Designing Bioregional Economies in Response to Globalization

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This chapter argues that there is a critical need to develop self-aware bioregional economies in responses to the challenges of globalization. This conclusion is based on a sector analysis of what a globalized economy can and cannot do. We then suggest that the design of conventional debt-based national fiat currencies tends to leave critical sectors of regional economies starved for liquidity and incapable of achieving a sustainable future. The solution to this problem is complementary currencies. Case studies of successful complementary currency experiments are included.

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INTRODUCTION

The most widely noted effect of the information and communications technology revolution is global economic integration. In this chapter we will examine the character of the global economy and show why a countervailing development of regional economies is essential. We will then look at the central institution of modern economics, money, and show why new forms of currency design are essential for the health of regional economies (and therefore, for the health of the global economy). We will also look at some case studies of places where new forms of money are solving social problems that have proven intractable under conventional economics. Currency design is an area where individuals participating in the design of community-based systems can solve problems that are impossible to solve through national policy prescriptions.

The history of the modern era can be seen as a dance between the imperatives of technological innovation, which bring new horizons of productivity but which can also unleash profoundly destabilizing social forces, and the processes of democratic politics, which must tame those disruptive forces and channel that productivity into social forms that enhance the quality of life for a majority of citizens. The invention of the factory led to child labor laws and the labor union movement; the invention of railroads led to antitrust laws and the Interstate Commerce Commission. The era of information and communication technology promises to be no exception.

The shift of the economic center of gravity from the nation-state to the global economy is generating several social forces. Among the most universally recognized is the increased competitiveness of manufacturing and trade. Also on the horizon, although not as universally recognized, are trends that include: the diminished political power of nation states, the collapse of the political legitimacy of the modern welfare state, a tendency toward ethnic balkanization, the global integration of the labor market (leading to downward pressure on consumption levels for the average worker in the advanced industrial economies), and the growing importance of potentially destabilizing speculation--Robert B. Reich (1) calls it "paper entrepreneurialism"--as a major form of economic activity and source of wealth.

All of these developments are leading to a need to rethink basic economic theory and systems design. Indeed, the information revolution raises issues about the basic design of capitalism itself. In the nineteenth century, Henry George noted the tendencies of capitalism to produce extremes of wealth and poverty, while in 1958 John Kenneth Galbraith (2) pointed out the modern society is awash in the overconsumption of private goods while there is a chronic shortage of public goods. Both of these
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economists attributed these imbalances to structural problems in modern capitalism.

We have seen that the principal consequence of information technology is the global integration of the capitalist system. It has also enhanced our awareness of the negative environmental effects of prior waves of industrialization, and it has exaggerated historic inequalities in the distribution of wealth. But while technology exacerbates the structural problems in the design of capitalist economies, it also provides the tools to fix them. Technology gives us better tools to manage complex environmental and economic systems. Indeed we contend that the process of correction is already happening at a practical level in several important social experiments in the area of currency design. In this area, we are in a period where practice is ahead of theory.

**THE STRUCTURE OF THE GLOBAL ECONOMY**

*The function of economic systems is to enhance human wealth and well-being while naging the interface between human and ecological systems.* Although globalization has mainly been about the global integration of financial transactions and of manufacturing and trade, a complex modern economy that satisfies the full range of human needs requires many different sectors, only some of which depend primarily on manufactured goods. Furthermore, many economic activities involve forms of economic benefits called "public goods" which are enjoyed by societies collectively. While the production and distribution of individually consumed goods and services can be managed by markets, public goods require public policy, or other forms of decision-making in the public interest such as philanthropy.

There are many essential sectors in a modern economy, and some of them are best organized on the regional level. Figure 1 outlines the major sectors in a complex modern economy and categorizes

**Figure 1. BASIC ECONOMIC SECTORS**

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them according to whether they lend themselves to global or regional economics, as well as whether they fall in the market or public sector.

The economic sectors that are most actively involved in international trade differ in important ways from the regional sectors. The latter are equally essential to the overall health of a regional economy, but they are necessarily based on local production for local consumption using local resources. This regional economy takes care of our basic needs for shelter, physical nourishment, and basic services such as
education and routine health care. These economic activities are often concerned with intangible values such as sustainability and nourishment, rather than the economically more aggressive (and conventional) values of competition, production, and accumulation. This economy tends to be dependent on values of public spirited cooperation, mutual support (reciprocal giving, which in more primitive societies has been described as the "gift economy"), and concern for community well-being.

In addition to being based on the use of local resources for local production and consumption, regional economic activities often involve low to moderate technological sophistication (what has sometimes been called "appropriate technology"). And they tend to be labor intensive, so that the supply can easily be increased by mobilizing underemployed labor in the local labor market. They produce goods and services that can be made more abundant by mobilizing underutilized local productive capacity. Investing in education is the principal strategy for mobilizing underutilized human resources.

There is no question that the global trade economy makes substantial contributions to the sense of wealth and well-being in the daily life of the average citizen. It is this contribution that has permitted democracies to tolerate the systemic diseconomies also generated by the trade economy (principally in the forms of pollution, economic instability, and cultural disintegration). But it is also true that modern information management technology gives us the ability to manage social and ecological systems with greater sophistication and effectiveness. Combining this technical sophistication with a clear understanding of the regional economy as a system can empower local democratic institutions to alleviate many of the toxic side effects of the trade economy.

Manufacturing and trade, and the financial systems that support these activities, still offer the greatest potential for economic growth and asset accumulation. They are the areas that are most easily integrated on a global scale by information technology, and they are the central focus of conventional economic theory. Classical and neoclassical economics, which is still the core of the economics that is taught to future businesspersons and politicians, is mainly about the economics of manufacturing and trade. When Adam Smith set down the foundations of this economic world view in the eighteenth century, he wanted to understand manufacturing and trade because these areas were demonstrating a stunning capacity for innovation and growth. The basic ideas of our conventional economic wisdom--markets, supply and demand, competition, productivity, growth, GNP--still primarily describe the economics of trade.

However, a complex regional economics would offer organizing principles for understanding both the emerging global economy and the countervailing regional and local economies that must be strengthened if the values of democracy, ecological sustainability, and social justice are to prevail. This analysis is further complicated by the fact that both the global and regional economies require economic activity in the public sector (the "commons") as well as in the private sector. It is also complicated by the fact that we are increasingly recognizing that economic systems must promote human wealth and well-being in the context of ecological adaptation and sustainability.

THE METROPOLITAN BIOREGION
We are suggesting that it is necessary to take a closer look at regional and local economic systems. In general terms, what we are doing is applying macrosystems analysis, which is usually applied at the national level, to regional systems. National economic policy is generally constructed by combining the analysis of the three macroeconomic factors—production/consumption, savings/investment, and government—as the basis of fiscal policy with the management of the money supply as the basis for monetary policy.

An analysis inspired by Jane Jacobs Cities and the Wealth of Nations (3) as well as by the bioregional literature has led one of the authors [Warmoth (4)] to propose the metropolitan bioregion as an important unit for economic systems analysis. The metropolitan bioregion as a systems concept integrates the two elemental whole systems of interest to planners. On the one hand, there is the basic ecological unit of the bioregion, a concept which is supported by a growing body of literature. This unit is created by the natural organization of biological life into integrated systems on the basis of geographical features such as watersheds, climate, and natural physical boundaries. On the other hand, there is the basic social unit of the city and its surrounding sphere of influence. Jacobs argues convincingly that the city region is the basic unit of human economic activity, as it is the unit within which natural resources and the human division of labor combine to create a system that addresses the full range of human needs. Often, the bioregion and the city region are overlapping entities. From the perspective of planners, it makes sense to view their effective integration as a primary goal of the planning process.

All regional economies are currently producing for international trade. Everyone wants to be part of the globalizing economy, and the conventional neoliberal economic wisdom holds that export-driven growth is the only viable path to modernization for developing economies. It is true now, as it was in the time of Adam Smith, that being a net exporter is the strategy for achieving the fastest rates of economic growth. However, it is also true that becoming a net exporter is an extremely competitive undertaking. This prescription ignores the logical requirement that a positive balance of trade by one country requires a trade deficit in some other country (or countries), and thus is an inherently unstable and unsustainable arrangement. That is why we need to pay at least as much attention to the health of local or "domestic" economic sectors.

A complete systems approach to the metropolitan bioregion requires us to look at several aspects of economic activity normally reserved for macroeconomic analysis at the national level: balance of trade, balance of payments, relationship between savings and investment, and money supply (liquidity), as well as production and consumption, and public spending. However, the remainder of his essay will focus primarily on the economics of bioregional production and consumption, particularly on the importance of liquidity in optimizing bioregional productivity.

THE CONFLICT BETWEEN NATIONAL CURRENCY CREATION & REGIONAL LIQUIDITY

A healthy regional economy needs all of its sectors to be functioning optimally. This in turn requires adequate liquidity, as well as an adequate attention to the provision of public goods and ecological
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sustainability. However, in modern economies, the public sector and environmental interests often find themselves starved for liquidity.

There are three primary causes of liquidity problems in regional economies. The most widely recognized is participation in the large scale swings of the national and global business cycle. A second is the problem of balance of trade. While we are used to looking at balance of trade issues at the national level, they can also have a significant effect at the local level. A community that imports more than it exports will tend to have a liquidity problem, especially if it is also exporting its savings to financial centers that are not investing in the community that is the source of the savings/capital. This problem is particularly acute in rural communities and inner city poverty zones, where most income is rapidly spent on imported commodities and, especially, manufactured goods. (Jane Jacobs suggests that tying all of the city regions in a country to a national macroeconomic policy is like connecting the respiratory systems of all of the spectators and players at a tennis tournament to one central nervous system. The result would be to require all players and spectators, whether resting, sitting, or actively playing, to function at one average level of respiratory activity.)

Understanding the Structure of Modern Monetary Systems

A third source of liquidity problems is the competitive character of bank debt-created fiat currency (which is the form of all modern national currencies) and the normal way in which the public and social (non-profit) sectors of the current economy are financed using that currency. While payment and banking technology have continued to dramatically improve, the fundamental objectives of the money system have not been seriously revised since Victorian England. From the perspective of the objectives pursued by the money system, we are still living with what propelled us so effectively into and through the Industrial Revolution. That money system includes four basic features still used today: 1) Our money is typically attached geographically to a Nation State, and 2) it is created out of nothing ("fiat money") by 3) bank debt, 4) requiring the payment of interest.

While all of this may seem obvious to those familiar with the monetary system, the full implications of each one of these characteristics is much less clear. The development of a universal reliance on national currencies has obscured the fact that historically many different authorities have been involved in the creation of money. The concept of the nation state itself is only a couple of centuries old. Therefore, the vast majority of historical currencies were in fact private issues, usually made by a sovereign or some other local authority. Furthermore, the concept of "fiat money" reminds us that our national currencies are created out of nothing by the issuing authority. Examining these two characteristics of modern money leads us to realize that the design of currency systems can in fact be a matter of choice or policy, reflecting various sources of authority and embodying various design principles.

One of the authors [Lietaer (5) (6)] has defined money as "an agreement by a community to use something [countable] as a medium of exchange." Historically, an extraordinary variety of things have been used as a medium of exchange. Today, the implicit agreement is to use national currencies, 95% of which are really in electronic bits stored in computers at banks, brokers and fund managers. The
currency in circulation in the form of bills and coins forms the remaining 5%.

Reflection on the other two characteristics of modern money—the fact that it is created by bank debt which bears interest—leads us to realize that the particular design principles embodied in modern national currencies make it inherently competitive in a way that tends to deprive regional economies, and particularly the public and social sectors, of liquidity. First consider how and where national currencies are actually created. At first sight, national currency appears to be created on the printing presses of central banks or in the U.S., of the Department of the Treasury. But this is not where money is created. **The surprising fact is that modern money is created as new money in bank accounts: Every dollar in circulation starts as a loan.** The function of central banks in controlling the money supply is to control the rate of creation of currency through bank lending; it does not act to create new currency itself, except for the small fraction of so-called "high powered money" when it buys government bonds not purchased by the private sector.

What is particularly brilliant about this scheme is that it solved the contradiction between two types of objectives pursued by Victorian England: creating and reinforcing the Nation State on the one side and relying on private initiatives and competition on the other. That is, by in effect privatizing the creation of national currencies, the system maintained the authority and image of the Nation State while creating a competitive pressure among banks to obtain both the loans and deposits of their clients.

According to Jackson and McConnell (7), this monetary system creates a currency that "derives its value from its scarcity relative to its usefulness." In other words, for modern money to function, scarcity has to be artificially and systematically introduced and maintained. **The way in which this scarcity is engineered into the system is through the mechanism of interest, perhaps the least well understood of the basic characteristics of modern money.** Interest builds competition into the system because each loan which creates new money also creates an interest obligation in an amount for which no currency has been created. Thus the borrower is always required to repay to the bank more money than was borrowed, and there is no place in the system where that additional amount of money has been created. The borrower must obtain the additional amount by competing with others in the economy. Because all banks are operating in the same way, the system requires bankruptcy for some of its participants in order to provide others with the liquidity to repay their loans. (See box.) The way in which money is created in its relation to interest sets up systematic competition among the participants in the system, actively discouraging cooperation as a consequence.
Once upon a time, in a small village in the Outback, people used barter for all their transactions. On every market day, people walked around with chickens, eggs, hams, and breads, and engaged in prolonged negotiations among themselves to exchange what they needed. At key periods of the year, like harvests or whenever someone’s barn needed big repairs after a storm, people recalled the tradition of helping each other out that they had brought from the old country. They knew that if they had a problem someday, others would aid them in return.

One market day, a stranger with shiny black shoes and an elegant white hat came by and observed the whole process with a sardonic smile. When he saw one farmer running around to corral the six chickens he wanted to exchange for a big ham, he could not refrain from laughing. “Poor people,” he said, “so primitive.” The farmer’s wife overheard him and challenged the stranger, “Do you think you can do a better job handling chickens?” “Chickens, no,” responded the stranger, “but there is a much better way to eliminate all that hassle.” “Oh yes, how so?” asked the woman. “See that tree there?” the stranger replied. “Well, I will go wait there for one of you to bring me one large cowhide. Then have every family visit me. I’ll explain the better way.”

And so it happened. He took the cowhide, and cut perfect leather rounds in it, and put an elaborate and graceful little stamp on each round. Then he gave to each family 10 rounds, and explained that each represented the value of one chicken. “Now you can trade and bargain with the rounds instead of the unwieldy chickens,” he explained.

It made sense. Everybody was impressed with the man with the shiny shoes and inspiring hat.

“Oh, by the way,” he added after every family had received their 10 rounds, “in a year’s time, I will come back and sit under that same tree. I want you to each bring me back 11 rounds. That 11th round is a token of appreciation for the technological improvement I just made possible in your lives.” “But where will the 11th round come from?” asked the farmer with the six chickens. “You’ll see,” said the man with a reassuring smile.

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Assuming that the population and its annual production remain exactly the same during that next year, what do you think had to happen? Remember, that 11th round was never created. Therefore, bottom line, one of each 11 families will have to lose all its rounds, even if everybody managed their affairs well, in order to provide the 11th round to 10 others.

So when a storm threatened the crop of one of the families, people became less generous with their time to help bring it in before disaster struck. While it was much more convenient to exchange the rounds instead of the chickens on market days, the new game also had the unintended side effect of actively discouraging the spontaneous cooperation that was traditional in the village. Instead, the new money game was generating a systemic undertow of competition among all the participants.

The Problem of Monetary Scarcity & the Solution of Complementary Currencies

As can be seen in Figure 2, under our conventional political and economic arrangements, the liquidity in the competitive national currency needed by the
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The productivity of many of the regional economies would be greatly enhanced by reliable and sufficient liquidity. Adequate liquidity by itself would make a substantial contribution to employment security, as well as to the market driven components of education, health care, social services, and recreation. Complementary regional currencies can be designed to assure adequate liquidity in the regional economy, dampening the negative effects of the business cycle. They can also be designed to make important contributions to social services and environmental sustainability.

BUILDING SOCIAL CAPITAL WITH COMPLEMENTARY CURRENCIES
As we saw above, the conventional way to provide liquidity for community exchanges is to siphon off some national currency and/or to encourage volunteerism. While it is certainly helpful to follow these policies, there is a growing awareness that this process is unsatisfactory. Taxpayers resent the tax burden, and at the same time the public and social sectors remain starved for resources.

However, a number of groups have solved the problem of starvation of medium of exchange simply by agreeing to use a complementary means of exchange, created for specific purposes. What complementary currency systems do is foster a community exchange economy with its own non-competitive, non-scarce currency. This idea is graphically presented in Figure 3.

![Figure 3. Activation of Complementary Cooperative and Competitive economic circles](image)

In this domain, economic theory is currently behind practice. However, It should be noticed that the idea of currencies operating in complement to the national currency is not a new one. Historically, the vast majority of currencies were in fact issued by local authorities. City development during the Middle Ages and early Renaissance (Jane Jacobs) was fueled by a combination of "long-distance" trading currencies such as Saracen gold coins and royal coinage, complemented by the currency issued by local lords and cities. Precedents of complementary currencies in the U.S. have been traced back as far as colonial Massachusetts. Furthermore, at every major financial crisis, people have also resorted to creating their own currencies. Mitchell & Shafer (8) have produced a catalogue of such currencies issued in the 1930's. It includes several thousand examples.

Today, a remarkable resurgence of complementary currencies has already started, although most of it is
happening below the radar beams of the official media and academe. Figure 4 shows the number of complementary currency systems which have mushroomed in over a dozen countries over the past decade.

**Emergence of Complementary Currencies**

*Number of Local Currency Operational in 12 countries (1984-1998)*

![Chart showing the emergence of complementary currencies](chart.png)

**Different Types of Complementary Currencies**

The three complementary currency systems that are best known in the United States are Ithaca Hours, Time Dollars, and the LETSystem. Ithaca Hours was developed in Ithaca, New York, by Paul Glover, and is based on a printed currency denominated in "Hours." It is the most widely copied system in the U.S. Time Dollars is the brainchild of Edgar Cahn, a prominent Washington, D.C., lawyer. The LETSystem was developed by Michael Linton in Courtenay, British Columbia, and is a mutual credit system based on electronically recorded transactions. It is the most common system in the remainder of the English-speaking world. Ithaca Hours have a designated exchange rate of One Hour = $10 U.S., while the LETSystem uses "Green Dollars" with a 1:1 exchange rate. Time Dollars operates primarily in the social welfare arena (e.g. retirement communities and some state welfare programs) and uses an hour of service as the unit of account. The LETSystem has the advantage of being largely self-regulating, since accounts are open, and members are therefore discouraged from running up excessive debit accounts. Ithaca Hours requires a policy-making body to manage the money supply.

However, rather than make a detailed inventory country by country, what we will present here is a small
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sample of specific contemporary cases, illustrating the flexibility and the potential of the complementary currency idea. Three short case studies will be presented:

1. Curitiba, Brazil. How a mayor in a provincial capital of 2.3 million inhabitants in Brazil used complementary currencies over the past 25 years to foster an economic growth rate 40% higher than any other city in the country. He managed to finance a series of social, cultural and ecological programs which has made his city receive the award of "the most ecological city in the world" by the United Nations in 1992. All this was accomplished while keeping his municipal tax rate at the same level as the rest of the country.

2. Minneapolis HeroDollars. An on-going experiment of a complementary currency system in Minneapolis using dual smartcards to enable simultaneous payment in both dollars and complementary currency. This system is currently in pilot phase in Minnesota, and enables the mobilization of many non-profits to achieve socially responsible development.

3. Japanese Health Care Currency. This design demonstrates the possibility of using complementary currency on a functional level, rather than simply on a geographical one.

Curitiba: the Brazilian City which left the Third World

In 71, Jaime Lerner became mayor of Curitiba, the capital of the southeastern state of Paraná, Brazil. He was by profession an architect. Quite typical for the region, the urban population had mushroomed from 120,000 people in 1942 to over a million when Jaime became mayor. By 1997, the population had reached 2.3 million. Again, quite typically, the majority of these people lived in "favelas," the shanty towns made out of cardboard and corrugated metal.

One of Jaime Lerner's first big headaches was garbage. The town garbage collection trucks could not even get into the favelas because there were no streets suitable for them. As a consequence, the garbage just piled up, rodents got into it and all kinds of diseases broke out. A mountain sized mess!

Because they did not have the money to apply "normal" solutions, such as bulldozing the area to build streets, Lerner's team invented another way. Large metallic bins were placed on the streets at the edge of the favelas. The bins had big labels on them which said: glass, paper, plastics, biodegradable material and so on. They were also color coded for those who couldn't read. Anyone who brought down a garbage bag full of presorted garbage was given a bus token. For the biodegradable materials they were given a plastic chit exchangeable for a food parcel of seasonal fresh fruit and vegetables. A school-based garbage collection program also supplied the poorer students with notebooks. Soon the neighborhoods were picked clean by tens of thousands of kids, who learned quickly to distinguish even different types of plastic. The parents use the tokens to take the bus downtown, where the jobs are.

What Jaime Lerner did, from our perspective, is invent Curitiba money. His bus tokens and food chits are a form of complementary currency. His program "Garbage which is Not Garbage" could just as well have been baptized "Garbage which is Your Money."
Today, seventy percent of all Curitiba households participate in this process. The sixty-two poorer neighborhoods alone exchanged 11,000 tons of garbage for nearly a million bus tokens and 1,200 tons of food. In the past three years, more than 100 schools have traded 200 tons of garbage for 1.9 million notebooks. The paper recycling component alone saves the equivalent of 1,200 trees each day.

*Let it be clear that Lerner's team did not start off with the idea to "create a complementary currency." What happened instead is that they used an integrated systems analysis for all the major issues at hand, and spontaneously ended up creating a complementary currency to solve them.*

Nor is the garbage cycle the only form of local money in Curitiba which has resulted from this approach. For instance, another system has been designed specifically to finance the restoration of historical buildings, create green areas and social housing in a way that would not financially burden the municipality. It is called "sol criado" (literally, "created surface") and works as follows.

Like most cities Curitiba has a detailed zoning plan which specifies the number of floors that can be built in each zone. In Curitiba however, there are two standards: the normal allowable standard and the maximum level. For instance, a hotel with a ground plan of 10,000 square meters is being built in an area where the normal allowable level is 10 floors and the maximum 15. If the hotel owner wants to build 15 floors he has to "buy 50,000 square meters (5x 10,000 sq. Meters) in the 'sol criado' market." The city itself only plays the role of an intermediary matching demand with supply in that market.

But where is the supply for these sol criado surfaces generated? One source is historical buildings. For instance the "Club Italiano" owns a beautiful historic landmark building called the "Garibaldi House." The property has a total ground surface of 25,000 square meters, but the place needed a serious restoration job. The Club did not have the money to restore the building. But because it is located in an area where up to two floors of new construction could theoretically be built, it sold 50,000 square meters (2 floors x 25,000 square meters) to the highest bidder, for instance, the hotel owner mentioned above. The proceeds belong to the Club to administer, but have to be used to restore the property. Therefore the hotel owner ends up paying for restoring the historic edifice in order to obtain the right to build the extra floors of the hotel, without financial intervention from the city.

Other sources of supply for such "created surfaces" are green areas where trees are protected, and the construction of social housing in other parts of the town. Several of the more recent of the sixteen extensive nature parks, open to the public, have been completely financed in this way. The owner of a large plot of land obtained the right to develop one side of the street on the condition that the other side becomes a public park. The new housing has an extra value because it is located at walking distance from the park; the people of Curitiba have another park for their week-end strolls; and the township does not have to go into debt or raise taxes to obtain all of that. Everybody wins.

What is most interesting from our perspective is that this market for "created surfaces" is another type of specialized complementary currency, which enables Curitiba to obtain public goods for which other cities have to obtain traditional financing.
What began as a garbage and public health problem, has become a way to solve public transportation and unemployment difficulties in a uniquely innovative way. By creating the "sol criado" market system, significant public advantages are obtained at no cost to the city itself. The secret is not that this city or population has something unique, but that an integrated systems approach has created new ways to tackle the problems at hand. The net result is a city where many things run against conventional wisdom (see box).

Curitiba: Another Development Strategy

- Public transportation is encouraged over individual car usage. This is accomplished by making the public transport better and more convenient than the private variety. For example, it is speedier because of an original speed-loading process: the bus tokens enable the users to enter into specially designed raised-tube bus stops; when the bus arrives, entire sections of both the bus and the unit open so that people can move in and out in large groups in a few seconds. No time is lost collecting money or tokens. Similarly, the special express lanes for public transport have made bus use the fastest and most convenient way to move around anywhere. A single fare of .65 R$ (about 50 US cents) enables someone to move over the entire system, independently of distance covered. This includes any connections to feeder and inter-district public transport systems. The real test is that this public transport system has become the preferred way. One out of four people using public transportation own cars, but prefer not to use them to get around town. Because of the efficiency of the public transport system, it has been possible to create several downtown pedestrian streets, including the Main Boulevard. These pedestrian streets are now used for local music, popular theater performances, and children's art festivals. There are also arcades of shops and restaurants which stay open 24 hours per day and maintain the vitality of the downtown area, instead of the ghost-towns that characterize most city centers.

- Conventional city planning claims that any city with more than 1 million inhabitants must have a subway system to avoid traffic congestion. Similarly, cities that generate more than 1,000 tons of solid waste per day need expensive mechanical garbage-separation plants. Curitiba has neither. And the investment needed for their public transport system costs only 5% of an equivalent underground system. The savings has allowed Curitiba to keep its fleet of buses among the newest in the world.
There is a Free University for the Environment offering practical short courses at no cost for homemakers, building superintendents, shopkeepers and taxi-drivers. They are taught the environmental implications of their daily activities. It is a breathtaking architectural building made mostly out of recycled telephone poles, in what is now an idyllic setting near a lake. The location used to be an abandoned industrial stone mine.

Curitiba is the only town in Brazil that now has a significantly lower pollution level than in the 1950's; it has also a lower crime rate and a higher educational level than comparative Brazilian cities. It is the only city in Brazil that has actually turned down grants from the federal government, because they have solutions which involve less red tape.

A botanical garden has been planted on what was once the inner city dump, which now serves as a recreation and research center. In addition, there are currently 16 different nature parks around the city, based on different themes. As a consequence, Curitiba has 52 square meters of nature per inhabitant. The UN ideal standard is 48 square meters of green surface per city inhabitant, a level rarely, if ever, reached by cities in either the developed First or the Third World. Furthermore, all these nature parks are easily accessible from the transportation network, so that the ordinary people can - and do - fully take advantage of them.

Curitiba was recognized in 1992 by the United Nations as the model ecological town in the world. And Jaime Lerner has received international recognition for his initiatives. Some other cities have started to take notice. About 20 cities in Brazil have started to implement the integrated public transport system. Cape Town has copied several features of it. City planners from Buenos Aires, Santiago de Chile, Montreal, Prague, Mexico and Lagos have been impressed by what they saw.

Perhaps the clearest political signal that all this works is the fact that every time Jaime Lerner presented himself for election, he was reelected by a landslide! Today, he is Governor of the State of Paraná. A movement has started to draft him as next President of Brazil. The Curitiba story demonstrates that there are political careers to be made in relation to complementary currency.

Finally, the impact of the complementary systems is identifiable in economic terms. The average
Curitibano makes about 3.3 times the country's minimum salary, but his real total income is at least 30% higher than that (i.e. about 5 times the minimum salary.) This 30% difference is income directly derived in non-traditional monetary forms, such as the food for garbage systems. Another indication is that Curitiba has by far the most developed social support system in Brazil, and one of its most vibrant cultural and educational programs, and still doesn't have a higher tax rate than the rest of the country.

Even at the traditional macro-economic statistical level there are clear indications that something unusual is going on in Curitiba. The Domestic Product of Curitiba increased between 1975 and 1995 by some 75% more than the entire State of Paraná, and 48% more than Brazil as a whole. Such difference in growth rate has remained valid in the recent past: between 1993 and 1995, Curitiba's Domestic Product grew 41% faster than the State of Paraná and 70% faster than Brazil's.

Curitiba's success has attracted an internal immigration, so that the Curitibano population grew faster than the State of Paraná or the country as a whole. On a per capita basis the difference is therefore slightly less impressive, but still quite significant. Between 1980 and 1995, Curitiba's Domestic Product per capita grew 45% faster than the State of Paraná or Brazil as a whole.

Curitiba is a practical case study where 25 years of experience show that a whole system approach using both the traditional national currency and well designed complementary currencies is beneficial to everybody, including people who are focused exclusively on the traditional economy denominated in national currencies. It enabled one Third World city to join First World living standards in one generation's time.

**HeroDollars: A Complementary Currency Design by Commonweal, Inc., of Minneapolis**

Joel Hodroff, founder of Commonweal, Inc., in Minneapolis, Minnesota, has created an integrated design formally integrating the complementary and the competitive currency systems. He also has obtained impressive endorsements from the business community (including presidents of several banks and of the largest shopping mall in the country), city and labor union leaders, a county board of commissioners, community activists, technology experts, and other opinion leaders.

The Commonweal Community HeroCard system is designed as a win-win proposition for all participants. Businesses gain new customers and improve their profitability. Non-profits attract more volunteers and stretch their dollars at little cost, and earn referral fees ("cause related marketing") every time one of their members makes a purchase with HeroCard. (The initial system is a simple debit card, but the design is ideal for dual currency smartcards whenever merchants will be equipped with smartcard readers.) And, perhaps most importantly, communities have a way to mobilize otherwise underutilized human and other resources to solve their local problems.

All the pieces of the puzzle, including the technologies, are currently available and have all been successfully market-tested separately. What is new is putting them all together in an integrated design. The secret is a dual currency system, where the national currency and the complementary currency
operate simultaneously. Here is how it works.

The Concept. In the Minneapolis case, two currencies would be utilized: the normal US$ and C$D. C$D is an acronym for Community Service Dollars. Its unit of account is 1 C$D = 1 US$, and one service hour is valued at 10 C$D.

There are also two complementary organizations in the HeroCard system: one a for-profit business and the other a non-profit community economic development network. The former deals primarily with the business participants and makes its money as any credit card clearing business does, and the latter issues the C$Ds to the non-profit community of the area.

The process of C$D creation starts in the business world. Practically all businesses have spare capacity in order to be able to deal with the high seasons or hours. This spare capacity is therefore idle most of the time: movie houses in matinees, even the most popular restaurants in the earlier hours, resort hotels during week-days. Most manufacturing processes similarly lend themselves to making a few extra runs whose marginal costs are only a fraction of the normal costs. For example, furniture makers or clothing manufacturers can produce at a low marginal cost extra items of a series, and often do so. Today, in most cases this extra capacity just lies idle. The more entrepreneurial businesses try to make something extra on it by off-loading the surplus items in barter or discount deals. This is already a very common business practice in many types of businesses from hotel rooms to two-for-one dining in restaurants, from textiles to sporting goods.

In Minneapolis, businesses have an additional option: joining the Commonweal Community HeroCard program and accepting C$Ds. (For example, a restaurant could decide to accept C$D for up to 50% of the bill for any customer before 7 PM instead of the usual two-for-one early dining discount. It could choose to accept only 40% in C$D after that hour. Or a movie house could accept up to 90% in C$D during matinees because their marginal dollar cost once they project a movie is, in fact, zero for additional customers as long as seats are available.)

What C$Ds do for non-profits is to "stretch their dollars": they can now reward their volunteers with C$Ds. In addition, the participating non-profits receive a percentage of all the dollar transactions whenever their supporters or members use their HeroCard. Indeed, each card user has the option--when (s)he joins the program--to choose one or several non-profits or causes to whom an agreed percentage of the transaction fee would be credited. Such cause-related marketing has proven to be a most successful new marketing device in the past decade.

One important feature of the Minneapolis approach is that after a C$D has been redeemed in a business, it disappears (in this aspect C$Ds are similar to frequent-flyer miles or discount coupons). New C$D are then issued to reward new community service. This limits the problems that can arise in decisions of quantities of money to be issued, given that they automatically self-destruct after each use.

The Process. An example may be helpful. Peggy is a systems analyst with one of the banks in
Minneapolis, and just loves to be around young children. She has joined a computer literacy training program for children of the poorer area in town, organized by her Church, and for which she is paid completely in C$D. (In later stages of the program, for someone who does not have a dollar-based job like Peggy's, the conditions may be 50% in US$ and 50% in C$D, for instance.) When she joined the program, she also decided to become a supporter of several non-profits (cause related marketing).

She decides to take her boyfriend out to Eddie's Restaurant. She pays with her HeroCard, and her boyfriend won't even know whether she is paying in dollars or C$D or both. In fact, as it is a weekday after 7 PM, the breakdown of the transaction with a total value of US$25 works out as US$15 and 10 C$D. When the cashier slides Peggy's HeroCard through the point-of-sale terminal, a confirmation code indicates that she has sufficient cash and C$Ds to cover the transaction, and the system automatically debits each account accordingly. This is what happens to the balances of all the participants:

<table>
<thead>
<tr>
<th>Participant</th>
<th>US$</th>
<th>C$D (in US$ equivalents)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eddie's Restaurant</td>
<td>13.75</td>
<td>10.00</td>
<td></td>
</tr>
<tr>
<td>Peggy's causes (non-profits)</td>
<td>00.75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Currency Exchange Network</td>
<td>00.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peggy's total bill</td>
<td>15.00</td>
<td>10.00</td>
<td>25.00</td>
</tr>
</tbody>
</table>

Or Peggy may decide she doesn't need the C$D income (i.e. she wants to be totally volunteer in her project), in which case she can give them to other people or organizations which she thinks could benefit from them. This possibility of "double giving"--like in the Japanese Health Care currency System (below)--ensures that volunteerism is even more encouraged.

The Many Advantages of the Dual-Currency Approach. From the participating businesses' viewpoint, it is very effective marketing, because it increases new customer traffic and loyalty without having to cannibalize their normal dollar-based clients. Businesses get clients they would not get without this system, and they still make a dollar profit on each transaction (because the dollar component should always more than cover the marginal dollar costs, including taxes). And there is an additional advantage: customer loyalty and the label of good "community supporter." Finally, there is an improvement in the neighborhoods where services are provided that otherwise would not occur, which is good for business overall.

Non-profit organizations are also among the big winners in this new game. They can increase their volunteer activities with the same dollar-base. Not only do they receive C$Ds at no cost from the Commonweal system, they also obtain a continuous dollar and C$D income from their members and supporters via the cause-related marketing aspect. The community involvement in the selection and allocation of C$D also gives the more active non-profits wider recognition. Finally, the overall quantity...
of volunteer time given increases when community giving receives more visibility.

Individual members who participate have an easier way to blend their two life-styles together. Those who choose to do so can have their jobs and their volunteer service work. Their service contributions are more acknowledged than before, and the general improvements in the quality of their community also benefit them.

For the unemployed and economically disadvantaged, this system enables people to turn time into money. Economically disadvantaged people can therefore more fully participate in the economic system, as they are typically those who have more time than money to spend. It therefore increases their earning power significantly. It also provides them with a second career chance in the non-profit world which would otherwise not exist. The discreet nature of the payment system (nobody but themselves has to know whether they are paying in dollars or C$D) also ensures more dignity than food stamps or social security checks. It is also free of the hassles of these bureaucratic programs.

The rest of the community also benefits. Even people who do not want to participate at all in any part of the system derive a significant benefit from this approach. If the Commonweal program did not exist, a number of functions in their community would either not happen at all or would have to be subsidized by their taxes. What the Commonweal system offers is a way to mobilize otherwise unused resources in the community to solve problems that need solving. It does this using the market system every step of the way without taxes.

An Alternative to Welfare?

Sometimes when confronted with this novel way to solve social problems, some people think it is just another new form of welfare. This is really a carry-over from the single-currency environments, and is not valid for complementary currency systems. Welfare is a system that intervenes in the market system to transfer resources from the rich to the poor. This is typically done by taxing the rich in order to provide an income to the poor. Complementary currencies such as C$D are, therefore, not a new form of welfare. C$D use the market system every step of the way. It is voluntary for everyone; it does not require taxes or government subsidies; and--once started--becomes a completely self-funding mechanism to address many social problems.

Complementary currencies could someday replace welfare systems, or make some of them unnecessary, but they are not a form of welfare themselves.

Japanese Health Care Currency

The Japanese population is the fastest aging one of the entire developed world. There are already 800,000 retired people needing periodic help and another one million handicapped people, and the Japanese Ministry of Health forecasts a vast increase in these numbers for the foreseeable future.
In order to face this rapidly rising problem, the Japanese have implemented a new type of Health Care Currency. In Japanese, the currency is called *Hureai Kippu*, which translates literally as "Caring Relationship Tickets." It began in 1991, and there are currently around 300 systems in operation. In this system, the hours that a volunteer spends helping older or handicapped persons in their daily routines is credited to that volunteer's "Time Account." This Time Account is managed exactly as a savings account, except that the unit of account is hours of service instead of Yen. Different values apply to different kinds of tasks. For instance, a meal served between 9 a.m. and 5 p.m. has a lower credit value than those served outside that time slot; household chores and shopping have a lower credit value than personal body care.

*These Health Care Credits are guaranteed to be available to the volunteers themselves, or to someone else of their choice, within or outside of the family, whenever they may need similar help.* The local and national government has set up a nation-wide electronic clearing network, so that someone can provide help in Tokyo, while the time credits become available to his parents anywhere else in the country. Many people just volunteer the work and hope they will never need it. Their Time Account Credits complement their normal health insurance programs. Others not only volunteer, but also give their Time Credits away to people who they think need them. To them, it amounts to doubling their time. It works like a matching grant: for every credit hour of service, the amount of care provided to society is two hours.

*Most significantly, this type of service is also preferred by the elderly themselves, because the caring quality of the service turns out to be higher than those obtained from Yen-paid social service workers.* It also provides a more comfortable emotional space for the elderly, who would otherwise be embarrassed to ask for free services.

The Japanese also report a significant increase in volunteer help, even by people who do not bother to open their own Time Accounts. The reason may be that there is a better overall community atmosphere, which promotes the idea of taking care of each other. Maybe with this system, all volunteers feel more acknowledged. Whatever the reason, this precedent should put to rest concerns that paying volunteers with complementary currency might inhibit those not getting paid in national currency from volunteering.

In summary, the Japanese Health Care Currency has proven both more cost effective and compassionate than the system which prevails in the West. As the US and Europe embark on an identical trend of an aging population, why not learn from the Japanese experience?

**CONCLUSION**

In this chapter, we have examined the critical importance of economic sectors based on the resources, particularly the human resources, of the metropolitan bioregion. These sectors include education, health care, and the management of natural resources. The health of these sectors must be attended to if the full promise of the global trade economy is to be realized.
Furthermore, we have explored the importance of liquidity in assuring the health of regional economies and discussed a number of ways that complementary currencies created on new design principles can make a vital contribution to the economic health of bioregions.

We have looked at specific systems where complementary currencies have been able to deal with ecological systems management (Curitiba), build up social capital (Minneapolis), and resolve specific social issues that conventional national currency has trouble dealing with (Japan). In other cases, for example New Zealand, it has been shown that complementary currencies can alleviate unemployment and thus reduce pressure on the central bank to inflate national currency. In each of these cases, practice is ahead of conventional economic theory.

We hope that we have shown that a theoretical approach that recognizes the specific whole system properties of the economies of metropolitan bioregions, coupled with a conscious approach to the possibilities of the design of money systems, can open up new horizons for solving the social and ecological problems that are inevitable in a rapidly globalizing economy.

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