To Main Proceedings Document

Lessons for Futures Studies from System Dynamics and Reinhold Niebuhr

by William L. Biach

Abstract:

Futures studies extrapolate the implications of current trends into the future. The objective is to either change undesirable futures or take advantage of desirable ones. The process has characteristics in common with System Dynamics methodology. Multiple social systems often interact in the analysis. Quantitative and qualitative variables work side by side in effecting the genesis of the future. Calibration is critical in ensuring that conclusions are supported. But, it can also suffer from traps that system dynamics has recognized and addressed. For example, basing decisions on conclusions derived from simple causalities is the source of unintended consequences and faulty policy. Or ignoring the implications of long term feedback loops. The results are calls to action but provide no clues as to what effective action may be. Beyond methodology and operational issues, there are broader lessons to be learned from System Dynamics about responding to insights into the future. Proactive, optimistic futurists assume that any future can be changed to a desirable one. System Dynamics would question how realistic that premise is. In fact, the most powerful learning futurists can get is stated simply in the Serenity Prayer of Reinhold Neibuhr - “God, grant me the serenity, to accept the things I cannot change, the courage to change the things I can, and the wisdom to know the difference”. This is the gift of System Dynamics.

Introduction

For half a century, modern Futures Research and modern System Dynamics have been developing along somewhat parallel paths. They were both seeded by the innovative work of a few brilliant people who continue to exert their influence. Both are being applied to the solution of commercial problems as well as major social ones. The practitioners in both fields are seeking better ways to make decisions because the decisions of the past are the seeds of the problems of today. Both fields deal with interaction of different categories of ideas.

Despite all this, they remain on parallel tracks, never joining forces. A history of futures thinking, as we will show, demonstrates the influence of systems. The ethical foundation itself of futures studies has shifted from correcting problems of the present to assessing the quality of decisions and their consequences in the future. The motives and characteristics of futurists have a basis in systems. Futurists study systems. And, inevitably, system behavior and principles of System Dynamics must come out in such studies.

Yet, while System Dynamics goes virtually ignored futurists wrestle with generic problems grounded in systems principles. Many significant problems futurists are engaged in remain intractable because System Dynamics principles aren’t an organic part

of their process. By incorporating the knowledge of system behavior and the disciplines of systems analysis, the important, global work futurists undertake could be made that much more robust. Additionally, the futurists' commitment to systematic futures planning brings credible attention to world problems and could give systems dynamists the role they seek in making a better future.

We will first look at the history of futures thinking and the resulting characteristics to show the link to system dynamics. We will then look at the issues that remain at the heart of futures research and discuss specific remedies taken from systems thinking. Finally, we will suggest some system dynamic principles that could form the basis of different, but more integrated discipline.

Foundations of Futures Studies

History of Futurism

The desire to know the future is part and parcel with being human. Early practitioners of "seeing" the future were linked to divine inspiration and magic. Cultures whose deism was tightly integrated with the environment gained their foresight through systems awareness. Interventions such as rituals and sacrifices reinforced respect for the larger system and were intended to keep it 'friendly' to the needs of mankind.

The Renaissance brought the scientific method to all things and replaced knowing through awareness with knowing through analysis. Mankind, no longer a part of the system was deemed steward. The 16th Century brought Utopian concepts. Originally, utopians envisioned a perfect society in a land far away. The end of the 18th century and the French Revolution saw a shift from spatial displacement to a temporal one. Sir Frances Bacon promoted the 'idea of progress'; a Utopia of the future developing out of the present over time. Cultural evolution, a concept that didn't exist previously led to the realization that the future could be designed and brought about by human action and that a better world could be created (Cornish, 1977).

Leaping over the formal evolutionary analysis, 'science' fiction writers made significant contribution to visions of the future. Social commentary always took on an exaggeration of current cultural norms. Novels like *Gulliver's Travels* or *Robinson Caruso* were rooted in the spatial displacement. Social criticism, a passive activity, found the spatial "present" satisfactory. The new writers, desiring a call to action, presented a future that was a consequence of decisions made in the present.. The futurists were and are activists and require a malleable culture that could only exist in the future.

The development of new countries and national planning in the mid 20th century created a need for more formal futures methodologies. WWII stimulated the growth of the operations research field and the creation of the 'think tank' for military applications. Professional societies focused on peacetime futures study and seminal publications such

as *The Art of Conjecture* by B. de Jouvenel marked the establishment of the modern futures field.

Critical to our discussion is to note the enormous impact that US futurists have had on modern futurist thinking. This in no way implies that the contribution from practitioners elsewhere was of less importance, stature or quality. However, during the developmental period of current practice, the US was in the strongest position commercially, politically, and academically to study, develop, and apply futures studies. It was also in the moral and spiritual state to be motivated to "get the answers". World War II left the US with a conviction of its own invincibility and the role of godfather to the.world The position that everything is a problem that must have a solution, was a systemic result of the dominance of males in policy-making positions. By application, the future was specific, predictable and could be fixed. The US view of what was morally 'right' took precedence, by brute force, over all other points of view.

As time went on, and the failure of policy became apparent as the hidden influence of systems continued to exhibit behavior. Society became disenchanted with the institutions for not providing the solutions they thought we were entitled to. While the more political/pragmatic, in-the-trenches response was to manage short-term solutions to symptoms, the futurist, looking at the long term, recognized the human influence on the future as well as the need to live with the uncertainty of it. And so, futurists and the discipline of futures study has taken its place as the pathfinder for managing the intentional movement of society into the future.

What is a Futurist?

Futurists attempt to clarify goals and values, describe trends, explain conditions, formulate alternative images of the future, and evaluate, and select policy alternatives (Bell(1996) of Lasswell 1967). Futurists are not fortunetellers. They do not believe the future is predetermined. A basic tenant of futurist thinking is that humans shape the future through the decisions they make. It is the futurist's job to analyze how the future can be shaped and the consequences of different decisions we might make to influence it. They are actively involved in determining mankind's future.

Futurists are transdisciplinary meaning the compounded influence of many disciplines applied to an issue rather than a linked involvement as implied by inter-disciplinary. Transdisciplinary applies at several different levels. First, most significant problems we face cannot be understood or addressed without understanding the stake different disciplines have in the problem and how they interact. Second, methods developed for different disciplines can provide new insights when applied to others as well as in joint contribution. Thirdly, alternative futures arise from different cultures, historical backgrounds, and different spiritual and intellectual bodies of thought (Masini, 1993).

Futurists Joseph Coates and Jennifer Jarratt surveying 17 leading futurists from many fields including business, anthropology, technology, etc and describe areas of commonality (Coates, 1989):

Technology- Futurists agree that technology is a, if not the, primary driver of change. Its pervasive role in all material parts of our lives, our decisions, and our interrelationship is a key systemic structure.

Complexity- Futurists must deal with complexity. Increasing complexity is a systematic reality and strongly affects the uncertainties of future outcomes. It affects the influence and therefore the number of variables that need to be incorporated into their thinking. Traditionally, coming out of the very American attitude of being able to "solve" all problems, was the objective of "managing" complexity. Donald Michael's view is that we need to learn to live with it (Michael 1973).

Multiple futures- Today, the idea that the future is pre-ordained has been replaced by the view that there are multiple futures. This takes into account the influence our decisions can have on the future.

Social Order- Although there will be flare-ups and discontinuities, they will not dramatically affect daily lives. Nuclear war, initiated by small third world countries will be the major threat. However, the growing interdependency, the "Global Village" will make this a less likely scenario.

Religious concerns or motives could be a source of instability. Religious beliefs, as a driver, are accepted for their long-term promise. That promise makes suffering in the present tolerable if not noble. The shared vision also creates a social acceptance of the policy.

Although there exists the belief that some solution to resource limitations on growth can be found, generally it is believed that the population cannot continue to grow

Energy- A transition to new energy sources will be required. However, the economic turmoil and possible slow down will make people reluctant to take the necessary action and ultimately it may take exhausting current resources to provide the urgency.

The Futurist as Observer of Systems

Futurists are activists by nature and are in their field specifically because they want to affect the future. They share the system dynamists' belief that anxiety and the strife in the world is a result of the decisions we've made. And, that by being able to make better decisions, the future will evolve with less unintended consequences and therefore match the what the futurist see as 'good'. Accurate models of extensive systems are impractical so futurists relegate themselves to observing system behavior rather than understanding it. Therefore they don't benefit from the value of System Dynamics in testing assumptions, aiding in understanding behavior and assessing the consequences of policy decisions.

As in the sciences (futurists don't believe Futures Studies is a science), when you don't understand the mechanics of the underlying process, you are left with trying to forecast

behavior based on observation and correlation. Regression, game theory, trend analysis, etc., the tools of the futurist, do not take into account the contribution of mass and feedback, systems concepts, and therefore lack insight into *why* behavior arises.

And so, the modern day futurist, trying to deal with a faster, more complex, and more unstable world made the transition from a tradition of predicting the future to one of suggesting a variety of plausible scenarios differentiated by the decisions we might make. These scenarios come out of an extrapolation of observed trends that are analyzed by people with broad understandings of interrelated disciplines. However, they lack the piece that gives them understanding of the "why" of the behavior.

Fundamental Challenges of Futures Studies

Forecasting

Forecasting, whether it is one or many futures, is the processing of observations. Futurists take past behavior and current trends and introduce policy decisions that affect the way changing conditions interact. The resulting possible futures are evaluated for their desirability and a course of action is agreed upon. So, forecasting accuracy is of great concern. How do we establish boundaries that correlate to an acceptable level of accuracy?

Time- Over too short a time frame, the model is too volatile. Over too long a time frame, the trends tend to perturb under the influence of factors outside the model. Trends based on extrapolating the past assume stability in the future. But, the increased rate of change of our core infrastructure makes that window shorter and shorter. Forecasting accuracy based on time is getting increasingly impractical.

Geography- Forecasting within a local geography assumes that environmental conditions, indigenous species, and social structure will be insulated from influences outside the region being studied. But the effects of environmental destruction such as global warming are influencing every part of the world. Increasing demand for natural resources is eliminating species of animals and plants several times a minute. Climactic shifts are making life in traditional locales untenable. Global information systems are dramatically changing the expectations of stable cultures.

Any attempt to use one-dimensional characteristics of a model to define the accuracy of forecasts is bound to be unsatisfactory. This is because these attempts mistake limits due to analysis of observed behavior with limits due to an understanding of the cause of the behavior. E.g. Although behavior is often documented over time, time doesn't cause the behavior.

Taking Action

Optimism vs. Pessimism

The objective of the futurist is to make the future desirable for mankind and the Earth. A fundamental issue is whether undesirable futures can be changed. Optimistic forecasts are a call to action to fix the future. A pessimistic, albeit realistic, position that there may be no action that will really makes a difference is anathema to futurists. But, where to draw the line or even if the line needs to be drawn is an issue that futurists have no established way of determining. So, regardless of how intractable the problem, the futurist is left with the option that action should be taken, an optimistic point of view.

So, being proactive and optimistic that action is worthwhile, the futurist helps establish policy to institute an action plan. The character of the action plan depends on whether we view the future as desirable. In such a case we look to take best advantage of it. If it's undesirable, we seek to change the course. That decision of what, not whether, depends on how we view the future and what is defined as desirable and good.

What is 'Good' and 'Desirable'

Futurists have moved to a position where they look at the consequences of their policies and determine if they are "good". This is a subtle shift from a position of assessing if the present is "good" and whether to continue with the status quo or change it. But, the shift to consequences requires studying a dynamic situation that may have no parallel in the past and is subject to great instability. The spectrum of questions must expand.

'Good' for who or what? -
Decisions for the good of mankind have historically been bad for the rest of the earth. Policy decisions have wide ranging effects that must be brought into the equation. Non-systemically based interventions are likely to make the situation worse. Nuclear power, intended to relieve the rape of the environment, may become the greatest polluter of all.

'Good' when? –
What is the time frame, this week, 1,5,10,50,100,1000 years? The futurist must take into account the inertia of the system, anticipate goal-seeking behavior, and accept that there may have to be trade-offs along the way. E.g. A major rehabilitation of the infrastructure could cause years of inconvenience.

'Good' is relative-
Enforcing a well intention "good" universally may be bad. It may be good to reroute a river to provide irrigation for agricultural commerce. But, the untold ecological damage probably lowers the long-term economic viability of entrenched communities upstream and down. A plan that would raise the standard of living for a region ten fold seems good. But if that region were economically depressed so that ten fold increase was still below the standard for the US, it would be viewed as exploitation, the program terminated, and the people returned to poverty.

'Good' may change-

The definition of ‘good’ changes. And it can change quickly as a result of dramatic cultural shifts. Look at the effect of the Internet on the economy. Prior to the Internet, a company was a bad investment unless it had shown a history of stability. Today, a company that shows stability is unattractive. “Good” is a perception and is based on social norms. But norms can and are manipulated. They often are manipulated for an ostensibly good purpose. They become part of the structure of the system. And as they become obsolete, they cause a system to resist change (*see discussion of Mass on page 8*).

Policy Making

Chronic errors in policy and decisions occur when the consequences of the policy result in no long term effect or worsen the condition they are intended to correct. This comes from low leverage decisions that underestimate the system ability to maintain stability. It also comes from a basic lack of understanding of how to manage basic system principles. Taking action without considering the systemic origin of the problem or the consequences of the action will conflict with the system. For example, self-destructive mechanisms are built into all organisms and institutions. In an effort to maintain an indigenous culture, we may interrupt one of these mechanism and in the process, necessarily change the culture we sought to preserve.

The “local” point of view

People tend to "fix" things that are undesirable on the local level without commitment to the long term or broader issues. An action, which has consequences to the non-local support system, is taken to improve a local condition. The practice continues because the local level is the limit of our scope of influence. Meanwhile, the damage to the support system demands more action. And so we become addicted.

System Dynamics and the Futurist

System Dynamics and Futures Studies

Futurists study systems. They study past behavior and the circumstances surrounding that behavior. Then project the future state of that system. If that future state is not in keeping with the spectrum of desired states, they seek to intervene in the process that caused the present to evolve into that state and re-chart the course. In the methodology futurists follow, recurring issues come up which affect the purpose and quality of their work. Forecasting accuracy is an example. Their solution is to induce the source of the issue and create structural or philosophical constructs to guide them.

Many of these issues are a direct consequence of working with systems. Futurist view systems as a grouping of associated components that partake in a pattern of behavior. They don’t acknowledge that the system is the source of the behavior. That many issues they wrestle with are the same issues anyone would confront working with a system.

Fundamental principles and behavior of systems are the source of much of the paradox and ongoing debate at the core of Futures Studies. System Dynamics holds the key to much of it.

System Dynamics Concepts in Futures Studies

Structure

System structure is what defines system behavior. The observed behavior of components of the system is the result of the interplay of all the components and how they respond to changes in other components. The effect of components that maintain their status when the process pauses, stocks, influences behavior in an unintuitive manner. Soft stocks such as national pride are as influential as hard ones like national debt. But, since they are harder to quantify, it is harder to codify their behavior and are therefore left out of the equation. Feedback of how the system responds to components of the system enables the system to control itself. Both of these characteristics are part of all real systems. Correlation, trend, and causal analysis, the stock and trade of futurists, cannot account for these effects.

Forecasting based on past performance can only be accurate as long as the inevitable perturbation from what was observed hasn't exercised much influence. Only by understanding the structure of the system can we correlate the future behavior of one component with another. This is the answer to forecasting accuracy.

Chronic results can develop from structure. Two systems with the same structure will produce the same behavior. Often we continue reapplying an intervention to systems with the same structure and the interventions continue to fail. Futurists attribute its failure to poor implementation or errors in forecasting. System dynamists attribute the results to the inevitable behavior of the system.

Policy is part of the system. They are the rules by which decisions are made. Due to the unintuitive behavior of systems the policy, in consort with the rest of the system structure, may produce unexpected and undesirable results. So, effective policy management without understanding the system structure is unlikely to produce the desired consequences and is likely to exacerbate the problem.

Mass

In physics, the measure of an object's ability to sustain efforts to change its state of motion is its mass. Objects in motion tend to stay in motion and objects at rest tend to stay at rest. An object's momentum and inertia are directly related to its mass. Systems also have the same characteristics. A balanced system responds to interventions in a negative feedback way so as to regain the "status quo". It therefore exhibits behavior as though it had mass. And indeed, since the stocks in a system are responsible for "staying power" it further makes sense to talk about mass.

Futurist must understand the forces and dynamics that give rise to current conditions and that the mass of the system determines how responsive it will be to interventions. Technology responds quickly because its mass, the body of technical know-how, reinforces change generally. However, if that applied know-how limits innovation, it can be make the system sluggish. Culture responds slowly because the mass of security rooted in the mass tribal knowledge, gained from a long history, makes change fearful.

Scope

Systems contain smaller systems, are contained in bigger systems, and are linked with other systems. Since there are practical limits to how large a system we can analyze we establish boundaries to or the scope of the system. Large system behavior generally overrides small system behavior. Small system behavior can be modified effectively, but will rarely alter the inevitable state of the larger. Nonetheless, changes anywhere in a system have consequences elsewhere and highly leveraged ones on small systems can be significant.

For the futurist, trying to establish the parameters for the 'correctness' of his forecasts, an understanding of system scope is invaluable. The scope will determine how insulated the behavior is from the effects outside the scope. He can therefore safely make his study knowing the parameters of the forces that would void his forecast.

The futurist is also concerned about the consequences of applying policy. As is well known to system dynamists, interventions produce unintended consequences. By limiting the scope, the futurist may be better able to assess the unintended consequences within the scope of study. But, this problem is relatively unimportant. The bigger problem is determining if there are undesirable consequences outside the scope of the system. One result may be that the broader system, in order to stay stable, may compromise the more robust mechanisms solving the problem creating a dependency on the intervention. Another result may be a serious influence of another system linked to it. Being outside the scope of study this might cause irreparable damage.

These concerns cannot be addressed unless the futurist considers the systemic scope of his studies.

Behavior

Although systems are the subject of his studies, system behavior is what the futurist works with. Working with behavior without acknowledging the system at best limits the choice of options. At worst it can produce irreversible unintended consequences.

Feedback and the persistence of stocks create very complex behavior. It is behavior that doesn't respond instantly to change. It is behavior where an intervention becomes part of the system and changes its characteristics. Given a large enough system, the behavior will always exhibit negative feedback in order to maintain balance. This basic balanced nature

of systems causes them to push back when efforts are made to change their course. This can be very subtle and one source of apparently chronic conditions. This complex behavior puts us on a road to change that is not one of continuous improvement. Nor do all elements of the system to arrive in an ‘good’ state.

System behavior is not all chaos, although behavior study may lead to that conclusion. System Dynamics has recognized that there are a few characteristic behaviors. Although they rarely appear in pure forms, nonetheless they give clues to what strategy produces desired results, and minimizes unintended consequences. With this knowledge, and the right system scope, the futurist can create more robust policy.

System Dynamic tools can give futurists a full understanding of what to expect before taking a route of change. They can then prepare for inevitable setbacks and not be discouraged. They can gain support to ride through the tough times by knowing that things will turn around.

Entropy

Futurists recognize destiny as a future state. It may or may not be pre-ordained. For practical purposes its preordained if we can't change it and not preordained if we can influence it. The difference is a matter of scope. But what drives a system to "behave"? It’s the dynamic resolution for tension within the system. The future of the system is where all dynamic tension is in balance and the system is in equilibrium.

In physics, the term for a physical system's tendency to transform itself to a state of minimum potential energy and therefore no unbalanced tension to cause it to change state is entropy. It is the ultimate state of a physical system. Likewise with all systems, there is an ultimate future for systems. Interestingly enough, along with entropy, behavior appears more predictable, but managing interventions and change becomes more complex. The system still has the same structure and therefore the same source of behavior, but because there is less dynamic tension, the influence of changes and trends is better absorbed producing subtler results which may not be obvious.

It’s the state that is the ultimate purpose for the system. It’s like Robert Conway’s final journey in *The Lost Horizon*. Regardless of the obstacles, the final destination is still Shang Ri La.

The Growing Need for Systemic Futures Studies- the Global Village

The futurists’ major problems

Futurists agree that the two most pressing problems we face are population growth and global warming. Not only are these problems systemically localized, but also they are tightly integrated with an ultimately bigger systemic issue, The Global Village.

#1-Population growth

Mankind has no organic survival instinct. It exists in emotions and is sustained by intellect. Mankind needs a survival policy- Death is bad and life, regardless of quality is better than death. Every culture has some philosophical construct that explains that either death is bad in and of itself or is bad because it subverts the purpose that can only be fulfilled in life. The byproduct has traditionally been the maintenance of as large a population level as possible. Programs to extend life expectancy or eliminate disease and starvation are part of the strategies. Early results show that the consequences may not be as good or obvious as expected and are clearly too complicated systemically to intuit an answer. The optimistic assumption that the solutions will arise in time to solve the undesirable consequences is too dangerous due to lack of time.

Starvation, for example, is a natural consequence of a system trying to maintain balance. Providing food will not end the systemic pressure to reduce the population. Changing the structure of the system will just shift the pressure somewhere else in the system and it will change the culture it was trying to save. But, quality of life in one culture is measured differently in another. So the only effectivesolution to starvation is in conflict with the value of maintaining diversity and ultimately with the original objective, to improve quality of life.

Extending life spans is fraught with conflicting issues. The ‘good’ of an extended life span is generally viewed as good only to the young. Deteriorating health is an obvious issue, but is likely to improve hand-in-hand with extended lives. But, the greater threat is an extended life without purpose. Currently, a career that allows you to maintain your lifestyle is over past 50. There’s a practical reason. Business is recognizing that management skills are of little value-added compared to those of innovation (*see Internet- page 6-7*). So, managers are a commodity. Experience only has value when the environment for applying the experience is the same. The pace of change makes experience obsolete in a few years. Few people in their middle age have the resources or mental acuity to start again. People in their 50's have memories which are barriers to the out of the box thinking required to produce innovation.

So, short of a major cultural change where there is a valued place for people over 50, extending life, even with better health, will increase the percentage of unproductive population. This problem, possibly one of physiology, may be solved, but will it be soon enough? Will the pieces be solved in the right order? Already we are better at keeping people alive than keeping them healthy. And we’re losing ground on keeping people valuable. Euthanasia is becoming more and more attractive despite its conflict with our basic strategy for survival.

The complexity of the issues go on and on. Traditionally, the futurist would deal with these issues separately. However, clearly they are tightly interconnected. The essence of the population growth problem is growing, unrestricted consumers.

#2- Global Warming

The issues around global warming are well known and equally growing in complexity. They are driven by demand for scarce resources, existence or high cost of environmentally friendly solutions, and a growing population of consumers. There are symptoms of far ranging systemic influences from local activities. There is the interplay of cultural change and conflict. The essence of the global warming problem is the fragile state of the global infrastructure supporting the growing global body of consumers.

The Global Village

Global logistics, economy and information infrastructure has increased the scope of our influence. Additionally, they have conspired together to put ever-increasing pressure on our capacity to survive. Information has spawned the desire worldwide for a middle class with a standard of living equivalent to the US. Economy has provided larger markets for the sale of value added products and services. And, logistics have made it possible for raw materials, finished goods, food, and information to be delivered anywhere.

The problems raised by the global village may be the most insurmountable of all. It is estimated that by 2050 50% of the earth's population will be in a middle class with a standard of living equivalent to the US. This is a consumer society on a gargantuan scale. Such a society would have an unimaginable destructive power. If China were to meet its growing energy needs by mobilizing its vast coal reserves, it would release more carbon dioxide into the atmosphere than the rest of the industrialized world put together making emission control hopeless.

The consumer society is a resilient system. It replaces religion with material goods. And, as dissatisfaction grows due to obsolescence, it transforms itself to offer new material goods that hold the promise of quelling the failure of the past. Despite efficiencies that come from consumer societies, the ultimate state of a global consumer society is an unsustainable one

The global village creates a tragedy of the commons scenario of on a virtually maximum scale. The commons is the world’s resources and the sheep is mankind. The solution to tragedy of the commons is overarching authority, establishing control. On what basis is that control exercised? Who is the authority in the global village? Futurists recognize that governments are not responsive enough to manage the future. Business, the likely successor, depends on consumerism for their survival. The implication is that the scopes of most efforts for sustainability are mere bumps in the road as the systemic behavior of the global society takes hold. More than ever, high leverage interventions based on sound system dynamic principles are the only possible strategy. Or, simply accept the inevitable.

The global village exists. It incorporates population growth, global warming, and most other major social and geopolitical threats. But, unlike local villages of the past, we cannot walk away from the unintended consequences of our actions.

Conclusion

Futures studies originated in an effort to survive through better integration with the mechanism of existence. The complexity of that mechanism defied fighting and tinkering and relegated futurism to one of facilitating a life of respect, harmony, and acceptance. The enlightenment brought with it a belief in the heroic capacity and responsibility of mankind to manage the mechanism. Man could understand it and control it for his own benefit. The leap of self esteem caused by the enlightenment could only be matched by that of the 20th century, and mostly by the second half after World War II. And more so by last 25 years with the growth of the computer. And even more so in the last 12 years with the growth of telecommunications and the last 6 with the Internet.

Yet, along with this growth in mankind's ability to analyze and control we have gained an understanding of the influence we have on the future. This changes the charter of the futurists from one of predicting the future to one of proposing possible alternate futures. Then to help develop policies that would make the future which best aligned with what is ‘good’ the most likely. This implies a responsibility to find a robust strategy for defining ‘good’ in light of an increasingly dynamic environment of interacting cultures and values. The scope of systemic influence has grown to virtually the entire earth, which means that strategies cannot ignore the behavior of the big picture. Scope needs to be systemically based; broad and transdisciplined.

But, there are always boundaries to the scope of the system we can influence. That system is only a part of a larger system that will absorb our influence in its greater mass and continue toward its ultimate entropic state.

Futurists must resign themselves to focusing their efforts on the interplay of systems in order to be effective and responsible. They must recognize the failure of policy due to the disregard of system principal. And, they must recognize that ‘good’ based on our understanding of it can only be instituted on a local short-term level. And the system we are part of has its own agenda.

How then are we to act? A principle of system dynamics is that our intervention must have a scope to match our assessment of the system. If the system is too large, our intervention will not produce the future we desire. If the system is too small, we will effect our change within the scope of the system, but we risk unintended consequences outside our analysis. We must accept responsibility for these consequences as the price for having the future we choose. A policy systemically based may result in an apparently chaotic behavior. But, we must have the fortitude to stand by the decisions and accept that the system has mass and will take time and effort to reach the desired condition.

System dynamists recognize the true beauty in observing the ever changing but progressing state of systems, even if there is peril or disaster in the future. They have the comfort that short term cycles lead to long term trends. And, that due to the need to balance, the "bad times" are the necessary high leverage tension to trigger a seminal change in the system's behavior. Reinehold Niebuhr’s *Serenity Prayer** summarizes the lessons system dynamics has for the responsible, effective futurists:

God, grant me the serenity
To accept the things I cannot change,
The courage to change the things I can,
And the wisdom to know the difference

*Reinhold Niebuhr actually accredited Friedrich Oetinger, an 18th century theologian

Bibliography

Bell, Wendell, (ed) Slaughter, Richard A. (1996) "New Thinking for a New Millennium", Routledge, London, UK

Coates, Joseph F. & Jarratt, Jennifer (1989), "What Futurists Think", World Future Society, Bethesda MD

Dator, James A (1986) "The Futures of Futures Studies: A View from Hawaii", Futures 18,3: 440-445

Dyson, Freeman (1992), "From Eros to Gaia", Pantheon Books, New York

Greider, William (1998), "Fortress America- The American Military and the Consequences of Peace", PublicAffairs, New York

Kaufman, Stuart (1995), "At Home in the Universe- The Search for the Laws of Self-Organization and Complexity", Oxford University Press, Oxford, UK

Michael, Donald (1973). "Learning to Plan and Planning to Learn", Jossey Bass, San Francisco

Masini, Eleanora Barbieri (1993), "Why Futures Studies", Grey Seal, London, UK

Samuelson, Robert J. (1995), "The Good Life and its Discontents- The American Dream in the Age of Entitlement 1945-1995", Times Books, New York

Toffler, Alvin (1980), "The Third Wave", Bantam, New York

William L. Biach
William L. Biach is President of Biach Information Arts and CEO of Biach Industries Inc He has been working in system dynamics for over 20 years. Biach Information Arts was started to integrate information technique and systems thinking as a tool to facilitate healthy change. He has participated in futures studies for many years. He has a BA in Physics and Phlosophy and an MFA in Directing.
Bill Biach, Biach Information Arts, 17 North Avenue Est, Suite B, Cranford, NJ 07016 Telephone 908-497-0585 FAX 908-497-0540 Email billb@biach.com