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Hwa A. Lim, and Da.Hsuan Feng, "A global economy without a global government", *VERIZONTAL*, 7(1), 2000.

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A Global Economy without a Global Government

Hwa A. Lim

Ph.D., MBA, MA [USA], B.Sc. (Honors), ARCS [UK]

D'Trends, Inc.

2570 San Ramon Valley Boulevard, A203

San Ramon, California 94583-1673

USA

<http://www.d-trends.com>

hal@d-trends.com

&

DaHsuan Feng

Ph.D., B.S.

Science Applications International Corporation

1100 First Avenue, Suite 300

King of Prussia, PA 19406

DA.HSUAN.FENG@saic.com

(January 15, 2000)

0. ABSTRACT	2
1. INTRODUCTION	2
2. INDUSTRIAL REVOLUTION	2
3. THE NEW ECONOMY ORDER - THE CHESS GAME	5
3.1. THE NEW WORLD ORDER (NWO) - THE CHESS BOARD	6
3.2. THE NEW COUNTRY ORDER - THE CHESS SQUARES	6
3.3. THE NEW GOVERNMENT ORDER - THE CHESS PIECES	7
3.4. THE NEW COMPANY ORDER - THE CHESS PLAYERS	8
3.5. THE NEW PROFESSIONAL ORDER - THE CHESS PAWNS	8
4. THE RULE OF THE GAME.....	9
5. THE STRATEGY OF THE GAME	10
5.1. BREAKTHROUGH DISEQUILIBRIUM.....	10
5.2. SOCIOLOGICAL DISEQUILIBRIUM.....	11
5.3. DEVELOPMENTAL DISEQUILIBRIUM.....	12
5.3.1. China.....	13
6. EDUCATION: THE FUNDAMENTAL BUILDING BLOCK OF A STRONGLY INTERACTIVE GLOBAL KNOWLEDGE ECONOMY	14
7. DISCUSSION AND CONCLUSION.....	14
8. REFERENCES	15
9. ABOUT THE AUTHOR	17
10. ABOUT VERIZONTAL PUBLICATIONS.....	18

0. Abstract

Three globalization factors are hastening in the globalization of trade. These factors are

1. Advances in computer and communications technology permit an increase flow of idea and information across border,
2. The progressive reduction of barriers to investment and trade by most governments, and
3. The trend toward the unification and socialization of the global community because of preferential trading arrangements.

The first factor leads to a reduction of geopolitical barriers. The second factor leads to mobility of workforce among trading nations, and the third factor encourages transfer of technology. The globalization of trade has led to a global economy. However, there is as yet not a global government to manage the new global economy. Despite this, entrepreneurs can still benefit from breakthrough-, social-, and developmental-disequilibrium to make a fortune.

1. INTRODUCTION

There is an anecdote that has been circulated in the business community which describes a US shoe manager who sends a shoe salesperson to a remote island to survey the shoe market. A few days later, the salesperson phones the manager and reports that there is no business opportunity on the island because no one there wears shoes. Disappointed, the manager waits for a few months when he dispatches another salesperson to the same island to do similar prospecting. A few days later, the second salesperson phones back and exuberantly reports great opportunity there. When questioned why, he responds, "No one on the island is wearing shoes now. The whole market is ours!"

One can interpret this anecdote in the following way. The first is that the first salesperson views the situation as a half-empty glass, while the second more optimistic salesperson sees the situation as a half-full glass. As we will see later, this is not the only inference.

In the anecdote, we used the international nature of the trade. We also used shoes as a commodity example. The two regions could have been any two, and the commodity any high-tech, low-tech merchandize or services. We shall have many opportunities to return to this anecdote later. But let us begin with some historical perspectives so that we can cast the anecdote into its proper character in the present global economy theatre.

2. INDUSTRIAL REVOLUTION

By the end of the eighteenth and the beginning of the nineteenth century, the Industrial Revolution brought eight thousand years of agricultural wealth creation to an end. Agricultural activities, which had been the sole economic activity for 98 percent of the population in the eighteenth century, are now the sole source of income for less than 2 percent of the US population [1].

At the onset of the Industrial Revolution, the steam engine opened up opportunities previously impossible, and it made many of what Leonardo da Vinci scripted on paper a reality. A hundred years later, at the end of the nineteenth century and the beginning of the twentieth century, electricity (and through systematic industrial research and development (R&D)) created the Second Industrial Revolution. Night literally turned into day. Older industries were transformed (e.g. steam trains became electric trains and subways in inner cities) and new industries emerged: telephony, television, movies, auto industry, etc. This spelled the demise of local economies, to be replaced rapidly (compare to pre-industrial revolution time scale) national economies.

Half a century later, World War II provided added incentive for many technological breakthroughs. Radar technology, for example, was perfected at MIT labs. The Manhattan Project, at a cost of \$2 billion, built from scratch in less than five years the first atomic bomb, a source of limitless energy in the service of peace and industrial progress. In 1945, ENIAC, the world's first large-scale electronic computer, comprised mainly of thermionic tubes, was completed at University of Pennsylvania. Three years later, the invention of transistors increased the calculating power of computers, invented just a few years before that in the University of Pennsylvania, by a million-fold to usher in the electronic age, the beginning of the Third Industrial Revolution, which we shall refer to as the Information Revolution. Chart 1 chronicles computer technology development at one of our best national laboratories, the Los Alamos National Laboratory (LANL) [2].

In the late 1970s, the Information Revolution developed sluggishly until the 1990s. A fundamental reason for this was that, except in rare cases (especially in the defense arena), computers were essentially stand-alone systems. In the early 1990s, with network becoming a civilian entity, information and knowledge economy literally exploded globally into its present form. With this global connectivity landscape, microelectronics, computers, telecommunications, designer materials, robotics, and biotechnology are transforming all facets of life, both what we do and how we do it. Indeed, one could literally see and feel the improvement of the quality of life. For example, biotechnology is changing the characteristics of life itself. Genetic diseases do not have to be accepted. New plants and animals with different characteristics are being developed [3]. Living in remote parts of the country does not equate with substandard educational opportunities or healthcare.

So far, our discussion concentrates primarily on historical developments in the US. There are also breakthrough developments in other parts of the world, especially Europe. We note however that the industrial economy lasted for slightly less than two centuries (1760s to 1950s) globally, with ninety years (1860s to 1950s) in the United States. We are probably seeing the current information economy halfway through its seven- or eight- decade life span [4]. Table 1 shows that the US is the leading exporter of high-tech products in 1999 and the leading investor in high-tech worldwide [5].

Table 1a. Leading US export market worldwide, 1999. Source: US Bureau of the Census, compiled by Global Trade Information Services, US Bureau of Economic Services.

FOREIGN COUNTRIES	In billions
Canada	\$29.3

Mexico	\$21.9
Japan	\$16.1
United Kingdom	\$10.8
South Korea	\$9.9
Germany	\$8.6
Netherlands	\$7.5
Singapore	\$7.4
Taiwan	\$7.3
Malaysia	\$6.2

Table 1b. Leading US electronics manufacturers' investment destinations worldwide, 1998. Source: US Bureau of the Census, compiled by Global Trade Information Services, US Bureau of Economic Services.

FOREIGN COUNTRIES	In billions
United Kingdom	\$12.0
Singapore	\$7.5
Japan	\$5.6
Canada	\$5.2
Germany	\$4.5
Brazil	\$3.6
Malaysia	\$3.4
France	\$3.3
Italy	\$3.1
Netherlands	\$2.9

1943-45: Desktop calculators and punched-card accounting machines are used as calculating tools in the Manhattan Project.

1945: ENIAC, the world's first large-scale electronic computer, is completed at the University of Pennsylvania. Its shake-down calculation is used for thermonuclear weapons at the Los Alamos National Laboratory (LANL).

1949: IBM's first Card Programmable Calculators.

1952: MANIAC is built at LANL under Nick Metropolis. This is the first computer designed according to von Neumann's stored-program idea.

1953: Serial 2 IBM 701, which is comparable in power to MANIAC, is installed at LANL.

1955: The MANIAC II project, a computer with floating point arithmetic, is initiated.

1956: MANIAC II is completed. Serial I IBM 704, comparable in power with MANIAC II is installed at LANL.

Late 1050s: LANL enters into a joint project to build STRETCH, a computer based on transistors rather than vacuum tubes, to meet the needs of nuclear-weapons program.

1961: STRETCH is completed. It is about 35 times as powerful as IBM 704.

1966: The first online mass-storage with a capacity of 10^{12} bits, the IBM 1360 Photo Store. Control Data Corporation (CDC) introduces the first pipelined computer, CDC 6600, designed by Seymour Cray.

1971: CDC introduces CDC 7600, successor to CDC 6600. These are supercomputers of these years.

1972: Cray Research, Inc. is founded.

1976: Serial 1 of Cray-1 is delivered to LANL.

1977: A Common File System, composed of IBM mass-storage components, makes it possible to store data for local and remote computer systems.

1980: Parallel processing efforts begin at LANL.

1981: An early parallel processor (PuPS) is fabricated at LANL, but never completed.

1983: Denelcor's HEP, an early commercially available parallel process, and Cray X-MP are installed at LANL.

1985: The Ultra High Speed Graphics Project is started. It pioneers animation as a visualization tool and requires gigabit-per-second communication capacity. A massively parallel (128-node) Intel computer does the trick.

1987: The need for higher communication capacity is met by the development of the High performance Parallel Interface (HIPPI), an 800-megabit/second channel, which becomes an ANSI standard.

1988: Cray Y-MP comes into being and is installed at LANL.

1989: Thinking Machines' CM-2 Connection Machine is installed at LANL. It has 65,536 parallel processors.

1990: A test device for HIPPI ports is transferred to industry. LANL, the Jet Propulsion Lab (JPL) and the San Diego Supercomputer Center (SDSC) start the Casa Gigabit Test Project.

1992: A 1024-processor Thinking Machines CM-5, the most powerful computer at the time, is installed at LANL.

1994: A massively parallel Cray T3D is installed at LANL for collaborations with industry.

Chart 1. History of computers and supercomputers. This chart is derived from a Los Alamos National Laboratory publication, Los Alamos Science [1], which keeps a good record of computer development at the Lab.

3. THE NEW ECONOMY ORDER - THE CHESS GAME

During the Agrarian economy, the community was primarily self-sufficient with limited commerce through barter trade. Later local economies began to debut. Using money as a legal tender, local economies persisted into the First Industrial Revolution.

With the dawn of the Second Industrial revolution, local businesses became national businesses and the economy also shifted from local to national. The US and most of the world spent the first half of the twentieth century to make national economies work. A national currency was needed. The Federal Reserve was established in 1913. Companies rapidly developed an understanding that more money could be made from monopolies and restricting output. This of course prompted the enactment of anti-trust laws to control monopolistic tendencies of new national corporations. Standard Oil was broken up in 1911.

The searing experience of the Great Depression taught the Americans that unfettered financial market could implode and could bring down the economy. In response to the economic tailspin, the Securities and Exchange Commission (SEC) was established to guard against insider trading and phony bookkeeping. Perhaps the most far-reaching consequence of SEC was that the consumers have the perception that banks are not allowed to default on depositors, which created an unprecedented level of confidence of such financial institutions. To ensure economic growth and continued prosperity, deposits were insured by the Federal Deposit Insurance Corporation (FDIC), even to this day! (This only pertains to federally insured financial institutions.)

But why global economy? There are at least three intertwined forces that are the leading causes to transform national economies into global economies [6]:

1. Rapid advances and deployment of computing and communications technologies are permitting an increased flow of ideas and information across disparate communities, state and national borders.

2. The progressive reduction of barriers to investment and trade by most governments are hastening global trade.
3. The unification and socialization of the global community is a growing trend because of preferential trading arrangements. An example is the North America Free Trade Agreement (NAFTA).

With this, the way is paved for a discussion of participants of this new economic order.

3.1. THE NEW WORLD ORDER (NWO) - THE CHESS BOARD

In the twentieth century, with local economies replacing national economies, national governments gained power. National governments were by necessity given power to control national economic systems. With the onset of the global economy, this process is reversed. By the nature of the global economy, national governments begin to lose their powers to control the economic system. In fact, nationalism is losing its intrinsic meaning. After all, the definition of what a country is, when countries are unable to chart their geographical and economic borders, is *de facto* diminished. A perfect example of this is pornography. Obviously, pornography which is produced electronically somewhere in the world where it is not illegal, can be accessed anywhere else in the world.

As the scope, reach, and powers of national governments shrink, the role of global entities, whether they are companies or educational institutions (lower or higher) expands. In fact, it is not beyond the realm of possibility that such entities can play countries off against each other. For example, a global company may locate its plants in countries that will give them the best deal in terms of cash payment, cost subsidies, and tax reductions. The company competes for market share and control of engines that drive the cost curve down and consumer benefits up. To become a fully integrated, networked, and truly global corporation of the future, its participation overseas may be a requirement.

3.2. THE NEW COUNTRY ORDER - THE CHESS SQUARES

Countries themselves are put into play. Many countries, which were caught in political or economic turmoil and fueled by the initial phase of the information revolution, essentially have disintegrated. For example, 15 republics emerged from the Former Soviet Union. Czechoslovakia divided into two. Yugoslavia became five. Scotland is almost independent from the British. Indonesia is unlikely to stay as one nation of many islands (East Timor is seeking independence). Africa is likely to be the next hot spot. Ten thousand different ethnic groups are not going to live together forever in about fifty countries carved out by the accidental meetings of the British, Dutch, French and Portuguese armies in the nineteenth century. China, with nearly 1.3 billion people and 56 ethnicities, is the world's most populous country in the history of mankind, and has for thousands of years remained a single entity. Maintaining its integrity in this new global interactive technological landscape is a challenge.

Perhaps the most startling example of the power of this information technology is the creation of “virtual” nations. For example, eleven European countries, with unwaned cultural heritages, have become a “virtual” single country, the European Economic Union (EEU). Countries with their own currencies in this Union are not completely independent. The remaining four countries of the Former Western Europe will join soon, while a few other Former Eastern Bloc countries are knocking on the door to try to join in the Union.

Geographically adjacent countries come together to form free trade zones. Some examples are the European Free Trade Association (EFTA) and European Economic Area (EEA), Association of Southeast Asian Nations (ASEAN), African Trade Agreements (AFA), North American Free Trade Agreement (NAFTA).

3.3. THE NEW GOVERNMENT ORDER - THE CHESS PIECES

Just as the Second Industrial Revolution moved us from local to national economies, the Third Industrial Revolution and Information Revolution have moved us from national to global economy [6]. History has taught us that the transition from local to national economy took a substantial amount of time. The transition from national to global economy is already full of surprises. When transitioning from a local to a national economy, the world had its national governments ready to learn how to manage the process. In contrast, there is no global government to learn how to manage the new global economy. The existing international institutions- International Monetary Fund (IMF), the World Bank (WB), the United Nations (UN), the World Trade Organization (WTO) - are not designed to deal with a global highly interactive knowledge-based economy. The IMF is designed to deal with temporary balance of payments problems such as the bailouts of the Mexican pesos, or the recent Pacific Rim crisis, particularly Indonesia and Korea. The World Bank is meant to finance basic infrastructure projects in developing countries such as the Three Gorges Dam of China. The UN is designed to stop wars such as the Kosovo conflict. And the WTO is designed to ensure free trade among nations. All of these "international" organizations, at best, are designed to be instruments of existing national governments. None of these "international" organizations can determine what a national government must or must not do. Quite the reverse, national governments tell these organizations what they must do. The recalcitrant case of China's entry into WTO is a striking example [7].

A logical answer will be global institutions that could (note use of could) give orders directly, without needing the permission of national governments to act or having to work through existing governments. This of course is not going to happen. By nature of its brilliantly set up mission in the 1700s, the US Congress, and indeed the U.S. Government in general, with its three nearly independent verticals, is unlikely to approve anything supranational. The US has veto power to ensure such organizations will not do anything its citizens disapprove. The same can be said of the Chinese, Russians or any other major powers within the UN.

In short, no national government is going to set up a global government in the foreseeable future. As a result, the world will have to “make do” with a global economy without a global government. This is tantamount to a global economy with no enforceable, agreed-upon set of

rules and regulations, no sheriff to enforce codes of acceptable behavior, and no judges or juries to appeal to if one feels that justice is not served.

3.4. THE NEW COMPANY ORDER - THE CHESS PLAYERS

But companies, like countries, are also in play. Merger activity (\$2.4 trillion in 1998) is five times as great as it was in 1990, and 50 percent greater than it was in the previous record high year of 1997 [8]. Mercedes bought Chrysler, Deutsche Bank bought Bank Trust, Nations Bank bought Bank of America... and more recently, AOL acquired Time Warner [9], GlaxoWellcome acquired SmithKline Beecham [10]... Table 2 lists the top ten mega-mergers in the first two months of year 2000 alone!

The emerging global companies are larger than any national companies have ever seen. The market value of the world's largest company in 1990, a national company, Nippon telephone, would not be close to large enough to make it to the 1998 list of top ten largest companies in the world.

Table 2. Top 10 mergers in the first two months of 2000. Source: Mergerstat.

Announced	Buyer	Buyer City	Seller	Seller City	Deal Size (M)
Jan 10	American Online	Dulles, Va	Time Warner Inc	New York	\$165,937.55
Mar 7	VeriSign	Mountain View	Network Solutior	Herndon, Va	\$17,779.00
Jan 17	JDS Uniphase	San Jose	E-Tek Dynamics	San Jose	\$14,247.74
Feb 29	Cap Gemini	Paris	Ernst & Young	New York	\$11,197.15
Jan 18	El Paso Energy	Houston	Coastal Corp	Houston	\$9,754.34
Feb 17	UPM-Kymmene Oyj.	Helsinki	Champion Int'l Corp.	Stamford, Ct	\$6,381.87
Feb 29	TeleCorp PCS	Arlington, Tx	Tritel Inc.	Jackson, Ms	\$5,154.29
Feb 23	MGM Grand	Las Vegas	Mirage Resort	Las Vegas	\$4,057.09
Feb 22	Stora Enso Oyj.	Helsinki	Consolidated Papers Inc.	Wisconsin Rapids	\$3,993.54
Jan 13	Boeing Co.	Seattle	General Motors	Detroit	\$3,750.00

At the same time, slice and dice is the name of the game. Siemens sold off its non-core activities. Royal Dutch Shell has sold off 40 percent of its chemical operations. Network Solutions, a URL registration giant, which used to be wholly owned by Science Applications International Corporation, was sold to VeriSign Inc... Workers go to bed working for one company waking up working for another. The seemingly very prominent Amazon.com is running in the red [11] and may not have enough cash to operate the entire year of 2000. In its reorganization attempt to face the global economy and to empower managers around the world, the world's most recognized brand, Coca-Cola is slashing 6,000 jobs, the biggest lay-off in its 113-year history [12].

3.5. THE NEW PROFESSIONAL ORDER - THE CHESS PAWNS

In the First and Second Industrial Revolutions, workers were leaving agriculture (low-wage sector) and entering manufacturing and mining (high-wage sector). In the Third Industrial

Revolution and Information Revolution, workers are leaving manufacturing and mining (high-wage sector) and entering services (a generally low-wage sector with a wide dispersion of wages, see Table 3 [13]). Like other resources that produce goods and services, the demand for labor resources is a derived demand in the sense that companies looking for labor do not value the labor resource itself, but rather the human resource's ability to produce profitable products.

Table 3. A new study released found that the income gap widening between the richest fifth and the poorest fifth of American families. Following is a list of the 10 states with the biggest gaps between rich and poor. Source: The Economic Policy Institute and the Center on Budget and Policy Priorities.

STATES	Richest 5 th	Poorest 5 th	Ratio - Rich:Poor
1. New York	\$152,349	\$10,768	14:1
2. Arizona	\$141,190	\$10,801	13:1
3. New Mexico	\$111,295	\$8,720	13:1
4. Louisiana	\$111,441	\$9,289	12:1
5. California	\$146,066	\$12,239	12:1
6. Rhode Island	\$160,176	\$13,527	12:1
7. Texas	\$130,302	\$11,200	12:1
8. Oregon	\$144,300	\$12,902	11:1
9. Kentucky	\$125,797	\$11,365	11:1
10. Virginia	\$151,117	\$14,141	11:1
United States	\$137,480	\$12,990	11:1

With both countries and companies concept in flux, how does an individual - the pawn of the chess game - play in the economic game with some degree of success and security? Whose team is the pawn on? The nation (chess square) and the employer (chess players) are losing both the ability and the willingness to help the pawns. How should the game be played?

4. THE RULE OF THE GAME

With the Information Revolution, data that had once been dispersed to cubbyholes and file drawers now wend their way as patterns of electronic impulses into vast databases, where by virtue of their comprehensive nature and instant cross-accessibility, they become commodities more valuable than the sum of their individual parts. This brings about a sweeping change in the character of information (and knowledge). It has passed from being an instrument through which we acquire and manage other information to being a primary knowledge and most importantly, a primary asset itself [14]. As a result, we are seeing private enterprises carving out their own information domains in much the same way that pioneers and explorers homesteaded new territories, which some refer to as "cowboy capitalism". The laws of cyberspace are wanting [15], reminiscent of the days of high-sea piracy. The real conflict arises from geopolitical boundaries, which information ignores; and electronic boundaries, which have no geopolitical counterparts! Intellectual property only offers legal control over the creative productivity of the human brain, but the technical boundaries between what can be maintained under personal or professional control and what may be freely circulated for others to capture and manipulate are not yet clearly defined.

Consequently, the long-standing tradition of "each generation standing upon the shoulders of previous generations" is no longer tenable because of the tendency to patent, copyright or license everything, be it most insignificant! Software professionals work in a myriad of small, medium and large software companies that rely for their financial health, if not their very survival, on the reactions of the market to their inventions. Traditionally, scientists competed in a very different environment. They were nurtured in research institutes and university laboratories, where in a tenured position, salaries were more or less assured and professional rewards and recognition were meted out through an elaborate system that included literature citations, research grants and prizes. The current generation of new scientists is more likely to be more entrepreneurial-minded, or to be reduced to making obsequious gestures toward those who hold the purse strings on their research. Notwithstanding, the academic sector can still be the nidus of creativity, while the private sector is always on the *qui vive* to look out for marketable innovations [14].

5. THE STRATEGY OF THE GAME

The strategy to excel in this environment is to create a disequilibrium. Whenever there is a change, a disequilibrium follows. Disequilibrium conditions create high-return, high-growth opportunities. The winners understand the new situations, are lucky enough to be in the right place at the right time, and have the skills to take advantage of these new situations. They become rich.

Some of the disequilibriums may be significant enough to cause a paradigm shift. For example, the Internet has such a great impact on our daily life that it changes forever the way we communicate and make purchases, among many others. There are three known categories of disequilibriums: breakthrough-, sociological-, and developmental-disequilibrium [1].

5.1. BREAKTHROUGH DISEQUILIBRIUM

This category of disequilibrium situation depends on radical changes in technology and it causes a paradigm shift. For example, in 1996/1997, the Web browser was introduced into the market. Netscape Navigator captured more than 80 percent of the market share. In the high-tech parlance of gorilla-chimpanzee-monkey terminology from Jeff Tarter, a software industry analyst and the editor of *SoftLetter*, it made itself a gorilla in this game [16]. Microsoft, playing the role of a monkey, made a strategic response by introducing the Internet Explorer, a clone of the Navigator. By so doing, it was able to co-opt the very market Netscape was creating. Playing the Microsoft Windows operating system to its advantage, Microsoft managed to capture a huge market share, and the rest is history. Table 4 is a listing of the fifteen most popular websites in the month of February 2000.

Table 4. Top 15 web properties in February 2000. Source: Media Metrix.

Names	Number of Unique Visitors
1. American Online	57,601,000
2. Yahoo	45,488,000
3. Microsoft	44,007,000

4. Lycos	31,572,000
5. ExciteAtHome	30,191,000
6. Go Network	21,297,000
7. NBC Internet	16,464,000
8. Amazon	14,463,000
9. Time Warner Online	13,798,000
10. About.com	12,966,000
11. Go2Net.Network	12,874,000
12. Real.com Network	12,754,000
13. AltaVista Network	12,316,000
14. eBay	11,826,000
15. Ask Jeeves	11,168,000

This category of disequilibrium normally arises from two sectors. The first is the public sector. The US government is investing a lot of funds in terms of grants in universities, research institutes, and classified centers for basic research. For example, the Internet came into being about a quarter of a century ago as a successor to ARPANET, a US military network disguised to provide networking capabilities with a high redundancy. The principle behind the project has remained unchanged and has proven very powerful: to have every computer potentially talk to each other, regardless of what platform or what network path the communication actually takes.

The Internet has created such a great market that on Monday, March 27, 2000, Cisco, the biggest maker of equipment to direct bits of data on the Internet and similar network, finished trading on NASDAQ with a stock value of US\$555 billion. This surpassed US\$542 billion for Microsoft, thus claiming itself the world's most valuable company overtaking Microsoft [17].

The second comes from the private sector. For example, we hear almost daily the private sector announcements of new breakthroughs in biotechnological research [3]: green revolution (agriculture), blue revolution (aquaculture), pharming of genetically altered herds to produce pharmaceutical products, and fabrication of human organs....

In 1987 when one of us, the founder of D'Trends [18], Hwa A. Lim, first introduced bioinformatics, a special niche of information technology, the work was funded by the US federal government [19,20]. Since 1996, the work has become a mainstream area in both the public and private sectors [21-36]: derivatives (such as chem-informatics, medical-informatics, and health-informatics) and other new sub-areas such as DNA chip, pharmacogenomics (individualized medicine), proteomics have come into being.

5.2. SOCIOLOGICAL DISEQUILIBRIUM

Sometimes entrepreneurs can create a disequilibrium by seeking sociological opportunities to change social habits. There are several forms of social disequilibrium.

One form of disequilibrium has its root in work habits. For example, Starbucks manages to persuade the Americans to replace a 75¢-cup of coffee bought at a local restaurant with a \$3.00-cup of gourmet coffee bought at a coffee bar. They make a competitive commodity with widely

distributed points of sale out of which no one makes much money into a noncompetitive differentiated product, thus creating a rapidly growing industry with high rates of return. Other cafes offering their services in the Silicon Valley of California realize that computer programmers tend to try to get away from their monotonous routine workstations and gather at cafes for cross fertilization of ideas. These cyber cafes prosper and their franchises spring up all over.

Another form of disequilibrium arises from social demographics. Cruise lines are such an example. These entrepreneurs notice the relative purchasing power of the elderly has doubled in the last quarter of century. Twenty years ago, the seventy-year-olds had cash incomes 40 percent below those of thirty-year-olds. In recent years, they have cash incomes 20 percent above those of thirty-year-olds. This creates a situation in which they have more disposable incomes. Cruise, a technology known since antiquity, is the perfect vacation for the elderly. The elderly are not as mobile. The cruise lines move them, and they just sit back and enjoy the scenic views, dine, dance or be entertained.

Yet another form of disequilibrium is a consequence of human behavior (vanity and ego in this case). For example, frustrated at the failure to come up with new cures, the pharmaceutical industry is forced to look elsewhere for profitable markets. This explains the rise of the so-called "lifestyle" drugs whose prime function is to restore social faculties or attributes that tend to diminish with age: Rogaine for the treatment of baldness, Xenical for obesity, Prozac for depression, Viagra for male impotence. Botox for migraines is now also marketed as a wrinkle reducer. The secondary function of finasteride, scientifically designed to block the metabolism of testosterone to shrink the size of prostate, is now marketed under Propecia for hair loss.

Many of the dot.com guys exploit social disequilibrium created by networking. They vertically segment their Web sites along ethnic groups (Latino.com, Sino.com, etc.), horizontally dissect along age groups (kids.com, parents.com), horizontally dissect along income lines (Autotrader.com, eTrade, eBay), or create a niche (WebMD.com, wine.com)

The Hospitals, Universities, Business and Science (HUBS) project of the Four States (Delaware, Maryland, New Jersey and Pennsylvania), funded so far by the Department of Defense and the Department of Education, managed by Science Applications International Corporation (SAIC), is an example of a project that is trying to create a smart region to bridge the digital divide which is growing by the day [37].

5.3. DEVELOPMENTAL DISEQUILIBRIUM

A third category of disequilibrium is developmental or copycat disequilibrium. We cite earlier the Internet Explorer is a copycat (clone) of Netscape Navigator. Microsoft, who had monopoly in PC operating system, was well positioned to exploit this disequilibrium. It quickly penetrated the market at the expense of the then industrial leader Netscape.

Opportunities arising from developmental disequilibrium also exist whenever there are countries at different income levels. Entrepreneurs can then replicate the activities of the developed world in the developing or underdeveloped world.

5.3.1. China

Shenzhen, a metropolitan grew practically overnight right across the intra-Chinese border from Hong Kong ("intra" since HK is now part of China) provides a striking example. What are commodity operations with low rates of return and low growth prospect in the developed world are high-return, high-growth opportunities in China. The business skills consist of being good at replicating and knowing the exact time when Mainland Chinese conditions are ripe for the movement of a particular activity.

Because of the increase in education level, income, supporting infrastructure and government, entrepreneurs can be highly profitable simply by moving first world normal activities (activities for which the demand increases as consumer income increases) [38] into geographical areas where they have not previously existed. This explains why there is an explosion of billionaires in Asia. These billionaires are experts at replicating.

The spectacular growth in the past quarter of a century has propelled China into a status what the New World meant for Europe several centuries ago: a huge new land of dynamic growth, possibility, and profit [39-42]. In addition to this, it may also be the fulcrum of global competition, where companies compete for market shares and control of engines that drive cost curve down and consumer benefits up. To become a fully integrated, networked, and truly global corporation of the future, participation in China may be a virtual requirement. These changes, plus patent protection, led to at least 12 international pharmaceutical and biotech companies investing in excess of US\$1.0 billion and employing more than 10,000 employees. These include most of the top ten pharmaceutical companies: Bristol-Myer-Squibbs, Pfizer, SmithKline-Beecham, Eli Lilly and Co., The Upjohn Co., Becton-Dickinson, Sequena & Arris Pharmaceuticals Inc (AxyS Pharmaceuticals Inc.), Pharmegensis Inc., Taishon Holding, Sinogen Inc., GeneCore (WFOE). This year in March, twelve international banks decided to move into Shanghai.

Most recently, D'Trends had also made its bioinformatics inroads into the country by establishing offices in four cities: Beijing, Chengdu, Shenzhen and soon in Shanghai. Bioinformatics, first introduced in the US in 1987 (see Section 5.1), is now very developed in the US. The market is also rather mature. The game now is to replicate it in China. Indeed, bioinformatics is one of the most popular and highly funded emerging projects in the country at this very moment. Staffing in China is not a critical issue because China has a really good talent pool of technical people. However, bioinformatics, sophisticated software, and inter/intra-net capabilities are tough to fill. Because of the immense interest in computer technology and bioinformatics, and the return of many foreign-trained scholars, the situation is changing very rapidly.

6. EDUCATION: THE FUNDAMENTAL BUILDING BLOCK OF A STRONGLY INTERACTIVE GLOBAL KNOWLEDGE ECONOMY

The old wisdom of a nation is that education is its underpinning. The new paradigm is of course global education.

Indeed, everything we have discussed so far will be reduced to naught if there is no smart work force to propel this knowledge economy. Faced with the diminishing importance of nationalism, the ever changing technology, and competition coming from all corners of the globe, any region that wants to remain economically viable and robust must transform its traditional form of education, from knowledge transmission from teacher to students, to knowledge transmission from nonlocal teachers to nonlocal students. The teaching process will change and the learning process will change. Indeed, the entire concept of education management will be transformed, if not changed. Not only must students be supplied and equipped with access to vast amount of basic information, but also they have to learn to appreciate and be friends with people at far away lands in order to break down cultural barriers which have plagued humans ever since there was recorded history.

7. DISCUSSION AND CONCLUSION

The progressive reduction of barriers to investment and trade by most governments, and the trend toward the unification and socialization of the global community (NAFTA, EEU, ASEAN, AFA) because of preferential trading arrangements are hastening globalization of trade. This creates a global economy for which there is not a global government. Advances in computer and communications technology, which permit an increase in free flow of idea and information across geopolitical borders, further exacerbate the situation. Real conflict can arise from geopolitical boundaries, which information ignores; and electronic boundaries, which have no geopolitical counterparts. Despite this, entrepreneurs can still make order out of this seeming chaos. Entrepreneurs can exploit breakthrough-, social-, and developmental-disequilibrium to make a fortune.

Breakthroughs normally come from heavy investment in R&D. The results are usually proprietary. The resulting disequilibrium more often than not leads to a paradigm shift. Social disequilibrium can come from investing in infrastructure, which can lead to a change in social habits. For example, pay TV (infrastructure from laying cable) and one of the *vade mecums* of today's urban trendsetter - the cellular phones (infrastructure from communicating satellites).

Developmental disequilibrium exists whenever there are countries at different income levels. Entrepreneurs can replicate the activities of the developed world in the developing or underdeveloped world. But then why are replications not occurring across all orders? The answer is the timing has to be right.

For entrepreneurs to be able to benefit from developmental disequilibrium, an increase in education level, income, and supporting infrastructure must take precedence. Public

infrastructures (roads, education, basic R&D) normally require long-term investments. This provides little economic incentive for the private sector. Thus these infrastructures can only be accomplished by the public sector, usually the government. The bottom line is that education is still one of the keys.

If the entire continent of Africa begins to develop, as surely it must in the 21st century, Africans will undoubtedly want the goods and services now being supplied in the developed world. New markets for what the developed world sees as old products will undoubtedly explode in Africa. However, at the moment, Africa, except for isolated pockets, is not getting richer. Indeed, its per capita gross domestic income (GDP) is even lower than what it was in 1965. Unless its income starts to rise, which can only come with better educational and healthcare systems, there are no opportunities for replicating activities in Africa.

This brings us a full circle back to the anecdote in the Introduction. The remote island does not have the infrastructure, education level, income and support for replication on the island of first world normal goods. So the first shoe salesperson was right when he concluded that there was no market potential for shoes on the island, albeit he based his conclusion on a wrong argument. The second shoe salesperson is an optimist, but he is a terrible marketer.

The case rests.

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9. About the Author



Dr. Hwa A. Lim was born in Malaysia and is a naturalized US citizen. He has a Ph.D. and an M.A in Science, and an MBA (Masters in Business Administration, with emphasis on strategy, market research and business laws) from the United States, a B.Sc. (Hons.) and ARCS from the United Kingdom.

In 1997, he founded D'Trends, Inc. (headquartered in the Silicon Valley, California, USA), a software and database emerging company serving the biotech, pharmaceutical and healthcare sectors. Prior to this new venture, he was Vice President of Science & Technology, Pangea Systems (now DoubleTwist, going public, 1996-1997), Director of Bioinformatics, Hyseq, Inc. (now a public company with ticker symbol HYSQ, 1995-1996). Dr. Lim was a tenured faculty at Florida State University (1989-1995), and Program Director, Supercomputer Computations Research Institute, Florida State University (1987-1995). He has participated in two different projects that went on to win Nobel prizes, authored/edited nine books, the latest with President of Peking University, Professor Xu Zhihong.

Dr. Lim is a well-sought after keynote speaker at international meetings. He is credited with coining the word "bioinformatics" and for initiating the first bioinformatics conference series (Bioinformatics & Genome Research), which is still ongoing. In addition to his scientific background, he has strong experience in market research and developing strategic alliances internationally.

In 1995, he decided to vacate his tenured position in the academia and join the private sector in the Silicon Valley, California, USA. Since he has been a very successful academia-turned-entrepreneur in the US and in China.

Currently he also serves as a bioinformatics expert for the United Nations, a review panelist for the United States National Science Foundation and the United States National Cancer Institute.



Da Hsuan Feng is currently Vice President of Science Applications International Corporation, a Fortune 500 high technology company and is on-leave-of-absence from his position as M. Russell Wehr Professor of Physics of Drexel University. He received his doctorate in Theoretical Nuclear Physics from the University of Minnesota. Prior to joining the Physics Department of Drexel University in 1976, He was a United Kingdom Science Research Council fellow and a Senior Scientist at the Center for Nuclear Studies of the University of Texas at Austin. In 1983-85, he served as Program Director of Theoretical Physics at the National Science Foundation and visiting Professor of the Niels Bohr Institute of the University of Copenhagen. Currently he holds the Honorary Professor/Senior Research Fellow of six universities/academy of sciences in China.

Feng is an expert in mathematical physics, nuclear physics, nuclear astrophysics, fundamental issues of quantum mechanics, network architecture and computational physics. He was also a consultant to the theoretical physics groups of Los Alamos National Laboratory, Oak Ridge National Laboratory, Brookhaven National Laboratory and United Kingdom's Daresbury Laboratory.

Feng has served as technical advisor to Congressman Curt Weldon, Chairman of the House Armed Services Committee Subcommittee on Military Research and Development and senior member of the House Science

Committee, regarding South Africa, Central Europe, especially Hungary, issues and China. He was a member of the Congressional Delegation to both East Asia and Central Europe in 1997 and 1999 respectively.

In the past three years, he has worked on the HUBS (Hospitals, Universities, Businesses and Schools) project. The HUBS project, inspired by the political leadership of the Four States (Delaware, New Jersey, Maryland and Pennsylvania) is designed to be the catalyst and the integration of information systems in the Four State region and is now managed by a Fortune-500 information technology corporation: Science Applications International Corporations (SAIC), for which Feng has been appointed as the General Manager of HUBS. The project has received over \$25 million of federal funding between FY98 to FY00.

Feng is currently the President of Monte Jade Science and Technology Association of Mid-Atlantic States, a chapter of a national organization of Chinese Americans entrepreneurs, with over 300 multinational corporation as members, a Business Board Chairman of D'Trends Inc, a leading Bioinformatics company in San Ramon, California, a special advisor to the Editor-in-chief of Korean American Science and Technology Network (which is read by 15,000 Koreans globally), a member of the Industrial Advisory Board of the Interactive Multimedia Intelligent Tutoring Center of Temple University and a member of the Computer Science/Engineering Technical Evaluation Advisory Committee of the Provost and President of the University of South Carolina and a past Vice Chairman of the Board of CyberFone Inc.

Feng has published over 180 scientific papers, wrote and/or edited over 20 books, and has served as editor of 4 scientific journals. In recognition to his contribution to the field of nuclear physics, Feng received the accolade Fellow of the American Physical Society, an honor bestowed to only 0.4 percent of the physicists in the United States. He is also the recipient of the 1999 Millennium Award for Vision and Leadership in Technology, TechFEST '99 in Allentown and the 1999 Delaware Valley Technical Recruiting Network 1999 TECHIE Award.

10. About VERIZONTAL Publications

VERIZONTAL is a mosaic of four words: verify, vertical, horizontal and portal. The dictionary defines a portal as a door or entrance, especially a grand or imposing one. It also lists portal the communicating part or area of an organism. On the Internet, a portal is both an entrance and a communication point. When a portal caters to a single need or concentrates on a single subject in deep, it is a vertical portal or vortal. Similarly, when a portal caters across disciplines, it is a horizontal portal or hortal.

VERIZONTAL is not meant to be a regular publication like daily, weekly or monthly publications.

Goals:

1. Its primary goal is to educate and inform the public. Instead of reports based on interviews, it fills a niche by reporting based on solid research work written by individuals with expertise in the field.
2. Its secondary goal is to help propagate an important issue, which the news media are very good at, but cannot afford the luxury of more detailed explanation. Thus VERIZONTAL shall bridge between technical articles and popular media.

Distinctions:

1. It is published whenever there is an important issue, a topic for discussion, or a trend on the horizon that will interest the general public.
2. Each publication contains only one article. The article can focus on a topic in detail (vertical), or can be trans-disciplinary (horizontal).
3. Unlike newspapers or newsletters, it has full citations so that interested readers can pursue the subject further if so desired. Thus all facts are verified by referring to their sources.
4. Unlike books, it is much shorter in length, but is self-contained. Because of the quick turn-around, it is also more current than books.
5. It is written at a level that is understandable to laypersons and newcomers. Experts will also find enlightening fresh perspectives.