therefore it seems entirely realistic to change this curve to reflect the greater efficiency of solution factories. So let's modify this curve to the one shown below:

The revised table for effect of funding on fitness
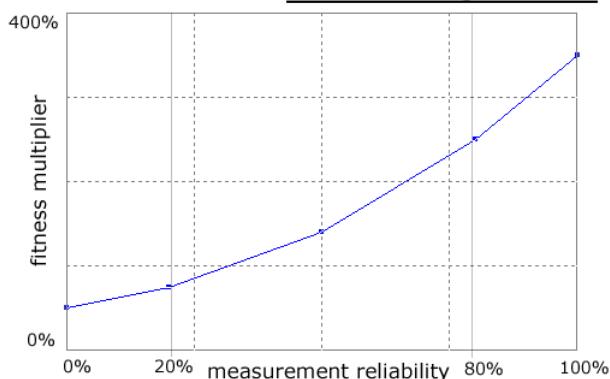
Starting from the left, the first two points remain unchanged. The next three embody the proposition that solution factories and certification will cause the fitness multiplier to rise from 75% to 250% instead of from 75% to 100%. I think this is very realistic, because when you examine The Dynamic Structure of Certification, you can see that the structure clearly has the amplification power to allow the introduction of solution factories and certification to radically increase the fitness of prob-

lem solving strategies. This is because the **Redirection of Investment to High Fitness Strategies** is such a powerful loop. Why? Because it's the same loop the invisible hand of evolution has used to create all biological life. The loop harnesses this power by causing certification scores to rapidly cause solution factories to evolve to be much more efficient than they are today. In fact, a fitness increase of 75% to 250% is probably a conservative estimate for what the loop can do for memetic life (the solution components), judging by what it's done for genetic life.

Running the Transformation Simulation Model with the revised curve gives these results:

Run 15. Full Analytical Activism, with revised effect of funding on fitness curve. Run 12 superimposed for comparison.
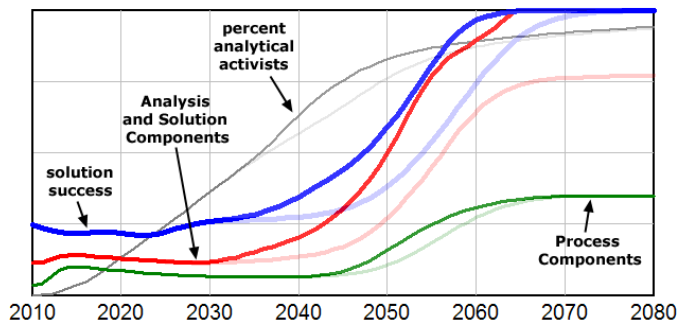
The revised curve causes time to success to drop from 72 to **58 years**. While not as large a drop as the 51 years of run 14, it is realistic, so let's call it a keeper.

Run 15 is the first refinement to run 12, which was the best that full Analytical Activism could do without solution factories. Next let's turn our attention to how we can design solution factories so that the new curve of run 15 can realistically happen. We start by learning from the past.

The World's First Invention Factory

Thomas Edison opened the world's first invention factory in 1876, in the very small town of Menlo Park, New Jersey. Francis Jehl, one of Edison's assistants at Menlo Park and later one of his managers, described its birth this way: (Italics added)

"By the spring of 1876 he was firmly settled [in Menlo Park] and ready for his experiments. Before leaving Newark he told his friend, Dr. George Beard, the electrician, that *he proposed to invent some minor thing every ten days and some big thing every six months*. Beard recalled this conversation several years afterward and confessed that the prediction had seemed a 'wild one' at the time. Strange to say, Edison more than fulfilled it." [132]

How did Edison fulfill that outlandish promise, one that no one person before or since has done? By deciding beforehand that his factory was not going to produce Adam Smith's pins or Henry Ford's cars. *It was going to produce inventions as its primary product.* Edison could do exactly that because he had something no one else in the world had: a process that churned out invention after invention.

W. Bernard Carlson and Michael E. Gorman describe Edison's process in their essay on *Thinking and Doing at Menlo Park: Edison's Development of the Telephone 1876 to 1878.* [133] (Italics added)

> "This essay recounts the *process* by which Edison developed the telephone, focusing on his efforts to perfect a powerful and reliable carbon transmitter in 1877. As Edison succinctly characterized this process in 1878, 'I had to create new things and [overcome] many obscure defects in applying my principle.' As this quote suggests, invention may be seen as involving two elements similar to what Edison called his 'principle' and 'new things.' *First, an inventor has a principle or mental model of how he or she thinks his or her creation should work. Second, an inventor uses 'things' or devices to express his or her mental model in physical terms, and these devices will be called building blocks.* As this essay will reveal, Edison had a distinctive set of building blocks and often borrowed from established inventions to create a new invention.

> "In this way, *the act of invention may be seen as the interplay of mental models and building blocks.* In developing something new, an inventor may begin with a mental model. This model incorporates a general idea of how a device might work and an awareness of its potential significance. By manipulating and experimenting with a selection of building blocks, an inventor explores variations and changes. Eventually, insights from the building blocks may lead an inventor to modify his or her mental model. An invention may be said to be complete when an inventor feels the fit between the mental model and the building blocks device is close, and when he or she is able to convince others that the device matches their mental model and expectations."

The authors of the essay then describe how Edison went about inventing the telephone. The crux of the problem was the carbon transmitter. Racing against Alexander Graham Bell, Edison wrestled the problem to the ground by revising his mental models until they converged upon the first workable, commercially viable carbon transmitter. But Edison did not stop there:

> "Although the development of the carbon transmitter was the predominant line of investigation in his telephone project of 1877, Edison also experimented with a wide range of transmitters. Some of these were modifications of his carbon transmitter, while others varied the resistance by using switches, capacitors, or batteries. *Underlying all of these designs was Edison's ability to generate a variety of alternative representations of his central idea.*

> "Yet these telephone inventions failed to exhaust the potency either of variable resistance as a mental model or of carbon and diaphragms as building blocks. Throughout 1878, Edison *used this model and these building blocks to create a remarkable series of spinoff inventions."* [134]

These passages demonstrate not only that invention factories are possible, but also the core of how it can be done. *All it takes is a process that works, and the people who believe in the process and know how to make it tick.* Today invention factories exist in the form of hundreds of thousands of R&D departments, university research departments, corporations specializing in invention itself, and, just as in Edison's day, scores of madcap inventors working alone in crowded garages and dingy basements.

What can we learn from the world's first invention factory?

Several things: Edison's mental model is our Transformation Simulation Model. His building blocks are our solution components. Invention factories produce physical inventions, which are solutions to technological problems. Solution factories produce memetic solutions, which are solutions to social problems. Lots of experimentation, as Edison did, is crucial. The right process is mandatory.

But while these insights may be helpful, there is no feeling they will be tremendously so and help us to make breakthroughs. They are an unorganized hodgepodge of insightful rules. Something much more is needed. It is time to apply our tools and go deep once again. We need a model of understanding that can help us to structure our analysis of why the world's first invention factory worked so well.

Solution Factory Work Flow
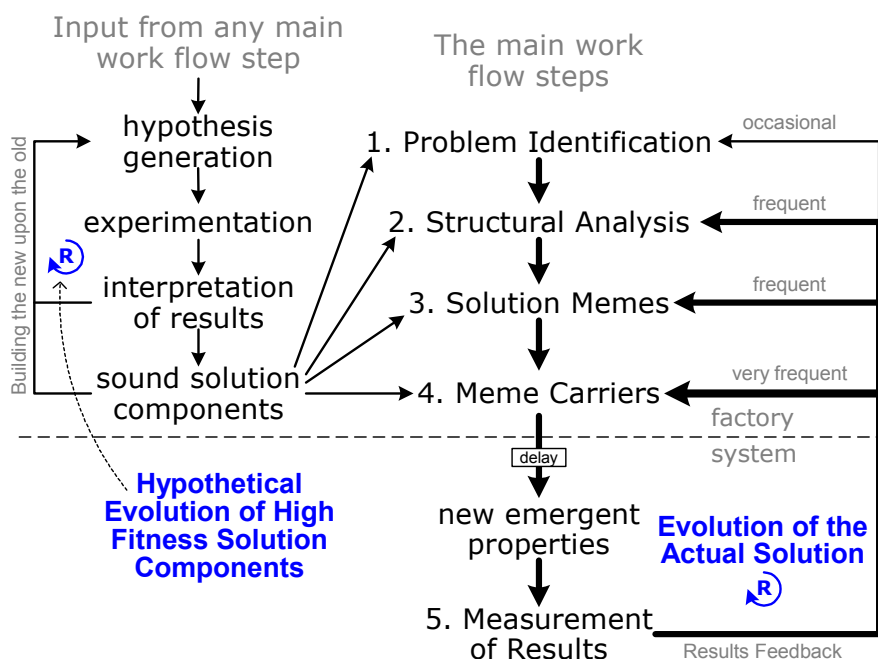
The Dynamic Behavior of Solution Factories

How solution factories work is shown above. The work flow process has five main steps, as numbered. Step 1, Problem Identification, corresponds to the first step of the System Improvement Process (SIP). Step 2, Structural Analysis, corresponds to the second step of SIP, which is System Understanding. Steps 3 and 4 correspond to the third step of SIP, which is Solution Convergence. The actual solution is the Solution Memes. But they cannot be transmitted unless they have carriers, such as books, articles, people, or physical inventions. When the Meme Carriers leave the factory and cross over into the system they are designed to affect, implementation occurs, which is step 4 of SIP.

Notice how there is no separate implementation step in the work flow. This is because the solution memes and meme carriers are designed to be *self-implementing*. For example, if a new meme and its carriers are well designed and released at the appropriate time, the meme will infect enough new minds and be well received by the system. Conversely, if it is not well designed, it will fail, and no amount of tactical brilliance by implementers will make a significant long term difference. *Successful implementation is thus an emergent property of the process*. The absence of an explicit implementation step in the work flow is one of many large differences between solution factories and present environmental organizations.

A self-implementing solution approach will move environmental organizations of all kinds away from their present preference for command and control solutions, and toward solutions with inherent high ability to self-adapt and solve the many tricky aspects of the sustainability problem. [135]

Meme release causes new emergent properties to appear in the system with the problem, such as tendencies toward less corruption and more sustainable practices. This happens after the *delay* of how long it takes the system to respond to the solution. After system behavior changes, Measurement of Results is used to improve all of the four main work flow steps, and the **Evolution of the Actual Solution** loop starts all over again.

Supplementing the main work flow loop is the **Hypothetical Evolution of High Fitness Solution Components** loop. Here the first step is hypothesis generation, such as an idea Edison wanted tested, key assumptions in a simulation model, or a potential solution to an environmental problem. In all but the smallest solution factories, division of labor allows the hypotheses to be handed off to experimenters, who perform experimentation to test the hypotheses. Then interpretation of results occurs. A hypothesis may be accepted, rejected, or sent back to hypothesis generation to be modified. If accepted it becomes a sound solution component and enters the solution factory's knowledgebase.

The sounder the knowledgebase, the more efficiently it can be used to build new knowledge from old knowledge. As more and more solution components

accumulate, they become a warehouse of knowledge a solution factory can use to build solutions from. Knowledgebases may be shared with other solution factories. The work in this loop is hypothetical because it consists of logical and artificial world experiments, as well as some small scale real world experiments.

Understanding How Solution Factory Process Efficiency Can Be Raised to a High Enough Level to Solve the Problem

Process Efficiency x Effort = Results. The greater the efficiency the less effort required to solve the problem. *If an organization or movement has a limited amount of effort and faces a difficult problem, then high process efficiency is the only way to solve the problem.* This is the case for the global environmental sustainability problem.

Currently the process efficiency of the environmental movement is low, causing the movement to thrash around violently in a desperate, educated guesswork driven search for solutions that will work. But if process efficiency was high, as it is for example in science and business, the movement would be united and driven by a formal, continuously improved organizational process that would lead the movement down the right road to the right solutions. On that road guesswork would be replaced by experimentation. Desperation would be replaced by a calm confidence that the problem can and will be solved, because we are now using the best known tools for the job. The massive failure of the last 30 years would be replaced by small successes, and then bigger ones, and eventually the stupendous breakthroughs necessary to solve the problem at the global level.

Let's take a close look at how the environmental movement can begin this process as soon as possible. Our strategy is to first perform a careful analysis of how the process efficiency of solution factories can be raised to a high enough level to solve the problem, and then apply the results of that analysis to an implementation model and plan.

In short, this book is trying to accelerate the solution by maximizing the process efficiency of the environmental movement.

Solution Factory Key Practices

The work flow model, or something close to it, is the basic process behind all organizations attempting to create solutions of any kind. Depending on the factory type, some process steps are done well, poorly, or not at all. Thomas Edison's invention factory was a type of solution factory. *What might happen if we could analyze the world's first invention factory from the standpoint of its underlying process, and find the specific factors that made it so extraordinarily productive?*

This can be done by extracting the key practices in the work flow model that determine how efficient the process is. A **key practice** is a work practice that contributes to overall process efficiency, such as how well a problem is identified. A list of key practices can then be used to measure how well a particular factory is following the process. If the process model is correct and the list contains the right key practices, we now have a powerful analysis tool. We can explain why some factories are more productive than others, and we can predict what would happen if a factory follows certain practices. This allows us to design factories that have a very high probability of solving their mission level problems.

The Solution Factory Process Rating Questionnaire on the next page measures how well a factory is following 12 key practices. The practices were extracted from the Solution Factory Work Flow process. The answers are on a scale of 0 to 5. If the answers are reasonably accurate and unbiased, they will give us a good idea of why a factory runs so well, or in some cases, why it doesn't.

The questionnaire is followed by a table for using the results of the questionnaire to come to some rather interesting conclusions.

Before you read what follows the questionnaire, be sure you have studied the questionnaire and considered how it might apply to your organization and others you are familiar with. Each question is designed for education as well as measurement.

Solution Factory Process Rating Questionnaire

Rate your organization's practices using a 0 to 5 point scale, where:

    0 means the practice is *not done at all.*
    1 means the practice is done *so poorly there are negligible benefits.*
    2 means the practice is done *poorly, with some benefits.*
    3 means the practice is done *reasonably well, with substantial benefits.*
    4 means the practice is done *extremely well, with terrific benefits.*
    5 means the practice is done in the *best possible manner, with optimum benefits.*

Overall Process

1. ___ The organization uses a formal process for solving its mission level problems. The process fits the problem, is written, everyone is trained in it, and the process is continually improved. The process drives the entire organization.

2. ___ After all major work projects are completed a post mortem is performed to see what went wrong, what went right, and how the process can be improved from that experience.

The Main Work Flow

3. ___ Problems are clearly and correctly defined, so that no effort is wasted on other pursuits.

4. ___ An analysis model of the problem domain is constructed. The model explains why the system with the problem behaves the way it does.

5. ___ Only after the analysis model is constructed do problem solvers begin to narrow solution alternatives down to the final selection.

6. ___ The solution is packaged in a manner that makes it self-implementing. That is, it takes no further significant effort from the organization to make the solution succeed, because the solution is designed to manage and cause its own successful implementation or acceptance by the customer.

7. ___ The results of released solutions are accurately measured as quickly as possible, and the results are used to improve the next version or phase of the solution, or when necessary the present solution. This is also known as measuring organization effectiveness, such as the way a for-profit corporation tracks its profits. This practice creates a formal solution results feedback loop.

Experimentation

8. ___ All key problem solving assumptions are declared to be hypotheses in need of testing. This includes all key strategies, including the organization's process itself.

9. ___ All hypotheses undergo rigorous experimentation to see if they are true, false, or need to be modified to become useful.

10. ___ Only hypotheses that have passed multiple well designed experiments are added to the organization's formal knowledgebase of sound solution components. The knowledgebase has a high quality gate.

Knowledgebase Management

11. ___ The knowledgebase is managed so well that what it contains enters into all decisions that would benefit from it, in a manner that optimizes the quality of those decisions.

12. ___ Knowledgebase additions, removals, and changes are used to improve previous decisions in all workflow steps.

Invention Factories Process Ratings						
A Rough Comparison of Solution Factory Types						
Key Practice	Weight	Before Edison		Edison's Invention Factories	
		Raw Score	Weighted Score	Raw Score	Weighted Score
1. Formal process used	2	0	0	2	4
2. Formal post mortems performed	1	0	0	3	3
Domain Specific Practices Subtotal	3		0		7
3. Problems clearly and correctly defined	1	0	0	2	2
4. Analysis model constructed	3	1	3	2	6
5. Analysis model drives solution convergence	1	2	2	3	3
6. Solution packaged as self-implementing	1	5	5	5	5
7. Solution results feedback loop is in place	4	2	8	4	16
Main Work Flow Subtotal	10		18		32
8. All key assumptions become hypotheses	1	0	0	5	5
9. All hypotheses undergo experimentation	3	1	3	5	15
10. Knowledgebase (KB) has high quality gate	1	1	1	5	5
Experimentation Subtotal	5		4		25
11. KB enters into all decisions affected	1	1	1	4	4
12. All KB changes become improvements	1	1	1	5	5
Knowledgebase Mgt Subtotal	2		2		9
Process Rating on scale of 0 to 100	20		24		73
Relative Productivity = R^2			576		5,329

The above table uses questionnaire results to compare two different types of solution factories.

Here's how a process rating is calculated: Each factory, such as Before Edison, has two columns. The left column is the *raw questionnaire scores*. The right column is the *weighted scores*. These are the raw score times the weight for that practice. For example, the key practice number 7 has a weight of 4. The Before Edison factory has a raw score of 2 for that practice. 2 x 4 = 8, which is the weighted score.

The weighted score subtotals show how a factory is doing in four general areas. The grand total of the weighted scores is the *process rating*. Because the weights add up to 20 and the raw scores range from 0 to 5, the maximum possible rating is 100. This gives a rating scale of 0 to 100.

The process rating is then squared to get the approximate relative productivity. What this means is that productivity varies exponentially with process maturity. A good example is the way student ability varies exponentially as one goes from grades 1 to 12. A student who is several grades above another student can usually do dozens of things the other cannot. Thus a difference of about 3 grades corresponds to a productivity difference of an order of magnitude. Given that, the difference between grades 1 and 12 is several orders of magnitude. Thus is perfectly reasonable to assume that the difference between a process rating of 10 and 100 should be several orders of magnitude, not just one order of magnitude. Squaring 10 and 100 gives 100 and 10,000, which varies by two orders of magnitude. This is enough for the rough comparisons the rating system will be used for.

The 12 Key Practices

Next let's use the table to analyze invention factories. Although we will speak in terms of exact numbers, please remember these are really only rough approximations, useful for comparison only.

Using one of his own inventions, I've had the great pleasure of traveling back into time to interview Mr. Edison, so as to collect an accurate questionnaire on his invention factory. Mr. Edison was also kind enough to fill in another questionnaire of what invention factories were like before. The results are listed in the table.

To be a wee bit more honest, the results are based on my own experience in business management, process consulting, general reading, and a reading of several books about Edison's invention factories. These were: *Menlo Park Reminiscences,* by Francis Jehl, 1937; *Working at Inventing*: *Thomas A. Edison and the Menlo Park Experience,* edited by William Pretzer, 1989; and *Thomas Alva Edison: Inventing the Electric Age*, by Gene Adair, 1996.

Domain Specific Practices

Key Practice 1 – The organization uses a formal process for solving its mission level problems. The process fits the problem, is written, everyone is trained in it, and the process is continually improved. The process drives the entire organization.

Starting at the top of the questionnaire, question 1 determines how well a good formal process was used. Because this is such an important key practice, it has a weight of 2. Before the world's first invention factory the very concept of turning out a steady stream of inventions in a factory did not exist, so there was no formal process used. This explains the 0 raw score for Before Edison. But after Edison created the first invention factory, there was a formal process for producing inventions. However, like most first efforts, it was not mature compared to today's invention factories, so it only gets a 2. But still, there is a huge difference between a 0 and a 2, and even more between the weighted scores, which are a 0 and a 4.

Key Practice 2 – **After all major work projects are completed a post mortem is performed to see what went wrong, what went right, and how the process can be improved from that experience.**

Formal post mortems were impossible before Edison, so that gets a 0. But after Edison came along there was a formal process that could be improved, so post mortems were possible. Edison and his team thought deeply about what went wrong and right after major projects, so Edison's invention factory gets a 3.

Main Work Flow Practices

Key Practice 3 – Problems are clearly and correctly defined, so that no effort is wasted on other pursuits.

Now we consider the main work flow key practices. Before Edison problems were not clearly and correctly defined. There was only a general urge to create something. But after Edison it became routine to define needed inventions in terms of missing knowledge, which could be found by experimentation using qualified teams of experimenters. Thus this factor gets a 0 and a 2.

Key Practice 4 – **An analysis model of the problem domain is constructed. The model explains why the system with the problem behaves the way it does.**

The earlier quotes about how Edison went about inventing things show that "mental models" and "building blocks" played central roles in his process. His mental models are a form of analysis models. Edison carried these models in his head and communicated them to others through drawings, so that a functioning invention could be built. His original sketch of how the first version of the phonograph should be built is shown on the next page. The extraordinary power of this sketch may be seen in the following passage from *Thomas Alva Edison*: Inventing the Electric Age, by Gene Adair, 1996, page 60:

"His experiments with the telephone had familiarized Edison with diaphragms—small, thin disks of metal of other material that vibrate in response to sound waves. One day he got the idea of attaching a pin to a diaphragm and placing a ribbon of wax paper beneath it. 'I rigged up an instrument hastily and pulled a strip of paper through it, at the same time shouting 'Halloo!' Edison recalled. 'Then the paper was pulled through again so its marks actuated the point of another diaphragm. My friend Batchelor and I listened breathlessly.'

"They heard a distinct sound, which, Edison said a strong imagination might have translated into the original 'Halloo.' The experiment was hardly conclusive, but it inspired Edison to do further testing.

"For several months, Edison worked with possible recording substances such as wax, chalk, and tinfoil. Word began to leak out from Menlo Park about a new machine that would somehow preserve telephone conversations. In early December [of 1877] Edison presented John Kruesi with some sketches and instructed him to build the device they illustrated. Kruesi wanted to know what it was for. 'The machine must talk,' said Edison.

"With his usual craftsmanship (and some skepticism), Kruesi fashioned pieces of brass and iron into the machine Edison requested.

"It was tested on the night of December 4, 1877. With his workers looking on, Edison carefully wrapped a sheet of tinfoil around the cylinder and lowered the needle of one of the diaphragms onto it. Turning a crank at one end of the cylinder, he shouted some words into the disk.

"Edison returned the cylinder to its starting point and placed the needle of the second diaphragm in the groove that had been impressed into the tinfoil. He turned the crank again, and to everyone's astonishment, the voice of Thomas Edison came forth. 'I was never so taken aback in all my life,' Edison later remembered."

The sketch was more than a sketch. It was an abstract model of how the invention was to work. If Edison had been unable to express his mental model in written form, he would have been forced to build the
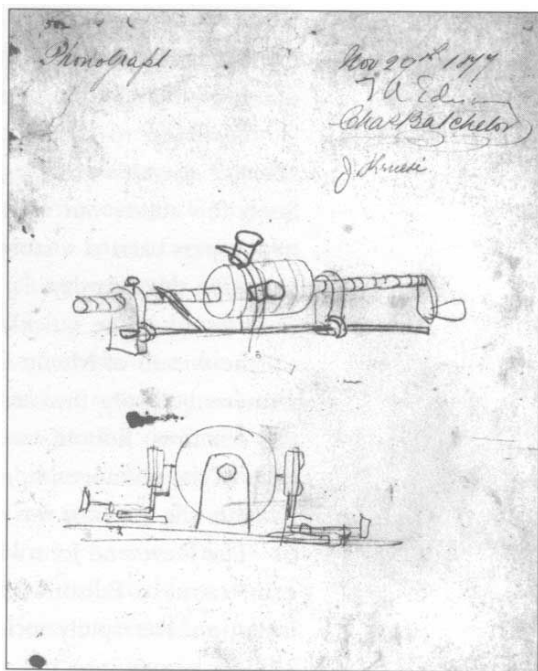
The solution model sketch that Edison handed Kruesi to build a working prototype of the world's first phonograph.

world's first phonograph himself, as well as all his other experiments. This would have slowed his rate of invention to a crawl.

Was the sketch an analysis model? No. An analysis model explains why the system with the problem behaves the way it does. The sketch explained only how the solution was to work.

This was an obstacle that Edison and others of his time could never surmount, because most of science was still in its infancy. For example, there was no chemical theory yet that could explain and predict what chemical compounds would have what properties. Without such a theory, a true analysis of many subproblems was impossible. This forced Edison and those in his invention factory into relying on multitudes of experiments to find things like the best filament for light bulbs and the best substance for the pressure sensitive rheostat for the telephone microphone. But because they had a good experimental process, as well as a genius at the wheel, their searches were fruitful.

Because Edison's models tended to analyze how the solution should work rather than the problems to be overcome, this key practice gets only a 2 for Edison's invention factory, and even less, a 1, for before Edison. This practice carries a weight of 3 because in modern science, analysis models drive research more than anything else except experimentation and a solution feedback loop, which carry weights of 3 and 4.

An outstanding example of this practice was the detailed model that James Crick and Francis Watson built to crack the code of DNA. Without that model, they would have been unable to conceptualize the molecular structures involved. [136]

Key Practice 5 – **Only after the analysis model is constructed do problem solvers begin to narrow solution alternatives down to the final selection.**

Compare the analysis model that Crick and Watson did to Edison's sketch of the phonograph. It is not hard to see that inventors of Edison's time used relatively crude models. Furthermore, inventor's before Edison, and even Edison himself, seldom used true analysis models. Instead they build solution models. Thus this factor gets only a 1 for before Edison and a 2 for Edison's invention factory, because in both cases they were putting the cart before the horse.

The purpose of an analysis model is to understand the system with the problem so well that converging on a solution becomes a matter of choosing between well understood alternatives. Contrast that to the many guesses Edison was forced to make because he had no analysis models. A good analysis model allows problem solvers to spend their time studying a handful of final alternatives in depth, thus saving much time and expense. A good analysis model can also transform a problem from insolvable to solvable, because now you can see a way forward.
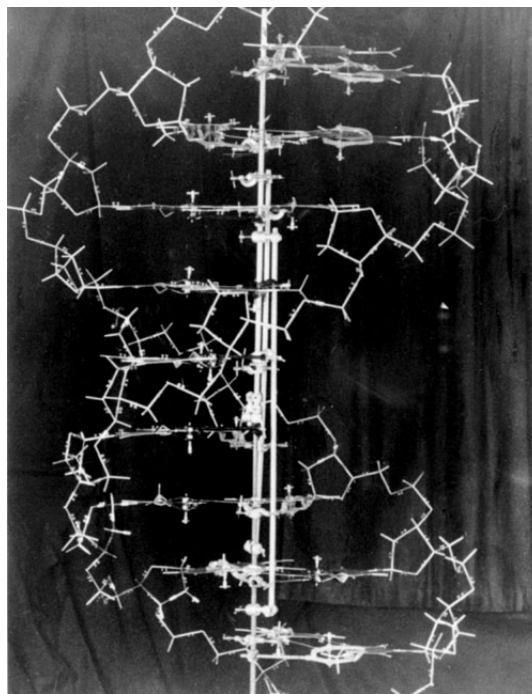
The structural analysis model that Crick and Watson built in 1953 to help in correctly conceptualizing the molecular structure of DNA.

Key Practice 6 – **The solution is packaged in a manner that makes it self-implementing. That is, it takes no further significant effort from the organization to make the solution succeed, because the solution is designed to manage and cause its own successful implementation or acceptance by the customer.**

Inventions like the phonograph and light bulb are self-implementing, because they contain everything the customer needs to solve a problem. Thus before Edison and Edison's invention factory both get a 5.

But if you glance ahead to other comparison tables in this chapter, you will see that solutions to social problems are mostly not self-implementing. This is because the output of social problem solution factories, such as think tanks and environmental NGOs, are memes. The memes, in the form of articles, books, conversations, and such, may or may not change the system and thus solve the problem. Solution memes and their carriers almost always require large amounts of companion memes for successful implementation. An interesting exception, which we will discuss later, is how think tanks after the Powell Memo achieved the near miraculous ability to produce self-implementing meme carriers. This is done by "graduating" think tank staff into governmental power structures. Once there, they can self-implement because they are now in power.

Key Practice 7 – **The results of released solutions are accurately measured as quickly as possible, and the results are used to improve the next version or phase of the solution, or when necessary the present solution. This is also known as measuring organization effectiveness, such as the way a for-profit corporation tracks its profits. This practice creates a formal solution results feedback loop.**

My impression of invention factories before Edison is they were very unorganized compared to today's research and development. They had only a rough idea of solution results, because they could barely measure anything but the most obvious results. Measurement of temperature, weight, acidity, infectivity, and so on was, by today's standards, primitive. Thus this practice gets a 2 for before Edison. But Edison's invention factory measured solution results better than the average factory, due to their heavy emphasis on experimentation and recordkeeping of the results. Thus it gets a 4.

This practice has the highest weight of all the key practices. This is because it creates the most important feedback loop in the process: **Evolution of the Actual Solution**. Feedback about solution results allows problem solvers to improve the results of the first four main work flow steps. For example, if a solution element fails in the real world, a failure analysis can be performed. It might lead to the conclusion that the structural analysis was flawed. Or it might point to the wrong solution meme alternative was chosen.

The importance of accurate, timely feedback on results can be seen in the fact that one of the greatest inventions in the history of the modern corporation was the discovery of double entry accounting by the Italians in the 15th century. For the first time traders could accurately tell what was contributing to profits and how much their profits were. This was such a competitive advantage that the practice of accounting swept the world quickly. Today measurement of corporate financial performance is considered so vital that it is a top corporate priority. Public corporations are required by law to publish audited financial statements, a practice which closes the feedback loop to their stockholders.

But strangely enough, accurate and timely measurement of results is given little importance by environmental NGOs. It seems they have not yet discovered what the New Dominant Life Form discovered 500 years ago: that the most important practice of all is to measure your own results with the speed and precision of a diving hawk.

Experimentation Practices

Key Practice 8 – All key problem solving assumptions are declared to be hypotheses in need of testing. This includes all key strategies, including the organization's process itself.

When I talk to environmentalists or read the literature of the field, I am continually amazed at how little they question key assumptions. It's certainly not that way in the business world, where questions like "Is that really true? Can you prove that?" are the norm when new strategies are being developed.

The same appears to have been true before Edison, where so little was questioned that this practice gets a 0. But Edison's invention factory made very few major false assumptions. Instead, Edison drove himself and everyone else to turn assumptions into hypotheses that needed testing. Thus Edison's factory gets a perfect 5.

Key Practice 9 – **All hypotheses undergo rigorous experimentation to see if they are true, false, or need to be modified to become useful.**

The emphasis Edison placed on experimentation is clearly described in this passage about Edison's second invention factory. This was built from scratch at West Orange, New Jersey. (Italics added) [137]

"By early fall [of 1887], five new buildings had been erected….

"*The main laboratory*, three stories high and containing nearly 40,000 square feet of floor space, included a beautiful wood-paneled li-

brary, offices, *experiment rooms*, a power house (containing dynamos, steam engines, and a boiler), machine shops, and storage space. The four smaller buildings housed *laboratories devoted to electrical testing, chemical and metallurgical experiments*, and woodworking.

"Just as he had done at Menlo Park, Edison *spared nothing to equip the lab*. He installed the best possible machines and instruments in the workshops and experiment rooms, filled the library with every book and scientific journal he could possibly need, and brought in supplies by the wagonload—tools, chemicals, mineral specimens, and just about every other kind of material. As Edison saw it, '*The most important part of an experimental laboratory is a big scrap heap.*' "

From this we can see that to Edison, an invention factory was a complex of buildings equipped with everything needed for massive amounts of experimentation. Very little space was needed for the actual creation of hypotheses. According to Edison this was the easy part, which is what he meant by "Genius is 1% inspiration and 99% perspiration."

Now what did Edison's staff do, once given such well equipped laboratories?

"The success of the invention factory idea depended on the skills of these craftsmen. Fast, flexible workers, accustomed to *high standards of precision work*, provided the foundation of the *experimental teams* that carried out the work of innovation. The fruitful cooperation between inventor and machinist, personified by the relationship of Edison and Batchelor, became the basis of the team approach to innovation that characterized work in Edison's laboratory. Edison made it clear later in his career that 'The way to do it is to organize a gang of *one good experimenter* and two or three assistants, appropriate a definite sum yearly to keep it going… have every patent sent to them and *let them experiment continuously*.' As this quotation indicates, the *chief experimenter* ran the group with the minimum of interference from Edison. He would outline the task and give some pointers, but he normally relied on *the initiative of the experimenter*. When one man asked him what to try next, Edison replied: 'Don't ask me. If I knew I would try it myself.' "

Thus Edison's invention factory gets a perfect 5 for this practice. Because rigorous experimentation drove very few invention factories before Edison, that gets a 1.

This passage gets to the core of Edison's greatest invention, which was the concept of invention factories itself. An invention factory become possible when two critical factors become true: (1) The factory manager wants to create a large steady stream of inventions, and (2) Correct division of labor to make invention manufacture a repeatable, scaleable process is used. Edison was the top level problem identifier and hypothesis generator. Through the use of drawings, writing, and conversation he was able to delegate everything else, starting with analysis and experimentation, to others. He did the "1% inspiration" and they did the "99% perspiration," which amplified Edison's output a hundredfold. Other inventors before Edison did not get these two factors right. But after Edison, hundreds of thousands did.

Key Practice 10 – **Only hypotheses that have passed multiple well designed experiments are added to the organization's formal knowledgebase of sound solution components. The knowledgebase has a high quality gate.**

Edison knew that "garbage in, garbage out" held true for his invention factories. He thus enforced the strictest possible quality gate to the knowledgebase that he and all his workers shared. Only after key hypotheses had passed a battery of experiments was he satisfied they were true enough to build inventions with.

This practice gets another perfect 5 for Edison. Before the miracle of Menlo Park most budding inventors built their dreams on such a vast variety of unfounded, untested assumptions that before Edison gets a 1.

Knowledgebase Management Practices
Key Practice 11 – The knowledgebase is managed so well that what it contains enters into all decisions that would benefit from it, in a manner that optimizes the quality of those decisions.

Notice the phrase "have every patent sent to them" in the previous passage. This is part of knowledgebase management. So is "filled the library with every book and scientific journal he could possibly need" in the passage before that. And then here is another description of Edison's approach to knowledge management:

"[Edison] established formal procedures for record-keeping on all laboratory work; numbered laboratory notebooks would provide the laboratory with a complete record of its work, thereby facilitating that work and protecting it legally. These three steps—thorough literature searches, keeping up to date on the emerging science and technology,, and careful documentation of work done in the laboratory—were among the central elements of [his] research efficiency." [138]

Edison wanted his company's knowledgebase, as well as that of science and industry, to enter into the decisions of his experimenters and their assistants. But it could have been even better if technology like video and the internet had been available. So we'll give him only a 4 for this practice. Before Edison gets a 1, because in most other invention factories only the driving genius was highly educated and well qualified. The rest were not nearly as capable as Edison's "chief experimenter's" were.

Key Practice 12 – **Knowledgebase additions, removals, and changes are used to improve previous decisions in all workflow steps.**

If knowledge workers are not kept abreast of change in their field and their organization, they are working from stale knowledge and will produce behind-the-times results. This is a minor issue when the knowledgebase is small and stable. But it becomes critical when the knowledgebase is large and rapidly changing. The last century of the growth of science has seen exponential growth in the size of knowledgebases and the speed of change. Thus this practice is crucial to today's solution factories.

It was also crucial to Edison's invention factory, because it was at the forefront of hyperchange. The Menlo Park invention factory alone produced 400 patents and at least three major inventions (the phonograph, electric light, and telephone transmitter) and many minor inventions in six years, an astounding record even by today's standards. I'd estimate that over 80% of these many innovations were based on reassembly of previous knowledge into a new form, rather than newly discovered knowledge.

Thus Edison's invention factory was at the top when it came to keeping everyone up to date on the latest in the knowledgebase. This practice gets a perfect 5. But before Edison gets only a 1, because the way earlier invention factories were organized encouraged the use of stale knowledge. This was caused by the use of less than top talent experimenters, who were not usually considered experimenters, but lowly assistants. These other invention factories were not as well stocked with the latest books and journals. Nor was their staff reading much of the time, as the photograph shows Edison's staff was. [139]
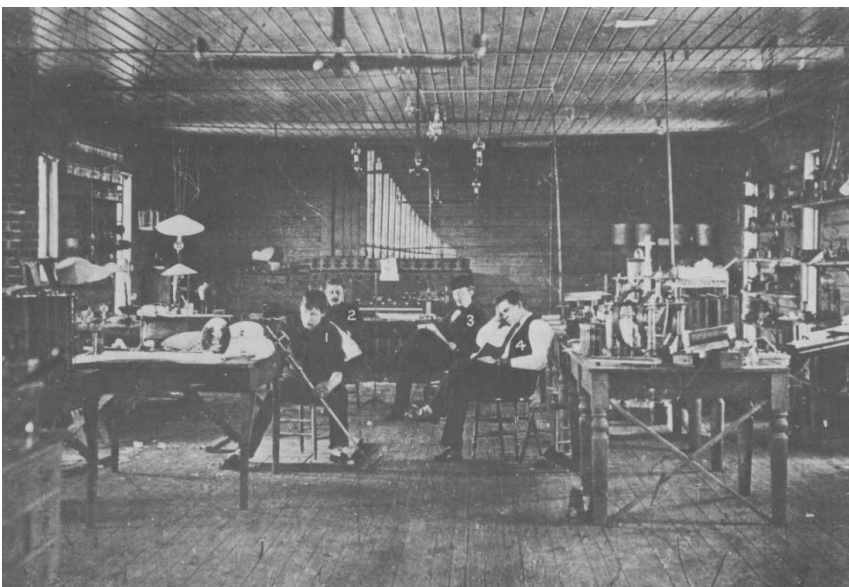
"Members of the staff relax by reading on the second floor of the laboratory [at Menlo Park]. The incandescent light bulbs attached to the tops of the gas lamps are clearly visible." In the back of the room was the pipe organ for intellectual entertainment. Note the formal attire of some of the staff. They saw experimentation as high status, high pay, immensely fulfilling work, just as doctors and professors saw theirs.

The Relative Productivity of Two Types of Invention Factories

The weighted ratings for the two types of invention factories add up to 24 for before Edison and 73 for Edison's invention factory. Squaring these gives 576 and 5,329 for relative productivity. While these are not exact numbers because we have not calibrated the process model, the questionnaire, the rating weights, or conversion to relative productivity, they can serve very well for rough ballpark comparison.

The most dramatic conclusion is that Edison's invention factory worked because its relative productivity was an order of magnitude greater than anything that came before. Edison's will to create an invention factory, combined with his keen sense of how to setup a manufacturing process that was repeatable and scaleable, allowed him to run circles around everyone else. This included Alexander Graham Bell, inventor of the telephone. Bell produced only one major invention and 30 patents because, unlike Edison, he never hired more than one assistant for work on inventing the telephone, did not focus on reusing his knowledgebase in similar inventions, and never devoted his life to creating as many inventions as he could.

The subtotals in the table of invention factories tell why Edison's approach worked so well. He had a strong formal process, while others had none. He had all the elements in the proper main work flow. He had the very

best key practices for experimentation, which was pitifully weak at other invention factories. And finally he managed his knowledgebase seriously, to get the most out of it. The emergent result was Edison fully delivered on his promise to "invent some minor thing every ten days and some big thing every six months."

The Memetic Side of Think Tanks

Invention factories produce *physical* solutions to problems. Think tanks produce *mental* solutions to problems, in the form of memes. While both are types of solution factories, invention factories and think tanks work very differently.

The purpose of think tanks is to produce memes that will affect the course of government decision making. This allows a rough definition: A **think tank** creates memetic solution components to important public problems, for the purpose of affecting government decisions. A shorter definition is a think tank is a memetic solution factory specializing in problems that require governmental intervention to solve.

Think tank employees produce new useful thoughts, each of which is a meme. These memes may be in the form of an appealing phrase, an article, a book, graphs, videos, an interview, a speech, etc. The actual article, book, person, lobbyist, etc is the *meme carrier*, which is necessary to carry the meme(s) to other minds where, if a mind is *infected* by the meme, the meme has *replicated*. The memetic output of think tanks enters society's *meme stream*, from where it flows to other minds. In pre-industrial societies, the meme stream is primarily conversational, augmented by the written word. In industrialized societies the meme stream is dominated by the media, and within that, television, and more recently the internet.

An indirect *measure of success* of a think tank is how many successful replications of memes that it created have occurred. A direct measure is how effective the resultant behavior is in solving the problem a think tank was working on. Thus usually the more minds a think tank's memes infect the better.

Memetic infection is what think tanks are really all about. But this perspective is not widely shared. For example, wikipedia.org defines a **think tank** as *"A research institute or other organization providing advice and ideas on problems of policy, commerce, and military interest."* The American Heritage dictionary defines **think tank** as *"A group or an institution organized for intensive research and solving of problems, especially in the areas of technology, social or political strategy, or armament."* These both miss the memetic abstraction completely. [140]
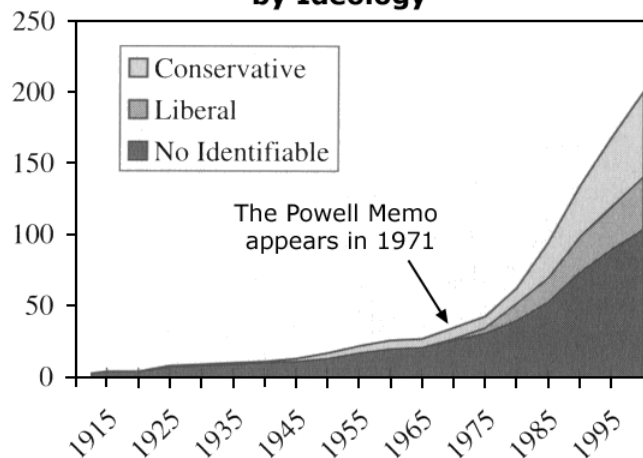
But far more insidious is the way both definitions hide the fact that many think tanks do not merely provide "advice and ideas." They promote it as aggressively as possible, using whatever means it takes to get the job done. As you might expect, this includes the many conservative think tanks that were established in the United States as a result of the Powell Memo. Their goal is not to provide "advice and ideas." It is to invent and propagate the memes necessary to win **The Race to the Bottom among Politicians**. This is done by first inventing persuasive rationales (memes) to convince people to support conservative politicians and policies. These are all fallacious, because the race to the bottom ultimately relies on falsehood and favoritism. There may be truth mixed in, but the only purpose of this is as a benign "carrier" for the rest of the message. The positive connotations of the term "think tank" serve as a very effective cover for the true mission of conservative think tanks.

Learning from the Opposition: The Rise of Corporate Proxy Think Tanks in the US

Think tanks are a murky type of organization to research because their product, memes, is so ethereal. It's easy to determine the number, size, and general political orientation of think tanks. But it is very hard to determine their actual political effectiveness and innermost strategies and techniques. Thus this sketch of the rise of think tanks will necessarily fall short in these important areas.

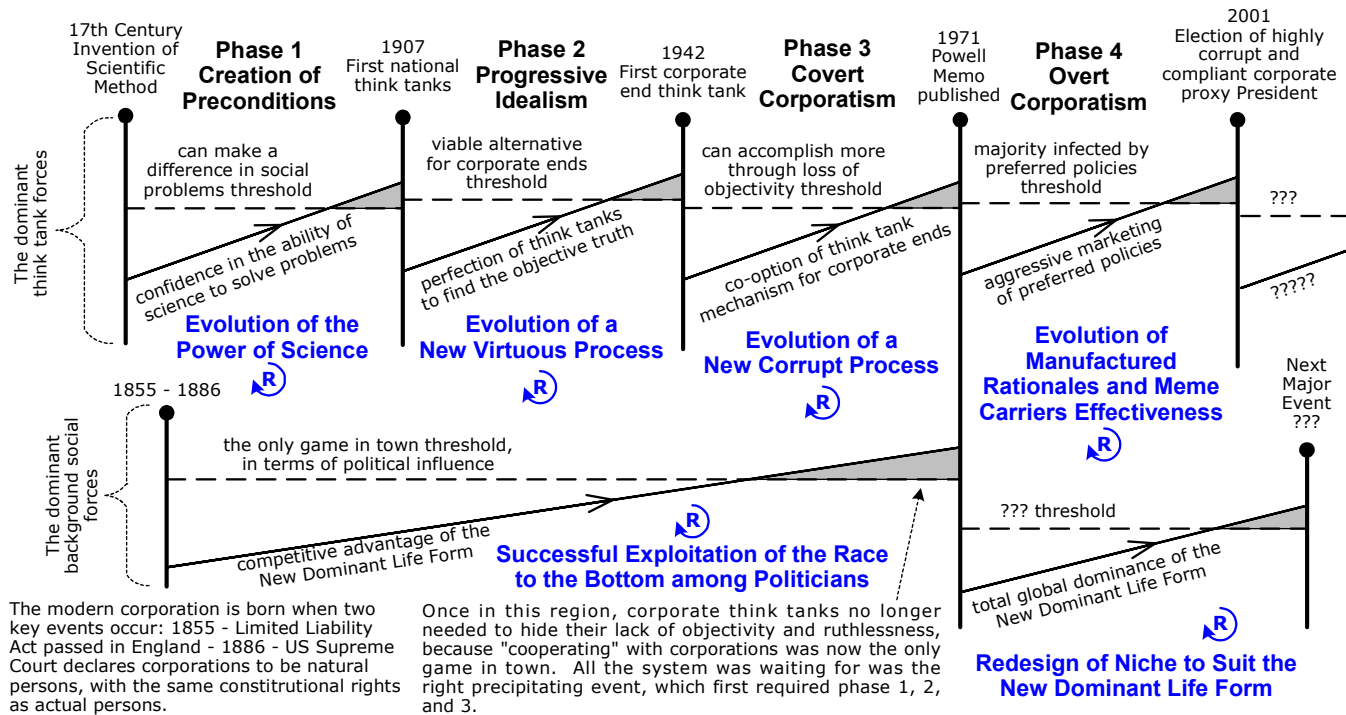Andrew Rich provides the graph below to show the growth of US think tanks by ideology. The curve shows

The Growth of US Think Tanks by Ideology

The proliferation pattern of nationally focused think tanks, by ideology. The largest group has no identifiable ideology. Notice how the late arrival of liberal think tanks gave conservative think tanks a large learning curve and first to market advantage.

The Rise of Think Tanks in the United States

17th Century Invention of Scientific Method

Phase 1 Creation of Preconditions

1907 First national think tanks

Phase 2 Progressive Idealism

1942 First corporate end think tank

Phase 3 Covert Corporatism

1971 Powell Memo published

Phase 4 Overt Corporatism

2001 Election of highly corrupt and compliant corporate proxy President

The dominant think tank forces

can make a difference in social problems threshold

viable alternative for corporate ends threshold

can accomplish more through loss of objectivity threshold

majority infected by preferred policies threshold

???

confidence in the ability of science to solve problems

perfection of think tanks to find the objective truth

co-option of think tank mechanism for corporate ends

aggressive marketing of preferred policies

????

Evolution of the Power of Science ↻**R**

Evolution of a New Virtuous Process ↻**R**

Evolution of a New Corrupt Process ↻**R**

Evolution of Manufactured Rationales and Meme Carriers Effectiveness ↻**R**

Next Major Event ???

1855 - 1886

The dominant background social forces

the only game in town threshold, in terms of political influence

??? threshold

competitive advantage of the New Dominant Life Form

total global dominance of the New Dominant Life Form

Successful Exploitation of the Race to the Bottom among Politicians ↻**R**

↻**R**

The modern corporation is born when two key events occur: 1855 - Limited Liability Act passed in England - 1886 - US Supreme Court declares corporations to be natural persons, with the same constitutional rights as actual persons.

Once in this region, corporate think tanks no longer needed to hide their lack of objectivity and ruthlessness, because "cooperating" with corporations was now the only game in town. All the system was waiting for was the right precipitating event, which first required phase 1, 2, and 3.

Redesign of Niche to Suit the New Dominant Life Form

that all was relatively quiet until the 1970s, when the Powell Memo precipitated a phase transition in the US political system. This caused the curve to jump from slow to rapid growth. What were the major factors involved? What is that curve composed of, in terms of conservative, centrist, and liberal think tanks? And how effective have think tanks been, compared to special interest groups such as environmental NGOs? Where might this growth curve and other trends be going?

As we search for answers to these questions, we will develop a model of understanding for think tanks. The examination will focus on US think tanks, since they are the most influential in the world and set the trends that other countries follow. Our model of understanding will be expressed in three forms: (1) The Solution Factory Work Flow model, which we have already discussed, (2) A SOFAN diagram of The Rise of Think Tanks in the United States, and (3) A table of process ratings for three types of think tanks.

We begin our analysis of the rise of think tanks with the Social Force Analysis Notation (SOFAN) diagram above.

In SOFAN a "force" is the impact exerted by a feedback loop structure on a social system. All the sloped lines are social forces, with the name of the feedback loop causing the force below each line. The circled Rs show that all the loops are reinforcing, causing them to grow until something stops them. In SOFAN what stops or transforms such growth is a precipitating event, as represented by a vertical line.

The diagram shows two main types of forces. On top are the dominant think tank forces. These led to the four phases of the rise of think tanks in the US. On the bottom are the dominant social background forces. As far as I can tell, there is a single main background force: the long, slow, relentless rise of the modern corporation to dominance over *Homo sapiens*. Because it is the most important force on the diagram, let's examine it first.

The Dominant Background Social Force

This force arises from the **Successful Exploitation of the Race to the Bottom among Politicians** structure. The exploiter is the New Dominant Life Form, more commonly known as the modern corporation and its allies.

This background force was briefly presented in chapter two, and then presented at length in the chapter on *The Dueling Loops of the Political Powerplace*. However, it is so important it is presented in even more detail in the *A Model in Crisis* manuscript as the Niche Succession Simulation Model. This model shows how the modern corporation and its allies have successfully exploited **The Race to the Bottom among Politicians**. It also shows how the modern corporation and *Homo sapiens* are engaging in a classic survival of the fittest struggle for niche dominance. The niche is control of the biosphere. According to the ecological **principle of competitive exclusion**, over time only one species (or life form) can exist in a niche. All others will be forced to adapt to a different niche, be driven out of the niche,

or be driven to extinction. While multiple life forms can exist in the biosphere, only one can control it.

There were two main precipitating events that caused the birth of the modern corporation. The first occurred in 1855 when the Limited Liability Act was passed in England. Similar acts had already been passed in France in 1807 and in most states in the US by 1830. But England, the dominant world power at the time, set the standard, which quickly spread worldwide.

Limited liability means that a corporation's stockholders (and employees, with some exceptions) are not liable for the corporation's debts and cannot be punished for its wrongdoings. Before the introduction of limited liability they were fully liable, which is called *unlimited liability*.

From the viewpoint of stockholders seeking to maximize profits, limited liability is a boon, because it means there is little incentive for stockholders to act responsibly. If a corporation causes large problems for society (such as catastrophes, pollution, or environmental destruction) that total far more than its net worth, it simply declares bankruptcy. Or if a corporation runs up losses much bigger than its net worth, such as by Enron style con games or just plain ole bonehead management, it declares bankruptcy. But in both cases, before bankruptcy occurs the company may pay out as much stockholder dividends and executive compensation as it wants, and these payouts cannot be retracted by those with claims on the company after bankruptcy.

From the viewpoint of society, however, limited liability is a shield of irresponsibility. Because stockholders and managers are shielded from behaving responsibly toward the needs of society in general, they behave irresponsibly and push their companies to engage in all sorts of risky and reckless behavior. Due to limited liability, stockholders and managers can essentially "gamble for free" at the expense of society, because they are not liable when they lose a gamble. But the corporate life form has been clever enough to hide this brutal fact behind a smokescreen of "benefits" that it brings to society. This has been done so well that the public has come to see the modern corporation, as it exists today, as essential to modern civilization. It is not, because there are superior alternatives.

How critical the precipitating event of limited liability was in retrospect may be seen in this quote from *The Economist* in 1926. It wrote that "[history will] assign to the nameless inventor of *the principle of limited liability*... a place of honor with Watt and Stephenson, and other pioneers of the Industrial Revolution." Going even further than that, in 1911 Nicholas Murray Butler, President of Columbia University wrote that "... in my judgment the limited liability corporation is the greatest single discovery of modern times." The end result is "limited liability encourages managers to take inappropriate risks." [141]

By 1855 the definition of the modern firm was almost complete: a separate legal entity, limited liability, stock ownership, and public reporting of a firm's affairs. But there was one key feature still missing: firms were inferior to people in the eyes of the law, because they were "artificial entities" and not "natural persons." But then, in 1886, came a legal thunderbolt. David Korten, writing in *When Corporations Ruled the World*, describes the final precipitating event that changed everything: [142] (Bolding added)

> "In 1886, in a stunning victory for the proponents of corporate sovereignty, the chief justice of the Supreme Court declared in *Santa Clara County v. Southern Pacific Railroad* that **a private corporation is a natural person under the US Constitution**—although as noted above, the Constitution makes no mention of corporations. Subsequent court decisions interpreted this to mean that corporations are entitled to the full protection of the Bill of Rights, including the right to free speech and other constitutional protections extended to individuals.
>
> "Thus corporations came to claim **the full rights enjoyed by individual citizens** while being exempted from many of the responsibilities and liabilities of citizenship. In being guaranteed the same right to free speech as individual citizens, they achieved, in the words of Paul Hawken, 'precisely what the Bill of Rights was intended to prevent: domination of public thought and discourse.' The subsequent claim by corporations that they have the same right as any individual to influence the government in their own interest pits the individual citizen against the vast financial and communications resources of the corporation and mocks the constitutional intent that all citizens have equal voice in the political debate surrounding political issues."

Once the modern corporation had all the prerequisites to compete against the then dominant life form, *Homo sapiens*, a classic battle of niche succession began. The competitive advantage of the New Dominant Life Form began to grow and grow and grow. More laws in its favor were passed. Society grew ever more dependent on corporations instead of partnerships or individuals for production of its needs. People in industrialized countries became highly dependent on corporations for jobs. Politicians became dependent on corporate money for election. Acting through govern-

ment representatives, international corporations set up their own World Trade Organization (WTO) in 1995. The WTO has more power then even the World Court (Actually The International Court of Justice, the principle judicial organ of the UN), because WTO members are legally bound to follow WTO decisions, while the World Court only has jurisdiction if the parties involved give their consent and agree to be legally bound to follow the court's decision. As a result of all these developments, some time in the late 20th century the competitive advantage of the New Dominant Life Form crossed over the only game in town threshold, in terms of political influence.

Once in this region, one precondition for a successful phase transition to Overt Corporatism was met. Corporate think tanks and other corporate sponsored organizations no longer had to hide their lack of "policy research" objectivity or their propensity toward ruthlessness, because they were now the only game in town. Any politician who did not play the corporate game was a dead politician, in the sense they would probably not get elected or reelected. The power of corporations was now so great that they could openly fix the so called "research" and the "facts" around the policies that would most benefit corporations. Or they could use direct force, such as:

"Consider the state of Montana, which for nearly a century was run as a virtual colony by the aptly named Anaconda Copper Company. The company had a tradition of corruption and hardball tactics. At one point, displeased with the decision of a state judge in favor of one of its rivals, Anaconda shut down all its mines and smelters in the state for three weeks, cutting off thousands of workers from their paychecks, until the governor called a special session of the legislature to pass a new bill that resolved the dispute in favor of the company." [143]

Or consider this example concerning the tax on wine in California: (Italics added)

"As late as 1989, the tax on wine remained a constant one cent a gallon.

"But California was changing. The California Highway Patrol pushed the state to see alcohol as a public safety issue. Mothers Against Drunk Driving (MADD) turned personal grief into political mobilization. In the late 1980s, a broad coalition of groups organized to pressure the state legislature to impose a nickel-a-drink tax on bars and restaurants, with revenues earmarked for trauma centers, law enforcement, alcoholism prevention and treatment. But despite

polls showing that 73% of Californians supported such a tax, the measure went nowhere in the legislature.

"…the coalition …decided to take the matter directly to the citizens of California by means of an initiative on the 1990 state ballot. Soon thousands of volunteers across the state were setting up tables on sidewalks and in malls to qualify the initiative, Proposition 134.

"Responding immediately, liquor industry leaders held emergency meetings to plot a counter strategy. The president of the California Wine Association called Proposition 134 'the most serious threat to this country since Prohibition,' and an industry newsletter reported that the industry would spend 'whatever is necessary' to defeat the tax. Led by donations from Seagram & Sons and Guinness Corporation, the industry committed *an unprecedented $38 million to oppose the nickel-a-drink tax initiative.* Attack ads were drafted, a one-penny-a-drink counter initiative was launched in order to muddy the waters, and an industry front group, Taxpayers for Common Sense, was created in the offices of the liquor executive.

"The combination of negative advertising, counter initiatives, front groups, and an overwhelming financial advantage proved effective. In the crucial area of broadcast advertising, the balance of resources was not even close. *While the liquor industry spent $18 million on ads that slammed the nickel-a-drink initiative, proponents had only $40,000 with which to counter them.* On election day, confused voters rejected both the citizen initiative and the industry alternative." [144]

Is there any question who is now the New Dominant Life Form on planet Earth?

The Rise of Think Tanks in the United States diagram argues that the dominant background social force since 1886 has been the steady increase in the competitive advantage of the New Dominant Life Form. This background force, which is not at all obvious to most analysts, affects foreground forces that are more apparent. In particular, this background force caused the co-option of think tank mechanism for corporate ends force to emerge and greatly strengthened the force of the Powell Memo precipitating event. Let's turn our attention to the upper part of the diagram to see how this came about.

Phase 1 – Creation of Preconditions

In the 17th century the greatest invention since agriculture was discovered 10,000 years ago occurred: discovery of the Scientific Method. Scientists and others now had a repeatable process for producing reliable knowledge, using experimentation to prove hypotheses true or false. New knowledge could be built from old knowledge several orders of magnitude more reliably, because the old could be assumed to be correct. Suddenly science could build its castles of wisdom on rock solid foundations of knowledge instead of quicksand. As a result, their castles soared to greater and greater heights. This caused the advance of knowledge, and its many benefits when applied, to shoot through the roof and become exponential.

As a result of technological advances like control of infection, the harnessing of electricity, the appearance of a flood of cheap consumer goods, rising life spans, and a mushrooming middle class, confidence in the ability of science to solve problems began to grow. Once it began to grow significantly, it was just a matter of time until society came to the conclusion that science could also be applied to solving social problems. Once this point was reached the can make a difference in social problems threshold was crossed. Phase 1, Creation of Preconditions, was almost complete. All that was needed was the right precipitating event to cause a phase transition.

Phase 2 – Progressive Idealism

The right event came along in 1907, when the first two national think tanks were founded. This signaled the beginning of the age of Progressive Idealism. Andrew Rich, in *Think Tanks, Public Policy, and the Politics of Expertise,* describes how this occurred:

"The First Think Tanks: Reflections of a Progressive Ideal.

"The first national think tanks emerged just after the turn of the 20th century with missions reflecting a Progressive Era confidence that expertise from the burgeoning social sciences could solve public problems and inform government decision making. Progressive reformers looked to experts to generate the 'scientific knowledge' that would move policy making beyond rancorous log rolling and partisan patronage. They aimed to make government reflect more efficient and professional standards.

"The Russell Sage Foundation was founded in 1907…. It began with a mission to promote 'the improvement of social and living conditions in the United States of America.' The Foundation was intended to contribute to the turn-of-the-century charity movement, as an institution that could both define standards for the social work occupation and find systematic solutions for the broader social problems to which the movement was addressed. Knowledge and efficiency were the watchwords for the movement….

"The Bureau of Municipal Research, also incorporated in 1907, took as its mission the efficient reform of government, rather than the solution of social ills. The Bureau evolved from efforts by New York businessmen and intellectuals, who placed high value on the establishment of defensible—and enforceable—budget and accounting standards in the city of New York. … Its mission was to meet the 'supreme need for an agency dependent neither upon politics nor upon an average public intelligence.' Its leaders brought academic credentials from top universities, in both finance and law, and a zeal for making government a more efficient provider of public goods and services." [145]

The first two national think tanks had an immediate impact. More were quickly founded, including the fabled Brookings Institution in 1916. Fifty years later, President Lyndon B. Johnson acknowledged their immense beneficial influence, when he said:

"The men of [the] Brookings [Institution] did it by analysis, by painstaking research, by objective writing, by an imagination that questioned the 'going' way of doing things, and then they proposed alternatives…. After fifty years of telling the Government what to do, you are more than a private institution…. You are a national institution, so important… that if you did not exist we would have to ask someone to create you." [146]

The era of Progressive Idealism was marked by one overriding value: *the search for the new objective truths* that were needed to take society to even higher levels for the benefit of all. The central product of think tanks during this period was new objective truths, in the form of unbiased analyses and solution alternatives. These were then used by government decision makers to determine what areas needed their attention the most, where the biggest gains might lie, and what might be done to achieve these gains. During the Progressive Idealism phase the driving force was perfection of think tanks to find the objective truth.

As more think tanks were founded and those that existed became more mature, the value of their output rose so high it began to catch the attention of the New

Dominant Life Form. At this point the <u>viable alternative for corporate ends threshold</u> had been crossed.

Phase 3 – Covert Corporatism

In 1942 a little noticed phase transition occurred when the first corporate end think tank was founded. Andrew Rich describes the precipitating event this way:

> "With the explicit backing of big business, the Committee for Economic Development (CED) emerged in 1942, representing a new variant on existing think tank models. Anticipating the end of the war, business leaders were concerned with generating high employment in a postwar economy. Marion B. Folsom, one of CED's founders and treasurer of Eastman Kodak Company, observed: "The problem is to find jobs in the post-war period for eight to nine million more persons than were employed in 1940 and to increase the output of good and services by 35%.... To bring about this increase… in two years time is a most difficult assignment. This is largely the task of private industry.
>
> "A research organization like the CED was deemed necessary to provide ideas for this undertaking. Business support of CED was explicit, with collaborative links to the Chamber of Commerce and the National Association of Manufacturers."

While this looked innocuous on the surface, it was not. Up to this point think tanks had virtuous ends. Their growth was driven by the **Evolution of a New Virtuous Process** loop. But once the first think tank designed to meet the ends of corporations (and not society) was established, a new loop appeared. This was the **Evolution of a New Corrupt Process** loop, which caused the <u>co-option of think tank mechanism for corporate ends</u> force to begin to grow. Bit by little bit, more corporate oriented think tanks were founded, as this new mechanism was perfected. One was the American Enterprise Association (AEA) in 1943, "with seed money from Louis Brown of the Johns Manville Corporation." It was "More conservative and anti-government than the CED."

Up to this point, think tanks had achieved success largely because they were perceived to be objective, reliable sources of critically needed information, problem analyses, and policy alternatives. But this began to change in 1961 and 1963, when the Hudson Institute and the Institute for Policy Studies (IPS) were founded. While they were not primarily motivated by corporations, they were motivated by a similar drive: *to be more influential*. According to Andrew Rich, to do that they:

> "…broke with some of the institutional conventions associated with think tanks, particularly norms of neutrality and academic objectivity. Neither Kahn nor Barnet [leaders of the two institutions] had Ph.D.s, historically the degree of think tank scholars. And both institutions seemed as concerned with staffing their organizations with creative and aggressive intellectuals as with those who might have obtained a long list of academic credentials. Both organizations doggedly defended—and gained respect for—the quality and accuracy of their research products. But Hudson and IPS were more dogmatic and unrestrained than their think tank forebears."

It did not take long for corporate masterminds to connect the dots. Once that happened, the <u>can accomplish more through loss of objectivity threshold</u> was crossed. Furthermore, <u>the only game in town threshold</u> had long been crossed. Now all that was needed was the right precipitating event.

Phase 4 – Overt Corporatism

It came in 1971 with the strength of a shot heard round the world. But because the shot was a confidential memo, the only people that heard it at the time were the recipients of the memo.

The astounding tale of the Powell Memo has already been told, back on page 149. But it is worth telling again in the context of the SOFAN diagram. The following material is from *Gangs of America: The Rise of Corporate Power and the Disabling of Democracy*, by Ted Nace, 2003. Ted devotes an entire chapter to *The Revolt of the Bosses: The new mobilization of corporate political power (1971 to 2002)*. The chapter opens with:

> "In August 1971, two neighbors in Richmond, Virginia, happened to have a little chat. One was Eugene B. Sydnor, Jr., a department store owner who had recently been appointed chairman of the U. S. Chamber of Commerce's Education Committee. The other was Lewis Powell, Jr., one of the most well-connected corporate attorneys in the country and a director on eleven corporate boards. The two talked about politics, and Sydnor was so intrigued by Powell's ideas that he asked Powell to put them in a memo to the Chamber of Commerce committee.
>
> "The late 1960s and early 1970s weren't the best of times for men like Sydnor and Powell. Public attitudes toward businessmen were in a free fall. From 1968 to 1977, the percentage of Americans who agreed that 'business strikes a fair balance between profits and the interests of

the public' dropped from 70% to 15%. The country was experiencing the biggest social upheaval since the Great Depression, and much of what was going on seemed aggravating if not downright frightening to big business. Wrote one political scientist, 'Order seemed to be unraveling: massive antiwar protests on the mall; a half-million-troop war effort bogged down and hemorrhaging in the mud of Southeast Asia; economic stagnation and declining profit rates; and in the cities, skyrocketing crime coupled with some of the most violent riots since the Civil War.'

"At the center of the turbulence was President Richard Nixon, who had built his career as a Red-bating politician but whose actual style of government, once in office, involved an eclectic mixture of conservative and liberal positions, flavored with a strong dose of old-fashioned corruption. Nixon supported a number of measure opposed by business: a repeal of the Kennedy-era investment tax credit, an increase in the capital gains tax, limits on the use of tax shelters, a strengthened occupational safety and health bill, and tough new regulations on air pollution.

"By 1971 it was clear that both the consumer and environmental movements, which had barely existed five years earlier, were forces to be reckoned with. Seven major environmental and consumer groups were established in 1969 and 1970 alone: Friends of the Earth, the Natural Resources Defense Council, Public Citizen, Common Cause, Environmental Action, the Center for Law and Social Policy, and the Consumer Federation of America. Caught flat footed by this grassroots mobilization, corporations were unable to mount enough opposition to stop such legislation as the National Environmental Protection Act (1969), the Clean Air Act Amendments (1970), a ban on all cigarette commercials from radio and television (1970), and the cancellation of funding for the Supersonic Transport Plane (1970).

"Perhaps it could have been foreseen that the successes of the environmental and consumer movements would trigger some sort of backlash by big business, but the scale of the corporate political mobilization proved to be unprecedented. Even more improbable was the man whom many credit with inspiring that mobilization, sixty-four-year-old Lewis Powell, Jr.

"A few days after his conversation with Sydnor, Powell called in his secretary to take dictation and composed a memorandum describing his view on the malaise afflicting corporate America and the steps he felt the U. S. Chamber of Commerce should take to reverse the slide in the political fortunes of big business. The memorandum was marked 'Confidential' and was distributed as a special issue of the Chamber of Commerce's *Washington Report* to top business leaders. Titled 'Attack on American Free Enterprise System,' it is a remarkable document, forming the seminal plan for one of the most successful political counterattacks in American history."

This then was the event itself. What was the response of the system?

That it would be a very strong and possibly sudden response can be seen from the two preconditions for a successful phase transition. One is that the can accomplish more through loss of objectivity threshold had been crossed some time in the 1960s, when the Hudson Institute and the Institute for Policy Studies had proved that being more dogmatic and less objective worked, and that it was the only way that would work for policies that were not in the best interests of the public. The other precondition was the passing of the only game in town threshold.

Ted Nace continues with a description of the system's response:

"As though in direct answer to Powell's rallying cry, an unprecedented wave of political organizing began among business executives soon after the publication of the memo. The most important development came in 1972, when Fredrick Borch of General Electric and John Harper of Alcoa spearheaded the formation of the Business Roundtable, an organization made up exclusively of CEOs from the top two hundred financial, industrial, and service corporations.

"Because of the composition of its membership, the Business Roundtable occupied a position of unique prestige and leverage. It functioned as a sort of senate for the corporate elite, allowing big business as a whole to set priorities and deploy its resources in a more effective way than ever before.

"Alongside and in the wake of the Roundtable, the 1970s saw the creation of a constellation of institutions to support the corporate agenda, including foundations, think tanks, litigation centers, publications, and increasingly sophisticated public relations and lobbying agencies.

According to Lee Edwards, official historian of the Heritage Foundation, wealthy brewer Joseph Coors was moved by Powell's memo to donate $250,000 to the Analysis and Research Association, the original name of the Heritage Foundation. Other contributors followed his example.

"At the national level, the permanent organizations that made up the corporate political infrastructure would assemble short-term coalitions as needed to wage particular battles. These coalitions often combined the prestige, financial resources, and Washington clout of the Business Roundtable with the ability of industry-specific groups to mobilize large numbers of people.

"Typical of such coalitions were the Center for Tobacco Research, described by the *Wall Street Journal* in 1993 as 'the longest running misinformation campaign in U. S. business history'; the Cooler Heads Coalition, which sought 'to dispel the myths of global warming'; the Competitive Enterprise Institute, a research and advocacy group that advocated against safety and environmental regulation; and the Environmental Education Working Group, which sought to undermine environmental education programs in schools.

"Over time, the new political infrastructure honed a variety of techniques. Alongside traditional tactics such as lobbying and junkets, innovative new methods emerged such as 'astroturfing.' As defined by *Campaign and Elections* Magazine, an astroturf campaign is 'a grassroots program that involves the instant manufacture of public support for a point of view in which either uninformed activists are recruited or means of deception are used to recruit them.'

"On the fringe of the new corporate politics was a grab bag of techniques used to smear or silence corporate opponents. …common was the use of lawsuits to intimidate corporate critics. According to law professors George Pring and Penelope Canan, thousands of such suits were filed from the mid-1970s to the mid-1990s. Pring and Canan coined the term 'strategic lawsuits against public participation,' or SLAPP. Their research showed that the targets of such suits rarely lost in court but nevertheless were 'frequently devastated and depoliticized' and that the suits discouraged others from speaking out."

These new corporate techniques are examples of how the <u>aggressive marketing of preferred policies</u> force

was now growing rapidly. For think tanks, aggressive marketing means not merely publishing research results, but beating on the right doors and getting the right people to read those results. Sharon Beder describes how the leading US conservative think tank goes about doing this: (Italics added)

"The Heritage Foundation has often been credited with changing the face of think tanks with its aggressive marketing strategies; others are now following suit. The foundation spends only 46% of its budget on actual research: more than half goes on marketing and fund raising, including 36% on public relations and 'educational programs.' Foundation president Ed Feulner says: 'We view production—that is, conducting research, analyzing the data, and publishing the finding—as only part of the total process. *The other key part is marketing*—the way in which we package our findings, our distribution network, and the various activities aimed at building support for our ideas.

"The Foundation produces hundreds of publications every year, including books and a quarterly journal, *Policy Review*. Its specialty is its 'backgrounders' or 'bulletins' which are *short essays (between two and twenty pages) on current issues*—'brief enough to read in a limousine ride from National Airport to Capitol Hill.' These are provided without charge to government officials, employee and journalists, *and are usually personally delivered*.

"The Heritage Foundation, like other think tanks, conducts public opinion polls as a means of—as a Foundation employee put it—'*influencing public opinion, not just reflecting it.'* This is done by selecting questions that will influence the results and then getting wide media attention for the supposedly objective poll findings."

If, as you have been reading this, you have been feeling a growing sense of anger, frustration and despair because environmentalists cannot hope to match what corporatists are doing, that feeling is well founded. The environmental movement, even if it was 100% united, cannot hope to out influence governmental decision making if it uses the same strategies as the New Dominant Life Form. Their only recourse is another strategy.

As a result of the Powell Memo of 1971, a phase transition from Covert Corporatism to Overt Corporatism occurred. Before the Powell Memo, industry had been reticent about pushing its agenda as hard and openly as it could. But after the Powell Memo, all that

changed. For example, here is the stated mission of the conservative Heritage Foundation: [147]

> *"The Heritage Foundation is a research and educational institute—a think tank—whose mission is to formulate and promote conservative public policies based on the principles of free enterprise, limited government, individual freedom, traditional American values, and a strong national defense."*

Compare that to the mission statement of the fairly centrist Brookings Institution:

> *"The Brookings Institution… is an independent, nonpartisan organization devoted to research, analysis, and public education with an emphasis on economics, foreign policy, governance, and metropolitan policy."*

The first mission statement essentially says "I am going to aggressively push the following policies as hard as I can, using any means necessary." The second statement, by extreme contrast, describes an organization that intends to perform objective work in certain fields, with no preconceived policy goals to bend their research and findings around, and no tendency to "promote" their findings aggressively.

During the fourth phase, Overt Corporatism, the **Evolution of Manufactured Rationales and Meme Carriers Effectiveness** loop worked so well it was devastatingly effective. The aggressive marketing of preferred policies force grew so strong that think tanks and the other types of solution factories spawned by the Powell Memo caused a seismic shift in American politics. Conservatism roared in like a lion unleashed. Once the majority infected by preferred policies threshold was crossed, it was inevitable that corporatism would get its way. And it did, in spades, when in 2001 the corporate proxy movement (better known as conservatism) elected George W. Bush as the 43rd president of the United States.

Background forces do not disappear after a precipitating event occurs. Instead, they are transformed into new forces. Before the Powell Memo the dominant background social force was the growth of the competitive advantage of the New Dominant Life Form. After the Powell Memo that force became the growth of total global dominance of the New Dominant Life Form. This is because the modern corporation now had enough competitive advantage to move onto its next challenge: global domination. This is occurring through the spread of corporations to second and third world countries, the infiltration of corporate proxies into nation and international bodies, the continued weakening of governments by privatization, regulation rollback, and tax cuts, and so on.

What will happen once the total global dominance of the New Dominant Life Form force grows to a high level, and crosses an important social threshold? What is that threshold? What will the precipitating event be? Looking a little deeper, is this really going to be the dominant force, if its source is the **Redesign of Niche to Suit the New Dominant Life Form** loop? Or is that even the right loop?

I don't know, but a detailed analysis could probably find out.

The Real Result of the Forces Unleashed by the Powell Memo: An Explosion of Corporate Agenda Promotion Institutions

The Rise of Think Tanks in the United States diagram makes it appear that the main result of the Powell Memo was the next major event: the election of a highly corrupt and compliant corporate proxy President in 2001. But that is only an obvious symptom of a deeper new trend: *the appearance of a plethora of new kinds of New Dominant Life Form driven solution factories.* This disturbing trend is not shown on the diagram because the diagram is only trying to explain the rise of think tanks.

Ted Nace wrote in a passage above that:

> "Alongside and in the wake of the [Business] Roundtable, the 1970s saw the creation of a constellation of institutions to support the corporate agenda, including foundations, think tanks, litigation centers, publications, and increasingly sophisticated public relations and lobbying agencies."

This "constellation of institutions" is the "big 80" that was described back in the first presentation of the Powell Memo on page 149, where Ron Hazen wrote that:

> "Consider that the conservative political movement, which now has a hammerlock on every aspect of federal government, has a media message machine fed by more than 80 large nonprofit organizations – let's call them *the Big 80* – funded by a gaggle of right-wing family foundations and wealthy individuals to the tune of $400 million a year.
>
> "Starting with just a handful of groups, including the Heritage Foundation, in the early '70s, the conservatives built a new generation of organizations – *think tanks, media monitors, legal groups, networking organizations,* all driven

by the same over-arching values of free enterprise, individual freedoms and limited government.

We need to pin a term on these New Dominant Life Form driven solution factories. Let's call them **Corporate Agenda Promotion Institutions**, or CAPI for short. The mission of CAPIs is to promote the dominance of the New Dominant Life Form, mainly by insuring that **The Race to the Bottom among Politicians** loop remains dominant and well exploited by the New Dominant Life Form. The counterpart to CAPIs is HAPIs, or **Humanist Agenda Promotion Institutions**. Their mission is to make the race to the top go dominant and stay dominant. (To remember CAPI versus HAPI, think of the "H" as short for "happy.")

The real result of the forces unleashed by the Powell Memo was the sudden appearance of CAPIs. The most important types of CAPIs are:

1. Alliances and networks
2. Think tanks
3. Lobbying agencies
4. Public relations agencies
5. Litigation centers
6. False front special interest groups
7. Foundations

The alliances are very important, because they steer and network the CAPIs so as to maximize their strategic impact. They are similar to the role of management in an organization. The leading CAPI alliance is the Business Roundtable.

The Most Powerful CAPI is Think Tanks

The most powerful CAPI, however, is think tanks. They are the only type of CAPI that does the hard, deep thinking and analysis on which strategies and offensives can be based. They also have the most credibility with the public, the media, and politicians. After corporations, they also provide the government with the most people who are fully indoctrinated and trained in promoting the corporate agenda. And, starting in the 1970s, a new breed of think tanks appeared that proved that aggressive "marketing" of a think tank's product could lead to highly successful direct influence of political decisions.

There is the question of why conservative think tanks have been so much more effective than liberal think tanks. Andrew Rich addresses this question directly: (Italics added)

"My research suggests that while it is true that conservatives have been more effective than progressive funders, this is not because they spend more money. Nonconservative foundations – what might be labeled 'middle of the road, mainline, or liberal foundations' – have devoted far more resources than conservatives to influencing thinking about public policy. This spending simply has not been as deliberate or effective. Conservative think tanks have quite successfully provided political leaders, journalists, and the public with concrete ideas about shrinking the role of the federal government, deregulation, and privatization.

"They are succeeding by aggressively promoting their ideas. By contrast, liberal and mainstream foundations back policy research that is of interest to liberals. But these funders remain reluctant to make explicit financial commitment to the war of ideas, and they do relatively little to support the marketing of liberal ideas." [148]

Conservative think tanks aggressively promote their ideas, while liberal thinks do not, or do so to a much smaller degree. Rich does not say exactly why they do this. My theory is that these behaviors stem from the dueling loops of the political powerplace. Conservatives are essentially corporate proxies exploiting **The Race to the Bottom among Politicians**. Because their arguments are based on falsehoods, they have little inherent logical appeal. But if they are cunningly packaged and aggressively promoted, they can work wonders. In fact they require aggressive promotion to work well at all, because their inherent appeal is so low.

The race to the bottom promotes falsehood in order to win supporters, while the race to the top promotes the truth. Because the truth has high inherent appeal, it needs less promotion to work. In a well running society, all you have to do is truthfully inform people of their options, and they will choose what's best. Attempting to hype the truth or aggressively push it will backfire, because people will start suspecting that if it needs to be hyped, then it's probably not true.

Rich implies that if liberals aggressively marketed their ideas as much as conservatives did, they would be able to have as much influence. I think this is true to a small degree, because you do have to inform people about basic data and their options. But it is not true to a large degree. *If liberals start aggressively promoting their ideas as much as conservatives have, that will NOT make liberal ideas as effective.* This is because the race to the bottom has an inherent structural advantage over the race to the top, for two reasons: (1) The size (and

hence the appeal) of falsehoods can be inflated, but the size of the truth cannot. (2) Corrupt politicians can use favoritism, while virtuous ones cannot.

Seen in this light, the sudden appearance of aggressive marketing in conservative think tanks is no more than the sudden discovery that advantage number one can be institutionalized, and used to give conservative think tanks an insurmountable advantage over centrist and liberal think tanks.

There is one further reason that aggressive promotion of liberal ideas will not lead to success. Liberal organizations simply cannot match the tremendous firepower that corporate sponsored conservative organizations can bring to the war of ideas. One example was mentioned earlier in the passage on a citizen's initiative to pass nickel-a-drink wine tax in California: "*While the liquor industry spent $18 million on ads that slammed the nickel-a-drink initiative, proponents had only $40,000 with which to counter them.*" While not all battles are as lopsided as this one, conservatives can easily outspend liberals on the battles that matter, because the New Dominant Life Form has deeper pockets than *Homo sapiens*. And those pockets are getting deeper and deeper.

Why CAPI Think Tanks Are Winning the War of Words

Andrew Rich, in his article on *War of Ideas: Why mainstream and liberal foundations and the think tanks they support are losing in the war of ideas*, states the main reasons why Corporate Agenda Promotion Institution (CAPI) think tanks are winning what is aptly called "the war of words." The reasons are:

1. "They are succeeding by aggressively promoting their ideas."

2. Liberal think tank funders are "reluctant to make explicit financial commitments to the war of ideas, and they do relatively little to support the marketing of liberal ideas."

3. By contrast, "conservatives structure their financing much differently than liberal and centrist foundations. A look at the data from 2002 reveals that conservative foundations consistently make funding policy institutes [think tanks] one of their top three priorities, while the liberal and mainline foundations rarely treat it this way."

4. "Think tanks on the left tend to be organized by issue area—around women's issues, poverty, or the environment—rather than taking on the broad range of issues with which Congress and the president deal." This a severe constraint, because "Whereas a multi-issue, conservative group can redirect portions of its resources and energy from promoting ideas for, say, environmental regulation to Social Security reform as the immediate priorities of Congress and the president change, more narrowly focused progressive think tanks cannot." This allows CAPI think tanks to work on what will influence the government the most at any particular time.

5. Conservative think tanks are perfectly willing to tell lies to promote their goals. Rich more delicately phrases this as "Concern for neutral, unbiased research is not a preoccupation of the foundations on the right."

Sharon Beder, in her book *Global Spin: The Corporate Assault on Environmentalism*, adds another reasons why CAPI think tanks are winning: (Italics added)

6. "These conservative think tanks aim to influence the government and set the agenda in a variety of policy arenas, including that of the environment. *To be effective, they insinuate themselves into the networks of people who are influential* in particular areas of policy by organizing conferences, seminars and workshops and by publishing books, briefing papers, journals and media releases for policy makers, journalists and people able to sway those policy makers. … Ultimately, think tank employees become policy makers themselves, having established their credentials as a vital part of the relevant issue network."

Think Tank Process Ratings
A Rough Comparison of Solution Factory Types

Key Practice	Weight	Before Powell Memo		Aggressive Conservative		Non-aggressive Centrist or Liberal	
		Raw Score	Weighted Score	Raw Score	Weighted Score	Raw Score	Weighted Score
1. Hyper aggressive marketing of preferred policies	2	0	0	5	10	1	2
2. The end justifies the means, so falsehood is okay	2	0	0	5	10	0	0
Domain Specific Practices Subtotal	4		0		20		2
3. Problems clearly and correctly defined	1	2	2	4	4	1	1
4. Analysis model constructed	3	3	9	3	9	3	9
5. Analysis model drives solution convergence	1	3	3	4	4	2	2
6. Solution packaged as self-implementing	4	1	4	5	20	1	4
7. Solution results feedback loop is in place	2	2	4	4	8	2	4
Main Work Flow Subtotal	11		22		45		20
8. All key assumptions become hypotheses	1	3	3	3	3	3	3
9. All hypotheses undergo experimentation	2	1	2	4	8	1	2
10. Knowledgebase (KB) has high quality gate	1	2	2	4	4	1	1
Experimentation Subtotal	4		7		15		6
11. KB enters into all decisions affected	.5	2?	1	2?	1	2?	1
12. All KB changes become improvements	.5	2?	1	2?	1	2?	1
Knowledgebase Mgt Subtotal	1		2		2		2
Process Rating on scale of 0 to 100	20		31		82		30
Relative Productivity = R^2			961		6,724		900

Rating the Think Tank Types

The race to see which side could produce the best think tanks began when the starting shot of the Powell Memo was fired in 1971. Conservative think tanks have easily won the race, as the above table shows.

Think tanks are a type of solution factory, so they follow the same key practices of the same process that Thomas Edison's invention factories followed in the table on page 175. A small difference is the domain specific practices are slightly different. These are the first two practices, which are very important hallmarks of CAPI think tanks. Because think tanks seek to solve a different type of problem from invention factories, the key practice weights in the above table differ from the invention factories table.

Conservative think tanks are winning because they are more intelligently exploiting every step in the process that gives them an advantage. These are the key practices with the higher weights and thus the higher leverage. Starting at the top of the table, notice how the aggressive conservative think tanks have trounced the non-aggressive centrist or liberal think tanks in key practices 1 and 2. While the non-aggressives are starting to catch up in key practice 1, they will never be able to score more than a zero on key practice 2.

This is because centrist and liberal think tanks are ardently committed to telling the truth. If they changed that commitment, so that they could start telling lies to achieve their ends, they would be joining a headlong race to the bottom. This they have wisely decided not to do, because it is an insidious trap to be avoided at all costs. Why is it a trap? Because if the end justifies the means, then soon the means become ends in themselves, and the original ends are forgotten. Each side competes on who can employ the dirtiest, trickiest, meanest methods that will work the fastest. Whoever can invoke the most fearsome false enemy, push the fear hot button the hardest, pursue the most expedient wrong priorities, make the greatest number of false promises, and successfully pass off the greatest number of lies will come out on top and stay on top. It is not a desirable world to live in.

In the main work flow key practices, the non-aggressive centrist or liberal think tanks do a little better. But still, they are missing some easy big gains. For example, in key practice 3 they are not clearly and correctly defining their problems in terms of the correct goals. The goal must include all the steps necessary to create and inject the true memes into the political system, such that they will have maximum impact. That is how the "war of words" will be won. Missing from the goal is the actual transmission of the true memes that research has created. The non-aggressive think tanks naively assume that all they have to do is produce

books, papers, and articles, and the job it done. It is not. It takes aggressive transmission of those ideas.

In key practice 4, the non-aggressives do construct an analysis model of the various problems they are solving. It's as good as the aggressives' model. That fact that the conservative analyses are biased toward the positions they want to support is irrelevant.

But the non-aggressives lose out in key practice 5 by optimistically assuming that a sound analysis is all it will take to converge on the correct solution. It is not. It must be converted into an appealing message that will convert the maximum number of the right decision makers. Thus they score only a 2 here.

Key practice 6 is packaging the solution as self-implementing. Aggressive conservative think tanks do an outstanding job of this by producing self-implementing meme carriers. These are think tank staff that, after being indoctrinated in the goals, dogma, and rationales of a think tank, graduate into the government. Once there, the solution is self-implementing, because its carrier is now in power.

Sharon Beder describes this marvelous ability (Or should I say frightening ability?) this way: (Italics added)

> "In the past two decades, *the most important function served by the network of conservative think tanks has not been the germination of new ideas, but the creation of a 'new cadre' of professionals*…. Not only have the dozens of conservative think tanks created a framework for disseminating ideas that exists largely outside the established infrastructure of academic journals, university presses, and commercial printing… they have also designed career vehicles for conservative activists and thinkers.
>
> "…when a new US government is elected, top level personnel in the administrative arm of government are changed for people whose ideology is more suited to the incoming government. Think tanks provide a ready source of such personnel, and Presidents from Carter to Clinton have made great use of them to fill high level government positions. Think tanks provide a fast track to a political career and a public profile in the policy area. They also provide a place for discarded government officials to go when there is a change of government, where they can be employed until 'their' government is re-elected, whilst still having some influence over public policy in the meantime.

> *"The revolving door between governments and think tanks is well established.* … With an eye to the revolving door between think tanks and government positions, the Heritage Foundation and the Cato Institute have sought to nurture a new generation of conservative leaders within their ranks by sponsoring college students and promising junior bureaucrats, and providing them with a place to meet and socialize. The Heritage Foundation also promotes a 'talent bank' of potential candidates for official positions in government administrations on the premise that *its policies will be influential if its people are in positions of power*. It was able to place 39 of its staff in government whilst Reagan was president." [149]

Aggressive conservative think tanks are so good at this practice they get a perfect 5. Non-aggressive centrist or liberal thinks tanks, on the other hand, tend to do this so poorly they score only a 1.

Practice 7, solution results feedback is in place, is another area where the aggressives outscore the non-aggressives. The aggressives more closely measure their results, such as media impact, legislative impact, personnel placements in government, contacts with key decision makers, and so on. Centrist and liberal think tanks tend to not be that concerned with the impact of their work—their chief concern is producing it. So the get only a 2, while the aggressives get a 4.

This gives the aggressives a main work flow subtotal of 45, versus a 20 for the non-aggressives. This is a huge difference. It and the difference in subtotals for the domain specific practices account for most of the total rating difference, which is 82 versus 30. That's bad enough, but when these are squared to arrive at relative productivity, the difference is almost a full order of magnitude: 6,724 versus 900. From this we can draw the firm conclusion that conservatives, through the use of think tanks, related CAPIs, and a vastly superior process, are winning the war of ideas by a very large margin. And because they of that, they are the current winners in the **Race to the Bottom among Politicians**.

The practices on knowledgebase management were impossible to figure out, based on study of available sources. In order to be evenhanded they were both estimated to be all 2s. But because of their low weights, this makes little difference in the total rating.

Why Environmental NGOs Are Failing to Achieve Their Objectives

Below is a table comparing the ratings for the processes of Classic and Analytical Activism in normal and expected use. Here is a short summary of those two processes:

Classic Activism is the use of the same three solutions to all problems. These are to find the proper practices necessary to resolve an important problem, tell people about the problem and the proper practices, and then if that fails exhort and inspire people to adopt the proper practices.

Analytical Activism says yes, those three things need to be done, but for difficult problems so much more is required that a relatively complex, formal problem solving process is mandatory. This process is the Analytical Method, which has all the steps necessary to solve any kind of problem, since a key step is picking a process that fits the problem.

There are vast difference between the process of Classic and Analytical Activism. The process ratings table shows the differences are so large that it's amazing that Classic Activism has been able to make as much progress as it has. I would attribute this to the early popularity of the novel concept of environmentalism in the 1960s and 80s, combined with the shock of knowing there was a gigantic new problem that needed solving, and the fact that the opposition had not yet created an effective response.

By now you are probably so familiar with the 12 key practices that the ratings in the table are self-evident. They are so lopsided that Classic Activism scores from 0 to 2 in all practices and has a relative productivity of 484, while Analytical Activism scores from 4 to 5 and has a productivity of 7,744. This tremendous difference is what happens when an accident of nature, Classic Activism, meets an engineered-from-scratch new process, Analytical Activism.

After several years of study of this matter, I've come to the conclusion that these ratings are approximately correct and that environmentalism is currently using the process of Classic Activism. If both of these propositions are true, it follows that the primary reason for the environmental movement's failure to achieve its objectives it the low process efficiency of Classic Activism.

Furthermore, if the ratings on Analytical Activism when used correctly are also approximately correct, then it follows that the movement can achieve its objectives by transforming itself into one based on Analytical Activism.

The center column is for you to rate your own organization. Be honest with yourself. Don't do it alone in five minutes. Take days or weeks and involve others.

Classic Versus Analytical Activism
A Rough Comparison of Solution Factory Types

Key Practice	Weight	Classic Activism		Your Organization		Analytical Activism	
		Raw Score	Weighted Score	Raw Score	Weighted Score	Raw Score	Weighted Score
1. Formal process used	2	0	0			5	10
2. Formal post mortems performed	1	2	2		`	4	4
Domain Specific Practices Subtotal	3		3				14
3. Problems clearly and correctly defined	1	1	1			5	5
4. Analysis model constructed	3	1	3			5	15
5. Analysis model drives solution convergence	1	1	1			5	5
6. Solution packaged as self-implementing	1	0	0			4	4
7. Solution results feedback loop is in place	4	2	8			4	16
Main Work Flow Subtotal	10		13				45
8. All key assumptions become hypotheses	1	1	1			5	5
9. All hypotheses undergo experimentation	3	1	3			4	12
10. Knowledgebase (KB) has high quality gate	1	0	0			4	4
Experimentation Subtotal	5		4				21
11. KB enters into all decisions affected	1	2	2			4	4
12. All KB changes become improvements	1	0	0			4	4
Knowledgebase Mgt Subtotal	2		2				8
Process Rating on scale of 0 to 100	20		22				88
Relative Productivity = R^2			484				7,744

Try to end up with a rating that a core group believes in. It will probably be low. And it will probably be lop-sided. The key practices that are the lowest are the places to start to improve first. As you assess your own rating, you may decide to add additional practices (or subpractices) and weights. This is exactly what you should do, because it will greatly improve the power of the assessment to pinpoint your unique organization's strengths and weaknesses.

Next, let's find out if it's possible to combine what we've learned in this chapter into a cohesive set of principles.

Measuring Process Efficiency

Process efficiency is the ratio of process output to input, which is output / input. The greater the output for a given input, the higher the efficiency.

If efficiency is less than 100% you have a worthless process. In a for-profit business one measure of process efficiency is income divided by expenses. If the result is over 100%, the business was efficient and turned a profit. If the business was inefficient then its process efficiency is less than 100%, it's losing money, and it will sooner of later go out of business.

The process efficiency of governments and non-profit businesses is not nearly as easy to measure. In fact, there is no standard measurement. But because you cannot manage what you cannot measure, we need a way to fairly accurately measure the process efficiency of any institution.

The output of any institution is the changes it causes to the system that are external to the organization. The input of any institution is the energy it takes from its surrounding system to cause those changes to happen. This gives a process efficiency ratio of:

$$\text{changes to external system} \, / \\ \text{energy from external system}$$

However this will not do. It is too all encompassing. We need a tighter, more relevant ratio that can be used for strategic planning and management, at the mission level. So let's try this ratio:

$$\text{energy output} \, / \, \text{energy input} \\ = \text{process efficiency}$$

Even this may be too broad unless we define the terms for non-profits and for-profits. (For simplicity of discussion, governments are included as a type of non-profit.) Let's address for-profits first. In a for-profit business the standard measure of efficiency at the highest level is return on investment (ROI), which equals:

$$\text{profit} \, / \, \text{investment} \\ = \text{for-profit process efficiency}$$

This formula is much more useful because the simpler measure of income / expenses is actually not a measure of efficiency. It only appears to be. For example, if it took a 10,000 euro investment to turn a profit of 100 euros on sales of 200 euros, that is a 50% profit. That's great if all you are looking at is profit. But the bigger picture is that from a management or stockholder viewpoint, all that really matters is true output and input, which is profit / investment. From this viewpoint ROI is only 1%.

In a non-profit organization we cannot use the formula profit / investment = process efficiency, because profit is not the output that matters. Instead, it is how well the organization has achieved its mission. All objectives can be quantified. How well they are achieved can thus be measured as a percent of objective achieved. This gives:

$$\text{percent of mission achieved} \, / \, \text{investment} \\ = \text{non-profit process efficiency}$$

This is how funders look at non-profits, whether they are foundations donating big money, or individuals donating small amounts of money or their own volunteer labor. This formula is a whole new way of thinking because it forces managers to start measuring progress in mission achievement.

For example, if your mission is solving the global environmental sustainability problem, then you might use the Ecological Footprint of the world as a measure of global environmental sustainability. Presently the world's Ecological Footprint is about 125% and growing. Your organization's management might set a long term objective of reducing the footprint to 100% in 50 years. Or it might think smaller, and set a sub-objective to making a specified contribution to achieving the top objective, such as by forming a guiding coalition to focus the efforts of environmental organizations. Either way, percent of mission achieved can be measured. And so can the investment required. The result is you now have a measure of process efficiency.

Once you can measure your own process efficiency, improving it becomes much easier, because you can start measuring cause and effect as you try to improve the process. Without an accurate measurement, a serious process improvement program is impossible. But behind that lies an even bigger problem. Without an accurate measure of mission achievement an organization is adrift and unfocused. It will tend to be unable to agree on or determine the best way to pursue its mission, be-

cause there is no accurate way to measure if one alternative is better than another.

Accurate measurement of an organization's process efficiency is so important, that when for-profit businesses finally figured out how to do it, it was such a breakthrough that it transformed the business landscape. The breakthrough occurred in the 13th century, when Italian merchants perfected the practice of double entry bookkeeping. At last they could accurately calculate the following three formulas. The first is that over any period of time:

$$income - expenses = profit$$

The second is that at any point in time:

$$assets - liabilities = equity$$

The third formula relates the first two with:

$$profit = change\ in\ equity$$

Suddenly all was light. In a few centuries the new method of accounting swept the Western business world, because it allowed even a large, dispersed firm to accurately measure and thus better manage what really mattered, down to the last penny. Never before had this been possible. *Because the fundamental mechanism of business performance measurement was now scaleable,* small family businesses as the norm were quickly replaced by larger, often national firms. These were later replaced by international corporations as the most powerful institutional forces on the planet.

But a similar revolution has yet to happen in the non-profit world. Certainly all successful large non-profits measure their financial performance. But how many measure

$$percent\ of\ mission\ achieved\ /\ investment$$
$$= non\text{-}profit\ process\ efficiency$$

which is what really matters? I am aware of none.

Thus to solve the larger problem of sustainability, the environmental movement needs to first solve the smaller problem of being able to accurately measure problem solving progress. Only then will non-profits be able to scale up and become large and powerful enough to make the global elephant dance to the tune of sustainability.

The Three Principles of Solution Factory Process Efficiency

An environmental organization with low process efficiency is probably making little or even negative progress towards achieving its objectives. It will eventually go out of business, due to inability to attract enough funding, volunteers, or both. On the other hand, an organization with high process efficiency is almost invariably achieving its objectives, even if they are extremely demanding. Organization maturity is really process maturity, and process maturity is really high process efficiency. *Thus process efficiency is the key to success*.

The process efficiency principles of solution factories follow easily from The Solution Factory Work Flow model on page 175, the 12 key practices of solution factories, and the central message of this book. Accurate measurement of process efficiency allows closing the all important **Evolution of the Actual Solution** feedback loop on the work flow model, as well as implementing key practice 7, solution results feedback loop is in place.

The principles, in the form of three simple rules, are:

1. **Follow the Analytical Method.**
2. **Use the 12 key practices of solution factories as the starting point for the process chosen as the second step of the Analytical Method.**
3. **Use the Solution Factory Work Flow model as the starting point for your strategy on how to best manage that process.**

If these principles are followed, your process efficiency will soon be very high. But please beware, for there is a towering roadblock ahead called change resistance. From my experience most people and most organizations, especially environmental NGOs, are allergic to thinking like this. When confronted with a message such as what you have read in this book, almost all environmentalists and environmental organizations I've encountered so far have soundly rejected these concepts, and have continued down the path of Classic Activism, and of course, down the path of continual failure.

But a courageous few have seen the wisdom of these suggestions, a spark has lit up in their eyes, and they have astonished those around them by proceeding to resolutely spread these concepts, one mind at a time.

How to Create the First Wave of Solution Factories

There's no need to reinvent the wheel here. To create the first wave of solution factories, we just follow the same pattern as the Powell Memo of 1971. That short document outlined the major reasons that CAPIs were needed, and how to get started on creating them. It inspired a few wealthy businessmen to make a few key large startup donations, and it inspired a few conservatives to found the Heritage Foundation in 1973 and other CAPIs. The success of the first ones proved the concept was valid, causing an audible swoosh as dozens of new CAPIs were founded in rapid succession.

The pattern of how US conservatives created the first wave of Corporate Agenda Promotion Institutions was:

1. *A sufficient precipitating event occurs.* This was the Powell Memo.

2. *One or more new institutions are founded using the new model suggested in the precipitating event.* These were think tanks, PR firms, lobbying groups, and other types of very aggressive CAPIs.

3. *In a few years the pioneers prove that the new way will work.* The Heritage Foundation did this, and inspired a host of imitators.

4. *The first large wave of new institutions is founded.* This occurred over the next several decades. The number of conservative think tanks in the US increased from less than 10 in 1971 to over 50 in 2000.

Forward thinking environmental movers and shakers can do the same. And because they will have a clear model of what they are doing and it's been done before, they can move much faster. There is no real reason the first wave of solution factories cannot be created in less than 5 years, other than that familiar bugaboo, change resistance. But the Powell Memo showed that it is possible for a good precipitating even to overcome even strong resistance. Thus it can happen again.

And it will happen again, if we can perform all four steps in the pattern correctly.

To do that, I ask you one simple question: What is your role in that pattern going to be?

There are two kinds of readers this book is targeted toward. One is the ardent environmentalist who earnestly wants to learn better ways to make a difference. The other is the same thing, but with one addition: they are also decision makers in an influential organization.

If you are an ardent environmentalist, here's what you can do to help create the first wave of solution factories and other Humanist Agenda Promotion Institutions:

1. Study this book and related messages like it, and fully understand the message.

2. These messages will have their flaws. See through them and correct them, so that you have not internalized anything that will jeopardize your mission.

3. Individuals no longer make much of a difference. But individuals working through the right institutions do. Find the one(s) you want to work with.

4. Alert them to the message that they need to become a solution factory, and that the first step is to adopt the three principles of solution factory process efficiency.

5. Stay with them as they do it, until success is assured.

6. Then go out and help found more solution factories.

If you are also a decision maker, you can do even more, and probably do it faster. The above steps apply to you as well, with some slight changes. Let's assume you are a top level manager of an environmental NGO. Your steps are:

1. Study this book and related messages like it, and fully understand the message.

2. These messages will have their flaws. See through them and correct them, so that you have not internalized anything that will jeopardize your mission.

3. Present your organization with the message that it needs to become a solution factory, and that the first step is to adopt the three principles of solution factory process efficiency.

4. Stay with them as they do it, until success is assured.

5. Then go out and help found more solution factories, or encourage people from your own organization to do this. But as you are doing this:

6. Help found a guiding coalition so that the solution factories are working together as a unified whole from day one. Each should be working on its own carefully selected contribution to the problem, so that the movement as a whole achieves high process efficiency.

That's about as detailed as the precipitating event can be. Good luck!

Improving the Transformation Simulation Model Even More, with the Creation of Solution Factories

Run 15 reduced time to 99.9% solution success from 72 to **58 years**. It did this by changing the fitness of problem solving strategies curve to a more aggressive one, due to the expected greater efficiency of solution factories. But the improved solution success curve was only a modest improvement, because it only took into account the prediction that adoption of the general idea of solution factories will make the environmental movement more effective. It did not consider what effect the explicit creation of highly visible solution factories would have on system response.

Run 16 considers this by explicitly starting a wave of solution factories in 2015, 5 years after the precipitating event. This is identical to the way a wave of CAPIs started after the Powell Memo. The system response is assumed to be an increase in the normal total investment rate from 100 to 300. This is identical to the way the Powell Memo caused a massive sudden increase in conservative investment, much of which went to the founding and later the running of conservative think tanks. Running the Transformation Simulation Model with this scenario gives the results shown below:

Run 16. Full Analytical Activism, plus revised effect of funding on fitness curve, plus explicit new wave of solution factories. Run 12 superimposed for comparison.
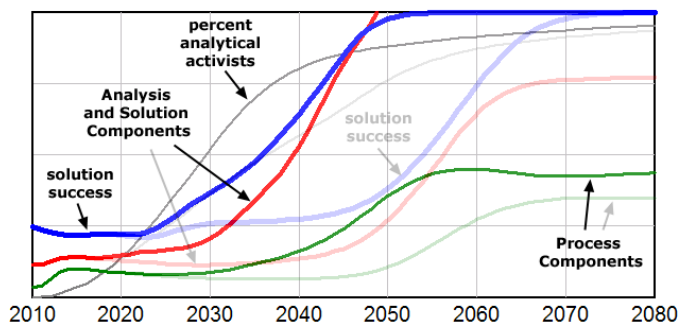
In Run 16 the new wave of solution factories starts in 2015. But as the simulation curves show, there is no immediate obvious system response. This is because the increased funding that solution factories attract doesn't have much effect on solution success at first, because it takes years for the Process Components necessary for improved process efficiency and attraction of more top talent to be created. This is akin to the way it takes years for an industry to adopt radically new practices. This slow rate of change is captured in the model in many ways, such as the process creation delay of 5 years, the analysis creation delay of 3 years, and many other delays in the model structure.

The biggest difference in system behavior between runs 16 and 12 is the Analysis and Solution Components

curve. In run 12 this was flat until about 2040. After that it curved gently upward until it reached about a 45 degree slope. But in run 16 the curve starts to turn upward in about 2018, which is 22 years sooner. This is just what you would expect, if the hypothesis that solution factories are a breakthrough is true.

The graph shows that it doesn't take long for more Analysis and Solution Components to cause solution success to also start curving upward much sooner and much steeper. The long flat plateau of the solution success curve is replaced by one that starts curving upward in about 2022. It continues at a steady pace. The result is that the time to solution success is reduced from 72 to **47 years**. Our efforts to better engineer the solution are starting to pay off.

Notice how the run 16 curve for Analysis and Solution Components sails right off the top of the graph, instead of stopping at an asymptote as in all runs before run 12. This is because the process of Analytical Activism is so efficient compared to Classic Activism that "solution overshoot" occurs. More Analysis and Solution Components are produced than is necessary. This is nearly unavoidable if one is to be certain that the problem is solved as fast as possible with the required confidence level. It is a little ironic that to solve the environmental overshoot problem, the problem solvers themselves have to resort to their own form of overshoot.

Run 16 is based on the proposition that it is entirely realistic to assume that the first wave of solution factories will have started by 5 years after the precipitating event. This is probably a conservative estimate, judging by how quickly the Powell Memo worked.

The first wave of solution factories is not going to have an easy time. They will be pioneering many things. They will have trouble. But if they follow in the footsteps of the near miraculous explosion of new ideas that followed the invention of the Scientific Method, they will succeed. All they need to do is follow their own newly minted process.

It is a little dicey to predict what will happen 20 years from now. But we expect that the first big challenge for solution factories will be to invent a breakthrough for compressing time to solution even more. This can probably be done by:

The One Year Success Feedback Solution Element

The first wave of solution factories will face many challenges. One is simply getting started, with a new business model that has not been tried before. The world has seen invention factories, and it has seen think tanks. But it has never seen solution factories, whose prime

output is solution components in the form of well engineered memes that are so well designed they do not require "aggressive marketing," because their acceptance by the human system has been treated as just another part of the problem to solve. The output of solution factories will push on system points with such high leverage that little force will be required, unlike the low leverage solutions of today that require such huge amounts of force to work they usually fail.

I believe that the concept of solution factories is so sound that it will attract many talented people. It will also attract the funding it needs. But after a few years, if the first solution factories have not achieved obvious, significant progress, they will soon fail. Therefore they need to take the fastest track possible to learning how to solve the sustainability problem.

This can be done by reducing the time it takes the solution success feedback loop to complete one cycle. In the Transformation Simulation Model this is the success delay. In the Solution Factory Work Flow model this is the time between when a meme carrier leaves the factory with some solution memes, and the time that measurement of results is possible.

Currently the success delay is set at 5 years. But in the section in the previous chapter on *how to reduce the many delays in the system* on page 175, analysis of the model and run 13 showed that reducing the success delay from 5 years to 1 year was realistic—if we had a process breakthrough. Solution factories are that breakthrough, so let's return to that angle of attack and explore it further. You may want to reread the section on page 175 and the material about run 13 before continuing.

The goal of the **One Year Success Feedback** *solution element is to reduce the time it takes to find out if a solution element is going to work to one year.*

Normally this cannot be done, because it takes many years to determine whether or not a solution is going to work once it is implemented. But solution factories are not normal organizations, so the old rules do not apply. This is because solution elements are not released until experimentation has shown that there is a very high probability of the solution element working—if it passes the critical change resistance step of system acceptance. If it passes that step, the next steps, which are moving the system from the present state to the goal state and then keeping it there indefinitely, are a cake walk.

It should not take solution factories very long to learn how to predict, given the system's response in the first year after a solution element is released, if the element is going to be accepted or rejected. Signs of rejection (meme replication failure) are foot dragging, lower than expected levels of understanding of the many novel aspects of the solution elements, decision maker confusion, missed milestones, and so on. Which signs are reliable can be statistically determined by experimental tracking of the first few solution elements or sub elements.

As a result, the simulation run below can probably be accomplished:

Run 17. Full Analytical Activism, plus revised effect of funding on fitness curve, plus explicit new wave of solution factories, plus One Year Success Feedback solution element. Run 12 superimposed for comparison.
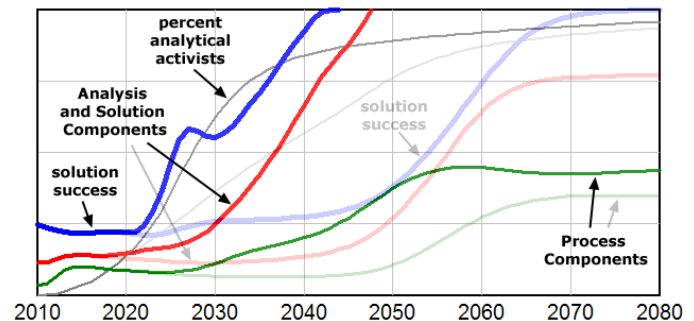
Run 17 reduces time to success from 72 to an impressive **33 years**. This may be as much as we can realistically hope to compress time to success, due to the strong change resistance the system exhibits for the first ten years or so after the precipitating event occurs in 2010. Thus nothing much appears to be happening from 2010 to 2020. But after that the system responds vigorously. The Analysis and Solution Components curve grows only a little faster than in run 16. But due to the sensitive nature of the process used to solve the problem, and the fact that the One Year Feedback Success solution element is pushing at high leverage points, the curve that matters the most, solution success, grows much faster than in run 16. This is an example of the high degree of amplification that pushing on a high leverage point can cause.

Is this final scenario realistic? I think so, because it is no more difficult that what millions of scientists have been doing for centuries. All environmentalists need to do is become as serious as scientists about the power of the right process.

Summary and Conclusions

Solution factories are a logical evolutionary extension of invention factories. The latest US patent number is over 7,000,000 and the Derwent World Patents Index is growing by 1.5 million patent documents a year. [150] If invention factories can churn out inventions by the millions, then solution factories can produce solution components to social problems by the hundreds, and then the thousands, and then the millions. As long as the three laws of evolution do not change, this will come to pass.

But it will only come to pass soon enough to avoid catastrophe if we can compress time to solution success from approximately 70 years to 30 years. This can be done by first inventing solution factories, and then by using every trick in the engineering book to make them highly efficient in record time. A possible way this could play out is summarized in the graph below:

Solution success for runs 12, 15, 16, and 17. The refinements of solution factories allow the solution to be greatly accelerated
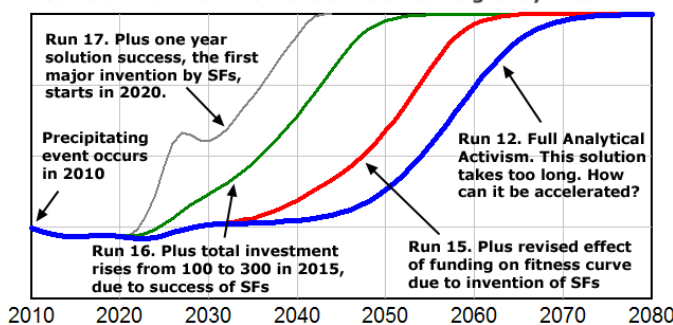
Run 12 represents the transformation of the environmental movement from Classic Activism to full Analytical Activism. While even that would be a pleasant success, it is not enough, because the basic process of Analytical Activism would take a long time, about **72 years**, to solve the problem. That is so long that failure to solve the problem by then would cause such loss of system functionality that the system could easily become unable to cope with the problem. It would then have reached the point of insolvability, regardless of how clever the problem solvers were.

But there is a way out. Using mankind's greatest tool, reason, it appears possible to engineer a breakthrough and greatly accelerate the solution. The principle method to do this is the invention of solution factories.

Run 15 uses the enhanced process efficiency of solution factories to revise the effect of funding on solution fitness. This reduces time to success from 72 to **58 years**.

Run 16 adds the effect of increased attraction of funding due to the appearance of solution factories. We are duplicating the success of the Powell Memo here.

That historic document proposed a new type of entity, aggressive think tanks, and pleaded for their funding, which conservatives did not fail to provide immediately. The same will hopefully happen once this book, *Analytical Activism*, is published. Or perhaps a similar concept will appear. Regardless of the exact vehicle, the right precipitating event will cause funding to the environmental movement to soar. It will flow to what is attracting it: solution factories. According to the model, this will reduce time to success from 72 years to about **47 years**.

But that is still not enough. The first sink or swim challenge that solution factories will face is how to compress time to success even further. We suspect that they will take the route of reducing the feedback delay on whether a released solution element will work or not from about 5 years to 1 year. This would cause the system to respond as shown in run 17, which reduced time to success from 72 years to about **33 years**.

Now for the big picture: If we change the X axis on the graph from a 70 year range to the full range of the simulation model, we get the graph shown below:

The big picture for solution success for runs 12, 15, 16, and 17. The precipitating event occurs in 2010. After about a 10 year delay, system response to the solution elements begins. The best scenario, run 17, reduces time to 99.9% success from 72 to 33 years. This is probably about the best solution factories can realistically do to accelerate the solution.
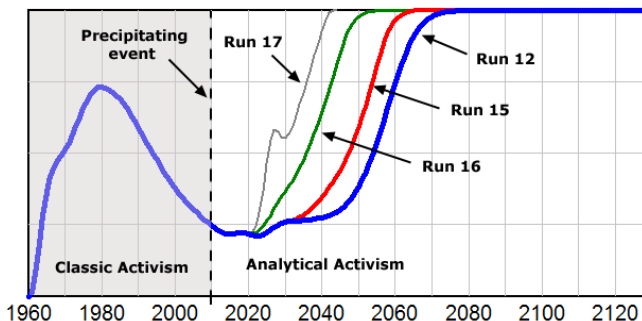
This shows that even though run 17 takes 33 years to solve the problem, that's not so bad compared to the 30 years we've already wasted since the solution success curve peaked around 1980, to the earliest reasonable time for a high quality precipitating event in 2010. The dramatic fall in the curve after 1980 shows the magnitude of the problem. That is a formidable curve to turn around. Run 17 or anything even close, if it occurs, will be reason enough for celebration, because guess what? We will not only have solved the global environmental sustainability problem. We will also have solved the New Dominant Life Form problem, and the concurrent enslavement of *Homo sapiens* problem, which was growing as fast as the curve above was falling.

Next, how can we convert the solution oriented models presented in this book into an Implementation

Plan? Well, we almost don't have to, because the models *are* the strategic Implementation Plan. Using the concepts of the System Improvement Process and solution factories, there is little need for a traditional Implementation Plan. This is especially true once solution factories get rolling, because their output, solution memes and meme carriers, are self-implementing. But still, there remains a pressing need for this book to express at least a high level written strategic Implementation Plan.

This is easily done by examining the philosophy behind the Implementation Models. Of these, the most important was the Transformation Simulation Model. That model employed a very small number of key strategies. Those problems solvers picking up the thread of this book and converting to Analytical Activism will be following these strategies, which are:

1. Create a good precipitating event. Don't rush it. The quality of the event is far more important than its timing. The right event will set off the right auto-activation chain.
2. Pick a process that fits the problem and follow it as if the life of *Homo sapiens* depended on it.

These two rules are all the high level strategic Implementation Plan needs at this point. The rest will follow logically and easily, if these two strategies are practiced fully.

Creating the One Year Success Feedback solution element, or something like it, will probably be the first major challenge of solution factories. But there is another even greater challenge that will follow. Or it may even precede it. This is finding a shortcut to causing the power of corporate proxy conservatism, as practiced in the most powerful country in the world, to collapse. This would accelerate the solution even more, and remove the greatest remaining risk of solution failure. (This is a much higher risk than this book has portrayed, so that an optimistic tone was possible and we could focus more on other aspects of the problem, particularly a suitable process.)

Is there an elusive high leverage point in the memetic structure of the US conservative movement and the corporate proxy machine that is their system's Achilles' heel? Could problem solvers walk up to that structure, and with the flick of a finger, cause it to collapse into smithereens? Can it be done?

We may have already found that high leverage point. It is *general ability to detect political deception*. Then again, maybe we haven't found it, because that hypothesis remains untested.

However, there is something that matters much more. Finding the right high leverage point is beyond the scope of this book, because the central purpose of this book is not to find *the* solution, but a path leading to one.

* * *

By now you may be wondering what you can do to help the system start moving down that path. We have a possible answer to that in the next chapter.