

The Merrill Lynch
forum

Cybernomics:
Toward A Theory of Information Economy



PREFACE — *from the Merrill Lynch Forum*

*S*ince World War II, industrial and clerical automation, and advances in telecommunications technology, have enabled developed economies to unite and create profoundly new forms of commerce. While it is an historical commonplace that there is a co-evolutionary relationship between technology, economy and society, the effects of revolutionary invention are rarely understood in their own time.

In this provocative essay, John Perry Barlow contends that we are now inhabiting a world which differs from the one most of us were born into — as much as did Newton's from that of Aquinas. We are already doing business based on assumptions that are profoundly different from those of our grandparents. These assumptions remain generally elusive to us and almost entirely so to the commercial and political institutions created earlier this century.

Indeed, Barlow argues, practically everything we think we know about economics no longer applies. To the extent that we can clear our heads of the past and understand the present, we will succeed. However, he warns that if institutions and individuals resist these changes, they may face failure.

SCARCITY AND THE ECONOMY OF THINGS

Throughout most of our conscious presence on earth, human beings have traded in things. Tools, weapons, things to eat, things to wear, things to enhance prestige. Sometimes those things were other humans. Sometimes those things were geographical areas. But in nearly all cases of economic exchange, the articles of trade were something one could touch and see.

Trade took place in the material world, and the material world has a number of immutable characteristics, dictated by a physics — predominantly the grim Second Law of Thermodynamics — that naturally inclined us toward the belief that commerce is a battle over the resources that entropy degraded on its way to the heat death of the universe.

The commercial focus on resource scarcity was amplified by industrialization. Before about 1840, most wealth had arisen from things we could create almost infinitely from sunlight, water, land, and labor — by which I mean the fruits of agriculture. After that, most of it was derived from minerals and fuels that, once ripped from the ground and turned into goods, were used and, once used, gone forever.

Manufacturing is a process that necessarily involves loss to the aggregate. If an organization manufactures a toaster, say, the minerals involved in producing its physical mass — iron, tungsten, etc. — are wrenched irreplaceably from the earth. The heat involved in turning those materials into an appliance is blown up the factory chimney. The toaster is sold to the consumer. And at this point, the manufacturer no longer possesses

it and whatever has gone into making it is no longer available to humanity.

Since Darwin, business has been a cartoon of his central idea: the survival of the fittest. Commerce was war, not conversation, and the principle regulator of value was scarcity. Indeed, throughout the Industrial Era, the very institutions that should have been trying to increase collective human wealth, the producers, have been working to reduce it, since one of the easiest ways to increase demand, and thus price, was to reduce supply.

The economy of things was further shaped by the natural properties of physicality, and these included the following:

I. Things Can Be Obviously Owned

Another defining characteristic of an economy of things is that things are easily owned and defined. One possesses them. And generally one possesses them unambiguously. When one sells things, one relinquishes both possession and, to the legal point, ownership.

If I sell you my horse — or if you steal it — I can't ride it anymore. It is of no further use to me. When I look out into my corral, no particularly useful aspect of the horse remains. When the horse becomes yours, it ceases to be mine. The same rule applies to the possession of territory or structures.

In the physical world, the idea of property is an enormously useful concept. And it seems to work better for the preservation, stewardship, and distribution of physical goods than other models — as anyone who has lived under Communism or in a commune can tell you.

2. Things Are Hard to Make

It can also be said that most physical things of value are not easy to make. The most obvious of these is land, which Will Rogers recommended buying since “they aren’t making any more of the stuff.”

Nor are they making any more diamonds, crude oil, iron ore, or many of the other things of which the things we make are made. Further, most of the things we’ve made for commerce, especially during the Industrial Era, are not easy to make, especially for an individual. Look around you right now. How many of the purchased objects in the room are something you could make yourself, starting with nothing but raw materials?

In the age of industrialization, people came to rely on large organizations, highly structured aggregations of capital, laborers, logistical and informational chains, manufacturing technology, etc. Even something as simple as a toaster is now well beyond the abilities of most individuals to make, except in the crudest form.

The economy of the physical world — and particularly the physical world during the Industrial Period — has involved heavy lifting of the sort that often required the combined heft of thousands of individuals.

3. Things Are Easy to Count

It was very near the time of Gutenberg’s first Bible that a monk employed by the Medicis invented double-entry book-keeping. This system of itemizing income against expenses, assets against debits, gave clarity to enterprise and thereby greatly increased its efficiency. Though Gutenberg gets a lot of credit — whereas I don’t believe I’ve ever even heard the name of that monk — it’s hard

to say which of these most enabled the development of industry.

When it comes to deciding which of these had the greatest effect on providing the architecture for commerce in the world — and thus, on the structure of human understanding since then — I vote for the monk.

Double-entry bookkeeping has always relied heavily on easy quantifiability — when, without too much faith, we could easily determine the value of things. When x toasters went out y Swiss francs could be expected.

The End of the World as We’ve Known It

Now that we are entering an economy of ideas rather than things, it is not surprising that we retain many habits of mind from physical commerce and are attempting to impose them on information economy. “When all you have is a hammer, everything looks like a nail,” the saying goes, and we have largely had nothing but hammers since one of us picked up a rock half a million years ago and realized that it could be used as a tool.

But the conceptual framework developed for physical economy may be counterproductive to maximized return from an information economy. Let me describe what I believe to be some of the basic principles of information economy and contrast them with characteristics, outlined above, in the commerce of things.

IS INFORMATION ALIVE? IS LIFE INFORMATION?

INFORMATION IS A DIFFERENCE
THAT MAKES A DIFFERENCE.
—GREGORY BATESON

Before I can address what an information economy might be, I need to take what might appear to be a mad sidetrack and address Life itself. I do this because I believe that in order to understand information economy, we must first understand some of the basic rules of the economy of Life, which is not simply like an information economy but simply is an information economy. The most relevant of these characteristics are the following:

- Life increases infinitely against the ebb tide of entropy.
- Scarcity has no value to Life.
- Difference is energy.
- Real-time, positive feedback loops are common.
- Chaos breeds order but not predictability.

For many readers, the relevance of these biological principles to economic matters may seem obscure, but they are fundamental to understanding an information economy and the most advantageous approaches to enterprise within one.

The Essence of Life

Perhaps the most striking aspect of the phenomenon of Life is its ability to resist the power of entropy — the natural tendency of physical order to become random, for energy differentials to randomize, for value to be

spent as the universe heads inexorably toward its “heat death.”

While this may be true of the Whole over 20 billion years or so, it manifestly does not apply well over the local, shorter-term phenomena that live. The motto of Life is “More!” Thus Life creates increasing complexity, greater order, more of itself. It layers one phylogenetic stratum atop another.

If one looks at the human genome, one can still find at its base the genetic code of blue green slime, operating precisely as it has since the pre-Cambrian period. From that simple bit of biological programming to the unimaginably detailed software required to make such a piece of work as Man, there is a seamless continuity of natural construction.

And that entire assembly is created by the combinations of only four nucleotides, complex strings of carbon and hydrogen that are the fundamental proteins. It is in the array of differences between these combinations — the coded sequence in which the nucleotides are strung along each strand of the DNA molecule — that Life exists. Indeed, Life could be said to exist as a kind of activity in the informational space between the elements of that code.

The information that sustains and expands Life does not entropically decay, since information is not subject to the same physical and chemical laws as matter. The energy stored in information is not the energy of combustion, which in burning resolves itself to nothing. It is more like the energy of a breeder reactor, which creates more fuel than it exhausts.

Precisely this same principle of eternal expansion applies to any economy that is based on the sorting and distribution of information, whether that sorting mechanism is a coral reef or the New York Stock Exchange. Like Life, information exchanges are processes that arise from differences and create additional differences — and thereby opportunities for growth — as they do so.

Across almost any difference — whether it exists between the price of pork bellies this month or next, the ratio between yen and dollars at any second, the fact that I know a secret you covet, or the vast matrix of differences between whole cultural ecosystems — there lies informational energy that can be turned into value.

Goods of the Mind

Let's return to the toaster I mentioned earlier. From the moment that toaster left the factory, it began to degrade in value. There could be only one such toaster and it could neither self-reproduce nor spontaneously improve itself in the space between the manufacturer and the buyer. It is headed for scrap the moment it's made.

The goods of Mind are not like this. If I have an idea and I sell it to you, I continue to possess it. Furthermore, the fact that we both have this idea doesn't diminish its value but rather — if it's an original and fertile idea — increases that value.

This is because, in addition to whatever you have paid me for imparting it to you, we can create additional value by hybridizing our slightly differing interpretations of that idea to create yet a third idea, which could

also have the voltage of difference between itself and its predecessors. This description applies not only to ideas or inventions but to points of view, insights, expertise, and even craft.

Thomas Jefferson put it more elegantly:

“He who receives an idea from me, receives instruction himself without lessening mine; as he who lights his taper at mine, receives light without darkening me.”

In this fashion, human knowledge has been building upon itself, indeed expanding exponentially — as Life has done — since we first developed the ability to convey more information to one another beyond the brute survival instruction set that is genetically conveyed through reproduction.

Now, as the curve of what humans may collectively know has gone nearly vertical, awareness is no longer the means to an economic end but becomes economy itself. And if one closely examines how most of the new value is being created in the world, it is neither from the sun nor the soil, but from the distinctions that the human mind can draw.

Economy of Abundance

There is a great deal of the wealth-making process of the Northern Hemisphere that comes very close to getting something for nothing. Or rather, something from nothing. It is value without tangibility. In an ironic way, Marx's prediction in the Communist Manifesto, “All that is solid melts into air,” has come to pass.

The principle of value arising from informational difference, if true, helps explain the changing focus of the American economy, a system which these days produces relatively few of those things like clothing, food, and shelter that are necessary for sustaining the flesh.

The result is an economy of abundance rather than scarcity. This is an economy that increases its value with each exchange. This is an economy where sharing makes more hard-headed practical sense than hoarding, where advantage belongs to the swift of mind (with diminished regard for the location or station of that mind), where things become the artifacts of ideas rather than the other way around.

If I'm correct in thinking that both Life and information economy follow similar rules, what else might follow?

CONSEQUENCES FOR THE INFORMATION ECONOMY

I. Relationships Replace Things

It is a never-ending marvel to me that people have such a difficult time de-materializing their thoughts about commerce — moving beyond the trade of things — when so much commerce in a post-Industrial economy is already based on intangible relationships.

Service enterprises, whether as HMO's, law firms, stock brokerages, rock and roll bands, or homepage design ateliers, are selling relationships between someone with a certain point of view, training, or talent and others whose understanding, advantage, or pleasure will be increased by the relationship.

The real curiosity here is that we continue to quantify these relationships as though they consisted of things, generally units of time. In most cases, time is of little relevance to actual value exchanged, which is, more often, expertise or insight. But it is, of course, very difficult to put a number on insight.

Unlike things, relationships do not increase in value with scarcity. Indeed, since a relationship is an active flow of information, the greater the flow, the more valuable the relationship, assuming that the flow is being pulled by the voltage of relevance.

It is also true that we are clinging to a model of economy that places a great deal of emphasis on “owning” ideas and expressions as though they were things. I have written extensively on the folly of trying to own that which is not physically definable, but to sharpen those arguments, let me say that trying to own your ideas makes as much sense as trying to own your friendships.

While it would be possible to assert a property claim over one's friendships — and certainly many people attempt to do so when those friendships are also amatory — there is negative practical value in doing so. But a relationship, whether a friendship or something that goes on between a service provider and client, is an activity, not a fact. As soon as one tries to own it, it immediately becomes less vital and free-flowing: “The caged bird cannot sing.”

2. Context Is More Important Than Content

I have also been mystified at the recent currency of the word “content” to represent the primary article of commerce in an information economy. But what is content when there is no container?

Is a conversation that occurs over dinner “content,” or does it only become so if there is a tape recorder running throughout? Are the speeches I give professionally “content” even when they are not being videotaped? Are the essays I put on the Net for ready reproduction “content”?

I don’t think so. Again, we are clinging to an artifact of previous methods of transmitting thought. And why wouldn’t we? Since we started painting on cave walls, the only method of conveying the invisible, transitive spirits of one mind into another, aside from apprenticeship, required us to embed them in physicality. Daubings on cavern walls became the pokes of cuneiform in hardened clay, became papyrus scrolls, became print, became compact disks, all of them brute physical “containers” for the uncontainable softness of thought.

But they were not that. They were transport mechanisms for compressed representations of thought that were at least portable so as to allow thought to live across distance in something like its natural habitat: the space between human crania.

Now arises a conveyance that is very much like thought itself: electricity. From the moment Morse tapped out, “What hath God wrought?” there commenced a process that even so antique a seer as Nathaniel Hawthorne was able to perceive when he wrote:

“Is it a fact — or have I dreamt it — that, by means of electricity, the world of matter has become a great nerve, vibrating thousands of miles in a breathless point of time? Rather, the round globe is a vast head, a brain, instinct with intelligence!”

In odd point of fact, we don’t know what thought is, nor electricity, nor even intelligence, but we can be pretty sure it is not a thing. Nor should it be confused in any way with the material objects in which we have traditionally distributed it over distance.

Suddenly, we can transport thought over distance without those objects. Indeed, we may be headed swiftly towards a point in which Hawthorne will be proven right — a terrifying and magnificent condition where at last every synapse on the planet will be continuously connected, not into one giant container but rather into one giant context: the home of all thought. Our Mind.

Until then, we would do far better to think about this context, Cyberspace, as an environment rather than a medium. And we would certainly do better to stop basing the transactions of information economy on those objects that once pitifully attempted to contain it.

3. The End of Accounting

As stated before, the underlying assumption of physical economy is that there is a predictable and tightly coupled relationship between inputs and outputs. Toasters go out (after some easily computable expenditure in creating them), and dollars come in.

An information economy behaves very differently. First of all, the cost of production is very difficult to assess without making a lot of assumptions that look far more concrete on paper than they would were we being honest about their intuitively “squishy” origins.

In fact, a very large percentage of genuinely productive creative activity is cast like bread upon the waters,

without clear assurance of any directly traceable compensation. Information economies thrive on wild acts of faith, any comprehensive list of which would consume far more space than the length of this document.

Thus, the current corporate reliance on predictable results — driven in large part by the constraints of those balance sheets that are the measurement of quarterly success — may be directly counterproductive to long-term organizational innovation.

On the other hand, the young corporations that are engaged in what might be characterized as a “gift economy” — a set of practices based on the principle that “what goes around, comes around” — are seizing, at the least, an enormous percentage of new investment capital.

4. Transaction Becomes Continuous

In the economy of Life, transactions are in constant flow — even though they may hardly appear so to individual objects of prey at the moment they become part of the market. In the economy of things, particularly during the Industrial Period, we were inclined to regard each deal as something apart from the surrounding flow. I go into the store and buy a toaster. End of story.

Information exchange is not like this. Commercial conversations continue because the longer they do so, the greater the value invested in them by their participants. If the exchange is valuable, trust and understanding deepen with time. Human bandwidth broadens. Networks form around such exchanges.

5. Transparency Replaces Secrecy

With the ubiquitous availability of cheap and detailed data, the ability of any organization to maintain leverage based on the invisibility of what it knows becomes more and more difficult to maintain. Not so long ago, real time interaction with trading on the floor of the New York Stock Exchange was limited to the likes of Merrill Lynch. Already, this is only partially true and will not long remain so. I strongly suspect that everyone who wants to know something will soon have the means to find it out, no matter what it is.

At that point, the balance will shift from those who have privately known to those who are able to act swiftly and decisively on the knowledge that most of the interested competitors share.

At this point, the whole nature of competition will shift from the Darwinian cartoon toward a model that more closely resembles how Life actually works. Because while much of Nature is indisputably “red in tooth and claw,” that’s only half the story. Most of what actually goes on between organisms is not combat but conversation — symbiosis, collective enterprise, cooperation.

This already accounts for much of what takes place at the engineering level of silicon organizations; most of whose actual creators engage in a level of covert cooperation that would induce apoplexy in their legal departments.

The engineers already know what the old-headed managers of their organizations seem incapable of learning: that open systems almost always win. The market failure of Apple Computer’s once vastly superior technology has one central cause, and that was Apple’s

refusal to make available the information that others in the industry needed to create products that would engage that information on a deep level.

The more open a system, whether that system is a company or a technology platform, the more likely it is to nourish interactivity and, therefore, stimulate attention.

And what continues to be valuable — indeed, the value that may become the fundamental currency of the future — is attention, perhaps the only thing Bill Gates and I possess equally. His cerebral processor (like his wallet) certainly exceeds mine, but there is only so much his eyes and ears can fit through them. Thus gaining, maintaining, and stewarding of attention become of paramount importance.

6. Chaos Becomes Opportunity

There is a famous Chinese ideogram that means both “crisis” and “good fortune.” How one reads that symbol depends entirely on one’s ability to tolerate ambiguity and the relinquishment of control.

Sigmund Freud once appeared to me in a dream and told me that neurosis was nothing more than the inability to tolerate ambiguity (I’m not making this up). And by that definition, most large organizations are alarmingly neurotic. It has been my observation that contemporary corporations value predictability — what I would regard as the delusion of certainty — even above functionality. Even, sometimes, above profit.

They vastly prefer “the devil they know.” If I am right about the biological nature of information economy,

the dream of predictability is no longer a luxury they can permit themselves, and this preference will undo many of them.

Life is unpredictable in an era of such absurdly expanding possibility. Unanticipated consequences are the rule. As technology increases exponentially, this “problem” only becomes worse. Each time we solve one problem, we create several more in the process.

This will not be an easy time for control freaks. It will be a great time for the agile, the small, the cunning, and the brave. Those managers who still fancy their organizations to be great machines, like ships at whose helms they stand, will find that the wheel no longer connects to the rudder.

Indeed, they may find that their organizations are more like coral reefs than ships. And what coral polyp can claim to “run” its reef?

THE GOLDEN AGE OF IRONY

Roughly 2,500 years ago, Heraclitus proposed that the fundamental operating principle of the universe was something he called *enantiodroma*, the never-ending process of things becoming their opposites. His universe was AC/DC, constantly reversing polarity, constantly upending what has been, in a continual dance of paradox.

He was right then, but in an age when everything seems to be accelerating alarmingly, the process is becoming irrefutable to even the most convinced traditionalists.

Indeed, in my own short history of observing technology and its consequences, I've received rude surprises. For example, when I left cattle ranching and began looking for a future that would keep me in my little Wyoming town, I assumed that I could use the Internet to let my mind roam the planet and earn a living while my body stayed in Pinedale. Now I find that my mind can always be found at barlow@eff.org while my body roams the planet instead. Indeed, I would venture from my own experience that the Internet will do for jet fuel what the personal computer did for paper. And by that I do not mean reduce its consumption.

But quite apart from my own trivial example, it seems likely to me that entering the information economy will likely cause a thorough re-negotiation of all the major power relationships.

I base this assumption on a variety of factors, but primarily on those that relate to moving the locus of economic energy from things to relationships between things.

Let me hazard a few projections.

1. Pantheism Replaces Monotheism

If ubiquitous information access does nothing else, it unmask the mystique of Authority. Even before the Internet, it was clear that the notion of God-given power was in steep decline. As recently as the 50's, there was still a great white, vertical, male column of Authority — God on top and you on the bottom — of which few questions were asked. Today, even in traditional organizations, authority is clearly lower case. It is earned, not ordained.

And it is earned largely by the workings of a flat web of networked consensus in which the Many increasingly replace the One. God, or Authority, emerges from an equilateral discourse within that network rather than being imposed in a one-way descent from on high.

2. Women Win

Fortunately, I believe women will be magnanimous in their victory, since I think they were always more interested in sharing power than imposing it. Let us hope so, because I would characterize Cyberspace as an environment that naturally favors women, while lacking many of the brutal sources of male power. It is a place made entirely of relationships, which, in my experience, women understand more deeply than men do. In Cyberspace, there is no heavy lifting, no credibility to physical threats, no force in arms. Indeed, in Cyberspace, there is no force.

I ask you. Whom does this advantage?

By next year at this time, it is likely that there will be more women online in America than men. Add to that the fact that information-based enterprises require less start-up capital, and therefore are less dependent on the Old Boy Network that still controls most investment, and you have a business environment where women can thrive.

3. The Southern Hemisphere Rises

The southern half of Earth lost out on the fruits of industry for reasons that had largely to do with cultural notions of time that made them poorly suited to becoming interchangeable machine parts in an industrial engine where time was the organizing principle.

As a consequence, they were spared indoctrination in many of the habits of mind I referred to in the beginning of this piece and thus are better able to approach the coming Discontinuity with fewer misleading assumptions.

Besides, Africa and Latin America have continued to operate the old many-to-many information exchanges that we in the North forsook when we traded gossip at the village well for a one-way signal emanating from our solitary television sets. Or, for that matter, when we traded the connectedness of villages for the isolation of suburbs.

4. Mind Over Matter

If some nerdy kid can go from zero to being worth 45 billion dollars in 25 years on nothing but the power of his mind — defeating the most powerful corporation of his time and now actually competing with whole nation states for control of the future — it is obvious that scale and economic momentum have lost a lot of their formerly fearsome credibility. Any storefront in Hong Kong can place itself on an even economic footing with the largest of organizations, given the right idea properly executed.

5. The First Shall Be Last

(Unless They Learn to Surf First)

If even half of this is true, it hardly takes an analyst to plot the trend line. The investment market cultures that have shaped Merrill Lynch and most other U.S. corporations throughout its history are about to change dramatically.

The Poor World is about to join the conversation, and they will be facile. They are sick of being regarded as problems and ready, willing, and able to be regarded as

opportunities. And neither chaos nor uncertainty bothers them much. They were raised on both, and the information economy presents possibilities for their harnessing wealth undreamed of before.

In other words, The Disenfranchised can surf, and they're suddenly surfing right at you.

Will The Entrenched be able to match them in agility and courage, or will your great storehouse of possibilities stay on the beach, drinking the usual gins and tonic and watching the sun set?

Are The Entrenched ready for markets that not only don't wear wing-tips but often wear no shoes at all? Since it seems all organizations ultimately come to resemble their markets more than their leaders, this is an important question to ask. Is your company ready to engage new customers that will change it utterly?

I would say this is an entirely open question. Corporate America probably has more intuitively stored knowledge about pure information economy than any group not presently running international con games from Nigeria. You have been pulling juice from the gap of informational differences — shorts, longs, upsides, downsides — for about as long as anyone. Use what you know. Get over the part that no longer works.

But are you ready to begin again?

Take some comfort in this. We are all beginners now. Let us begin.

ABOUT THE AUTHOR

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He is a writer and lecturer on subjects relating to the virtualization of society and is a contributing editor of numerous publications, including Wired. He is a recognized commentator on computer security, Virtual Reality, digitized intellectual property, and the social and legal conditions arising in the global network of connected digital devices. He also works as a consultant on such matters with the Vanguard Group, the Global Business Network, and Diamond Technology Partners. He is also a member of the External Advisory Council of the National Computational Science Alliance. He lives in Pinedale, Wyoming (the only county seat in America without a stoplight), New York's Chinatown, on The Road, and in Cyberspace.



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