



We Just Went Through 200 Years of Radical Economic Upheaval -- The Next Economic Era Offers Us a Chance to Control It

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Editor's Note: *The following essay is a deep-think attempt to re-imagine the fundamental concepts of how modern societies can restructure their economies and how citizens can reorder their lives in a more democratic fashion. The author considers the emerging technologies of the future and the huge problems posed by industrial economics.*

Proposing a Design Economy

I. In contemporary economic discussion, the idea of the Industrial Revolution is frequently presented as something bland, neutral and inevitable. Instead of conveying a sense of historical turmoil, disruption and the overthrowing of established cultural, political and economic institutions dating back millenia, we simply throw off the term, "Industrial Revolution" with little regard that it represented a fundamental reordering of human life. In many ways this is understandable, as the Industrial Revolution triumphed, becoming industrial rule, industrial economy, industrial bureaucracy, and industrial life -- the industrial status quo. In large swaths of the world, industrial economy is so dominant, it leaves the sense the world has always been that way and only a fool could imagine it being any different. Most amazingly, this has all been accomplished in less than two centuries -- an historical blink of the eye.

Today, we confront an era of equal historical change. Further understandings of the natural world and resulting new technologies are beginning to impact industrial society to a degree as fantastic as industrial knowledge and technology transformed agrarian society. While agrarian civilization lasted over 10,000 years, the reign of industrial society has been relatively brief; nonetheless, it is being usurped. This transformation is rapidly intruding on our lives, yet still not quite recognized beyond a general trepidation that things don't seem to quite work like they did before. The great collective social anxiety of the Industrial era, never satiated, now confronts a new transition for which the tools, skills, thinking and institutions are little developed, if they exist at all.

Maybe the most essential understanding we can have in such a time is the simple recognition of change. The Industrial era, for many reasons, is transitory. It is inherently unstable, and incapable of truly meeting the challenges and problems it created. For in the end, industrialism tries conforming or forcefully overwhelming life's great diversity into a few narrow homogenous environments, which are

unhealthy and unsustainable for both the individual and the system as a whole.

The Industrial era's greatest strength, an uncompromising faith in technology, is also one of its greatest weaknesses. The simplistic adoption of any given technology, without an understanding or systemic feedback mechanisms to track its impact on society, is the ethos of a child, an immature civic morality. To paraphrase the technology thinker Marshall McLuhan, first we shape technology, then technology shapes us. We still grasp to understand how technology shapes us, yet we rapidly transform from industrial technologies to a new era, for lack of a better term, of information technologies.

These new electronic information technologies are transforming industrial economies. Technology has been the fundamental shaping force of the modern era; developing an understanding of the power of this shaping will enable us to meet some of challenges we face as new technologies now reshape industrial society. It is the understanding of this shaping process, call it design, that will be a fundamental force and positive potential of the next economic era. We are leaving the era of industry and embarking on great new experiments of design. To succeed, we will need the active participation of each of us helping shape our individual and collective lives. We must all be active participants in creating the thinking, tools, institutions, politics, and culture of the design economy.

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II.

The cycle of the machine is now coming to an end. Man has learned much in the hard discipline and the shrewd, unflinching grasp of practical possibilities that the machine has provided in the last three centuries: but we can no more continue to live in the world of the machine than we could live successfully on the barren surface of the moon. – Lewis Mumford

There are many components of the Industrial era that differentiate it from the Agrarian era. Among the most important were the great developments in the sciences of physics and chemistry. The thinking in these two areas led to the great technological advances that were the foundations of industrialization; the mass forging of iron/steel and the harnessing of energy gained from the burning of fossil fuels – coal, oil and natural gas.

In just 150 years, these industrial forces transformed the United States. In that time, a matter of just five generations, over three-quarters of the population went from working in agriculture to just one percent today. We went from mostly rural living to urban, and mid-way, with the infrastructure of the automobile in place, to extensively suburban. A republic, founded mainly of small farm landowners and merchants at the end of the Agrarian era, was transformed into a population of mostly wage earners. Economic power initially quite diffuse, gradually became ever more concentrated into fewer and fewer mega-corporations – the great institutional inventions of the Industrial era.

Over the entire era, political economy became increasingly centralized. Industrial

production, its implementation with the machine and the assembly line, enabled mass production and mass consumption, fostering centralization of production and distribution. Local diversity and knowledge was overwhelmed by the homogeneity of industrial technology. The distributed political economy of a small farm agrarian society was transformed into centralized government in Washington and centralized control in the industrial mega-corporation. Not only did government power become increasingly centralized, but, with the introduction and eventual domination of broadcast media, the processes of politics did as well. This centralization led to the techniques of mass manipulation as politics and the growth of bureaucracy for mass control in governance.

Over time, the politics, culture, and institutions of the industrial era took on the appearance of the machines and technologies of industry itself, and this machine has become increasingly unsustainable.

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III.

Unfortunately, once an economy is geared to expansion, the means rapidly turn into an end and "the going becomes the goal." Even more unfortunately, the industries that are favored by such expansion must, to maintain their output, be devoted to goods that are readily consumable either by their nature, or because they are so shoddily fabricated that they must soon be replaced. By fashion and build-in obsolescence the economies of machine production, instead of producing leisure and durable wealth, are duly canceled out by the mandatory consumption on an even larger scale. -- Lewis Mumford

As various industrial philosophies and schools of thought were developed, the most important to emerge was the idea of industrial capital and its unquenchable need for growth. Unlimited production and unlimited consumption facilitated infinite growth, becoming the *raison d'etre* of the entire system. Coupled with the notion of any technology capable of being developed should be utilized, growth and technological innovation became their own necessary ends, dominating all others.

The industrial era's great perpetual machine's fundamental product was infinite growth. It created a society divided into two components; production and consumption, in which a person needed a job in the production aspect to gain the benefits of consumption. The system is only considered healthy if it produces more every year. It is only considered beneficial if consumption increases each year. It is a system that values quantitatively, and scarcity is confused with qualitative value.

Just as the end of the Agrarian era did not end agriculture, the end of the Industrial era will see neither the end of industry or its fundamental importance; however it will require increasingly less labor and will rapidly be less defining of the economy, politics, and culture of human society. There are two main reasons for this: First, the knowledge and the technologies of the sciences of quantum physics and biology are adding to, replacing and surpassing the impact of earlier technologies developed with the understandings of Newtonian physics and chemistry. Second, the doctrine

of unlimited growth, necessitating unlimited production and unlimited consumption is meeting natural resource and ecological systems constraints. Fortunately, the first element can provide solutions for the second.

Knowledge of the planet's material limits, shown in part by growing environmental problems including decreasing biodiversity, collapse of ocean fisheries, and climate change, all instigated by industrial technologies, have in recent years raised important questions on the feasibility of unlimited industrial growth. At the same time, limits are being revealed in supplies of natural resources, particularly oil, the lifeblood of industrial modernity. However, as was recently described in the *Financial Times*, oil is certainly not the only resource limit:

The broad story is of depletion. Most of the easily obtainable resource deposits have already been exploited and most usable agricultural land is already in production. Natural resource discoveries, where they continue to occur, tend to be of a lower quality and are more costly to extract. Meanwhile, the dwindling supply of unutilised land faces competing demands from biodiversity, biofuels and food production.

As technology confronts various environmental constraints, the Newtonian physics and chemistry based paradigm is transforming to one of quantum physics and biology. It is the difference between fossil fuel power and solar energy, broadcast media and the Internet, and chemical farming and bio-knowledgeable sustainability, simply, a greater understanding of natural systems. These sciences and their technologies are rapidly changing industrial society, combined with ever growing environmental challenges, they create the need for a new understanding of political economy. It's a sensibility that rejects the idea of infinite growth and the tyranny of unlimited production rewarded by unlimited consumption, while embracing the transition from the industrial economy to the design economy.

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IV.

Without constant enticement and inveiglement by advertising, production would slow down and level off to normal replacement demand. Otherwise many products could reach a plateau of efficient design which would call for only minimal changes from year to year.
-- Lewis Mumford

The steam engine, comprised of steel and coal, both best symbolizes the industrial era and represents what might be considered its quintessential tool for shaping and defining the entire era. With the steam engine, the technology of Newtonian physics fundamentally reshaped the natural landscape in less than two centuries to a greater degree than agrarian technologies allowed humanity to reshape the planet in over 10,000 years.

In this new era of design, the tool that might both symbolize the era and become its greatest shaping instrument is the networked microprocessor. A technology of

quantum physics, and while presently fired by fossil fuels, though soon to be powered by renewable energy sources, the networked microprocessor produces and then communicates the fundamental element of the design economy – information.

The term information is used quite informally, though the most general and widest definition might be the most accurate. The bits, numbers, words, sounds, images, and even touch sensations produced by humanity, our technology, and our systems are all information. We gain value from information using design. That is, information not utilized for some aspect of design, whether it is scientific, economic, political, or entertainment becomes noise, though some people's noise might be valued in others design, but without design – editing, communication and utilization – information basically remains noise.

The creation of information and its design have been fundamental aspects of civilization since its inception, in fact one could argue it is civilization. Power in civilization has always coincided with the control of the creation, editing, and communication of information, particularly that information essential to the society's core functioning. For example, the calendar, necessary for proper functioning of agrarian society was controlled by both government and religious ruling classes.

Five hundred years ago, with the dawn of the modern scientific revolution, the printing press was also birthed, revolutionizing the communication of information. In the 20th century, the invention of electronic broadcast media again saw a revolution in information creation and communication, having very dramatic impacts on society – economically, politically and culturally. The control of creation, editing, communication, that is the design of information is a fundamental aspect of political economic power in any society. The invention of the printing press helped loose control of the Catholic church and the established aristocracy across Europe, while the establishment of broadcast media helped Washington D.C. and the Fortune 500 gain control in the United States.

The networked microprocessor, again both as symbol and practical tool, brings a new information revolution to our society, allowing the creation, editing, and communication of information at rates exponentially higher than anytime in previous human history. Importantly, information plays an increasingly fundamental role in production processes and the product itself. Only several decades old, this information revolution has initially been co-opted by the industrial era as a means to “better” industrial processes. However, the true value of this information revolution will not be gained via industrial valuations, just as agrarian values and definitions could not give industry its true value. Increasingly, industrial constraints are hindering our ability to obtain the true value in utilizing information – the value of design – which is not gained simply quantitatively by increasing production and consumption, but qualitatively through design. The greatest value gained from design will be in using less resources, less labor, and in many cases less consumption, for these things, industrial society has limited value.

An example of this is the process of automation, removing human labor from the industrial machine, allowing less human labor for the production of the same amount of product. However, in taking the line-worker out of the production process, you are also taking away former and would be future workers from the labor that allows them to consume. While the American economy is much larger

than it was 50 years ago, we still produce a similar amount of steel, but due to automation, the American steel industry today uses one-third or less of the labor to produce the same amount of steel. This process is going to continue and eventually, in the not too distant future, remove human labor from most industrial processes. Information is cheaper than labor.

Yet, just as designing fully robotic factories of the future will have a transformational impact on production, it will have an even more important, one could say transcendent, impact on consumption. In many ways, industrial economy's consumption components are primeval. They are based on elemental components of human existence, such as food, shelter, security, and reproduction. These primary elements of existence have deep roots in the human psyche. As the capitalist industrial economy grew, and thus the need for infinite growth, it combined with the 20th century information broadcast revolution to create a mass consumption economy and culture based on the exploitation of primal urges, creating in many senses a Neanderthal economy. One only need watch or listen to a few minutes of most advertising to experience its manipulation of hunger, fear and sex, most of it having little to do with the product.

It is this playing to primal urges that stokes the growth economy and stokes mass cultural anxiety. For primal urges can never be satisfied so much as only satiated, yet our growth economy disallows even this. In fact, it does just opposite, constantly and incessantly stoking primal urges for the ends of ever more consumption and thus endless growth. It is in fact only the rational mind that can soothe primal urges by understanding them and not allowing them to endlessly dictate behavior.

If we were to borrow from the ancient Greeks, and separate life into thoughtfulness and primal urges, the American economy would resemble a massive Bacchanalian orgy. We would be wise to remember the Greeks looked at these primal urges as essential and enjoyable aspects of existence, but they also walled off unmitigated enjoyment into a festival. The idea of the primal as a foundation for society, would be foreign to the Greeks, for civilization by its very definition is thoughtfulness, the smoothing of primal urges with rational thought.

Seventy percent of the American economy is consumer-based, and to thrive relies on hundreds of billions of dollars of advertising endlessly triggering deep primal urges – it is literally uncivilized. What we need to do is get more thoughtful about our consumption, that is, to better design our economy on available knowledge using information as a tool. Instead of reward exclusively through consumption, reward will be gained by participating in design. This will lead to less gross consumption, which is not only OK, but essential as we reach the limits of natural resources and the destruction of ecological systems. Paradoxically, the primeval ecological elements which birthed the human species, and on which our survival remains completely reliant, needs to be saved by the uniquely human concept of civilization.

We live in a time where Newtonian physics and industrial technologies need to be transformed by our 19th- and 20th-century knowledge of biology. Most revolutionary is the concept of evolution and natural selection. In nature, life changes continuously through constant reproduction and mutation. It is with natural selection – the choosing process of the greater environment – that new designs move forward or are rejected. We must adopt this thinking for our political economy, with

an understanding that each of us our components of the greater human environment known as civilization. We are the selection process in creating the future, both individually and just as importantly collectively. As we continue to reshape our civilization and the planet itself using technologies derived from the processes of rational thought, decisions cannot be left to simply exploiting primal urges. We must use the same thought and deliberation to design the economy, politics and culture of our civilization. That is the design economy.

The greatest example of how design will become paramount is with energy. The Industrial age was built on the seemingly unlimited supply of cheap fossil fuels, combined with failure to assess the negative costs for the environment. What developed, particularly in the United States, was an economy dependent on massive energy waste. This now immoral waste is apparent in all aspects of energy use, for example lighting, heating, and cooling, however it is most easily exemplified with the U.S. automobile culture. It is the height of inefficiency to take a 150- to 200-pound person, encase him in a couple tons of steel powered by a highly inefficient internal-combustion engine, and use that as the main means of transportation, restructuring the entire infrastructure, much of the economy, and the culture itself.

The automobile represents the perfect product for the Industrial era. It is labor intensive, that was before increasing automation, resource intensive in metals and other materials, and requires massive amounts of energy. They also need to be relatively frequently replaced, they are certainly not built to last. Every aspect of the automobile added to the Gross National Product, the industrial era's ultimate barometer of economic fair weather, while its impacts on the greater ecological systems from extraction of resource material to its pollution of air and water systems were at first ignored and then socialized.

Now in direct contradiction to industrial economy, a design economy would look to design transportation using the least amount labor, resources, and energy. It would look at the uses of transportation, and then design processes which would be more efficient. For example, the centralizing of goods distribution in warehouse size grocery and department stores, requiring people drive two ton automobiles to pick up five pounds of foodstuffs or two pounds of clothing is crazily inefficient. Much better would be to design neighborhoods where people could walk and bike to pick up their day-to-day necessities, allowing most of the physical goods distribution to occur using larger more efficient vehicles.

Now the same inefficiencies, off-book environmental degradation, and resource exploitation occur throughout the industrial economy, in fact, distressingly, such things in many ways define a healthy and vibrant industrial economy. We need to redefine much of this value, understanding if we concentrate on design first, production and consumption second, instead of an economy based on ever greater growth, simply more and more stuff, we will have an economy of enough, providing a quality of life much more satisfying and substantial than that gained by quantitative value.

V.

The ordinary person senses the greatness of the odds against him even without thought or analysis, and he adapts his attitudes unconsciously. A huge passivity has

settled on industrial society. For people carried about in mechanical vehicles, earning their living by waiting on machines, listening much of the waking day to canned music, watching packaged movie entertainment and capsulated news, for such people it would require an exceptional degree of awareness and an especial heroism of effort to be anything but supine consumers of processed goods. -- Marshall McLuhan, The Mechanical Bride: Folklore of Industrial Man

Humanity's great agrarian era produced agrarian government systems, economies and cultures. Human life and human identity derived overwhelming from the processes of farming. The much shorter two-centuries-old industrial era redefined life. The processes of production and consumption became the overwhelming dual identities of individuals and our institutions that evolved to foster the processes of unlimited industrial growth. As we move into the design economy, increasingly the most imperative questions will be what are the roles, identities, institutions, and processes of design.

Design has been part of human history before the beginning of civilization. It has at times played an instrumental role with the designing of hunting tools, farming implements, and industrial technologies. However today, information, the raw material of design, is becoming not simply ubiquitous but fundamental to every aspect of human life. For example, with our knowledge of DNA comes the ability to manipulate the very information codes of life itself.

Presently, many of the processes of design – the creation of information, its editing communication, and finally decision making for its utilization – are in turns both centralized and insufficient. We need to evolve our institutions, organizations, and individual roles to understand that design is increasingly the primary value of political economy, ultimately creating a value shift from industrialization's quantitative value of infinite growth based on unlimited production and consumption to design's more qualitative values of participation, efficiency, elegance, and enough.

If we look at the processes of design today, we see rapid change. Companies, governments, NGOs, and individuals each year produce an exponentially greater amount of information. In the distribution and communication of information, paper is in great decline as electronic media explodes. Creation and communication of news and public affairs, once the exclusive domain of print, was supplanted by electronic broadcast media by the mid-20th century, and is now rapidly being replaced by the networked microprocessor, creating both a plethora of real and potentially valuable information, but also an unprecedented amount of noise, with little or no value. Noise grows as what could be useful information is communicated with no ability for the individual or organization to place it in meaningful context.

Yet, even the gaining of valuable information is hamstrung in utilization as the decision making for political economy remains tremendously centralized. Much of the wealth, and thus the economic decision making of the nation is concentrated in the Fortune 500. At the same time, over the past century as government power became more greatly centralized in Washington, political decision making became further and further removed from state, localities and the citizen. As previously noted, information both for consumer purposes and electoral decisions – the only

direct role citizens have in political decision making – is overwhelmingly manipulative and based on primal motivations, not the rational decision making necessary for civilized design.

In an information environment overwhelmed with noise, the individual is increasingly at a disadvantage as it becomes ever more difficult to filter or more appropriately edit information so that it might be utilized. Individuals face a tsunami of information provided with little or no context, making it difficult to put any of it to use. In contrast, the industrial organization, be it the Fortune 500 or a federal bureaucracy has advantage in contextualizing much of the information they need to make decisions, not to mention the power to then implement. Thus, they can staff tremendous numbers for simply editing information flows. However, over time, this can also become a disadvantage in large organizations and bureaucracies as information channels become locked-in, leading to stagnation and inability of the organization or bureaucracy to utilize new information. And just as importantly, these large structures play a role in protecting the status quo, manipulating information flows to suit their self-interests.

We need to begin to evolve our institutions, organizations, and bureaucracies with an understanding that the creation, processing, and utilization of information is not simply an essential component, but the predominant one. This means both changing our institutions and creating new ones. It necessitates reviving the idea of associations, an essential part of the American republic's democratic history. As Tocqueville wrote of the vibrant agrarian American republic, “Americans of all ages, all stations in life, and all types of dispositions are forever forming associations.” Yet, this necessary distributed formation of associations has been lost or replaced by the centralized order instilled by the Fortune 500 and Washington.

A design economy needs to birth millions of design associations. They will be both local and geographically based and distributed electronically across global networks. They will stand alone and be distributively tied. These associations will create, edit, communicate, and utilize information, that is they will design. Most importantly, they will provide the individual, the citizen, the consumer a mean to be an active participant of the design economy.

In the end, the foundation of the design economy is not stuff, it's people. And for the design economy to transcend industrial life, people are going to need to be freed from industrial structures, most essentially the processes of unlimited production and consumption. People are going to need the time, and just importantly society is going to have to value the processes of design. Which means people as both individuals and collectively as associations are going to be valued as creators, editors, communicators and decision makers, in short we must revalue the citizen.

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VI.

It would be curious... if an idea, the fugitive fermentation of an individual brain, could, of natural right, be claimed in exclusive and stable property. If nature has made any one thing less susceptible than all others of exclusive property, it is the action of the thinking

power called an idea, which an individual may exclusively possess as long as he keeps it to himself; but the moment it is divulged, it forces itself into the possession of every one, and the receiver cannot dispossess himself of it. Its peculiar character, too, is that no one possesses the less, because every other possesses the whole of it. 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. That ideas should freely spread from one to another over the globe, for the moral and mutual instruction of man, and improvement of his condition, seems to have been peculiarly and benevolently designed by nature, when she made them, like fire, expansible over all space, without lessening their density in any point, and like the air in which we breathe, move and have our physical being, incapable of confinement or exclusive appropriation. Inventions then cannot, in nature, be a subject of property. Society may give an exclusive right to the profits arising from them, as an encouragement to men to pursue ideas which may produce utility, but this may or may not be done, according to the will and convenience of the society, without claim or complaint from anybody." – Thomas Jefferson to Isaac McPherson, 1813

The great transformation from the Industrial era to an era of design will be pushed by the increasing knowledge of science and its technologies, but one of the great changes will be revaluing of political economy, from an overemphasis on product to a greater valuing of process. After all, life is not product, it is process, an understanding enabling us to greater value that which makes us human. Using knowledge from quantum physics and biology will allow us to create more organic systems, with people not technology, and design not product as the greatest mediators of value. Integral to the whole process will be information and how it is created, controlled and communicated, and in so doing we will revalue information.

Industrial markets pay little value to information, value is predominately gained on physical goods. While we can and must evolve markets to place more value on information content, in many ways what must be revived and placed prominent is the value modern democratic politics places on the free flow of information. This is part of the American system little valued in economic dogma, yet essential to not only the health of the American political system, but just as much to the vibrancy of the American economy. We need to add the political back to the economy.

In the American constitution, you will find certain foundational pillars on the control of information necessary to build the design economy. The ideas of free speech and freedom of the press remain just as important today as then. But they must be defined anew in an era of networked microprocessors, where each individual's speech can be amplified, every person owns a press, while the Fortune 500 and our own government fight to keep ever more information proprietary.

The constitutional questions of copyrights and patents are essential to this new era. As Jefferson pointed out these are not natural rights but societal creations based on fostering innovation. But again, in industrial America, the benefits of copyrights and patents gained through production become more problematic in an era of design,

where information in an organic design political economy becomes something like DNA, necessary to build all the physical processes atop it. Limiting the free transference of this information can cause vast mutations in the entire design political economy. Today, the Fortune 500 spends millions on lobbying to strengthen patent and copyright law, not to help innovation, but to stifle and gain further control.

The Internet has given us a few hints on how to evolve design principles. Open distributed networks can create their own order based on an open architecture, that is, allowing all equal access and not discriminating transmission based on content. In the software area, principles such as open source have shown people can create dynamic stable systems where the information is left open to all to freely manipulate and evolve. These are issues of fundamental importance to the design economy, just as questions about labor and control of the railroads and utilities were to the industrial age.

One of the most interesting changes that might occur is to money itself. Money has an information component, a necessary question for much greater probing is if some of this information can be “socialized,” that is, extracted from money and claimed as part of a more robust political culture. An easier way to think about this is how industrial economy in many cases forces information to be turned into product so that it might be valued. However, if we create new associations and evolve our present organizations to understanding the societal value of information, we may gain value from much information without it being monetized. Yet, over years, industrial society and particularly the last few decades has trended in the exact opposite direction, monetizing all aspects of life.

In the end, we must revive and evolve the citizen, our politics, and our government. We need to create value for design, thus valuing the processes of design. Most importantly, we must give value to the citizen, and that means the work of the citizen must be valued. We need to redesign our economy so that production and technology are both second to people.

Read more of Joe Costello's work at [Archein](#). He was communications director for Jerry Brown's 1992 presidential campaign and was a senior adviser for Howard Dean's effort in 2004. He's spent two decades thinking and acting on the confluence of information technologies and democratic political economy.

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