Editorial

New Economy of Networks

There is an increasing sense that the affairs of business, management and economics have been fundamentally transformed by the emergence of information technology, global hypercompetition and customer sovereignty. Labels of New Economy or Network Economy (or Digital Economy) are proliferating, attempting to capture the sense of this profound change. The world of business will never be the same and even quite current knowledge and practice can become strikingly irrelevant in the Network Economy. The paradigm of NE is still emerging, its contours hard to discern, its rules still churning and evolving: it can only be captured in the process of becoming, not in the state of being.

One thing is clear: the boundaries and the barriers between products and services, industries, sectors, companies, functional departments, etc., are going to be completely destroyed in the New Economy.

As more commercial activity shifts toward knowledge (and information), the economy becomes ripe for terminal disintermediation. Network systems make it possible to bypass conventional information brokers.

1. Introduction

Communication services used to be a sector of the economy. Now, communication *is* the economy. Whatever happens in the world of business (and increasingly in other areas too) is fundamentally shaped, influenced and molded by communication, telecommunication and telecommuting.

Telecommunication networks are the new infrastructure, replacing the rails, roads and bridges. Networks are the new workspace and railroad can't get you there.

Now there are Infohighway, Infobahn and Infostrada. Now there is a New Economy.

There are about 14 million self-employed, 8.3 million independent contractors, and 2.6 million temporarily employed "agents" in the USA: 25 million Americans are working as a unit of one, interacting through the networkspace.

Self-service, work-at-home, do-it-yourself, telecommuting and telework are flourishing activities in the New Economy. Traditional economics, with its upward sloping supply curves and downward-sloping demand curves are of little use in the network economy of prosumers (producers <=> consumers) and demand-generated supply.

2. New Rules

Among the many sets of the new rules for the New Economy, we choose a very popular and simple one, advanced quite recently and offering a number of metaphors for the uninitiated. Yet, the deeper contents behind these simple metaphors are quite significant and demanding.

From the New Rules for the New Economy [1]:

1. Embrace the Swarm;
2. Increasing Returns;
3. Plentitude, Not Scarcity;
4. Follow the Free;
5. Feed the Web First;
6. Let Go at the Top;
7. From Places to Spaces;
8. No Harmony, All Flux;
9. Relationship Tech;
10. Opportunities before Efficiencies.

The above metaphorical "Newspeak" has to be translated and explained in order to appreciate the full impact of the New Economy. We provide some paraphrasing and "fixing" for each of the Kelly rules:

1. *Embrace the Swarm.* This refers to decentralization and distribution of efforts. Power flows away from the center – in business, politics or culture. Distributed, networked power (empowerment) is becoming stronger and more effective than its centralization. Network connectedness is the new measure

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of complexity and performance. Biological connectedness is the foundation of emergent performance, knowledge and results. Autonomous networks of autonomous firms, teams and individuals are the foundation of New Economy.

2. *Increasing Returns.* As the number of nodes increases arithmetically, the value of the network increases exponentially. After centuries of expounding the "Law of diminishing returns", NE networks are increasing their returns to scale: the larger the network (of computers, faxes, businesses, people, etc.), the larger the return to the individual user. The number of connections provides the power to sustain explosive compounded growth – creating a positive feedback of a self-feeding process. This is what networking firms-gazelles are experiencing. Biology, not physics, is the new metaphor of both economy and economics.

3. *Plentitude, Not Scarcity.* Falling raw-material prices, productivity driven disinflation and even deflation, manufacturing techniques that are capable of perfecting copying, multiplying and propagating virtually everything: products, services, information and knowledge – abundance rather than scarcity increasingly drives economic value and business thinking. Average weight of products is dropping, including automobiles. We move towards "weightless economy" as information replaces mass. The plentitude, not the scarcity, of networks is the basis of their ever-increasing value. Opportunity maximizing, rather than profit maximizing, for the individual *and* for the others, is the main characteristic of the New Economy.

4. *Follow the Free.* Gold is scarce and therefore less and less valuable; network is valuable and priceless and the access is virtually free, open to all. Falling prices and disinflation characterize the abundance-based economy. The best is the cheapest; the very best is virtually free. Having the only (scarce) fax machine in the world is of no value; having the access and use of millions of them is of the real value. As price goes down, supply increases; so does the demand. The only scarce factor in economics is time and therefore human attention. Let your customers complete and finish your products and services. Don't charge for use, charge for joining.

5. *Feed the Web First.* Rather than maximizing the firm's value, it is important to maximize the network's value first. The net must survive and become strong, otherwise the firm perishes. Strong company makes strong employees, strong network makes strong companies: network is the first allegiance of your firm's employees. All commerce migrates to the network economy, avoiding networks amounts to economic suicide, resisting them is a modern folly.

6. *Let Go at the Top.* Do not wait for failure, devolve proactively, abandon the old at the height of success. Make disassembly, reverse logistics and material recycling a part of the production process: close the organization. Accelerating innovation drives from success to another success, avoiding the eventual failure or obsolescence in between. Do not get stuck in a local optimum, search for the global optimum. "Creative destruction" is an integral part of creation. Start a new organization; give up changing the old one.

7. *From Places to Spaces.* Physical proximity, geographical distance and the sense of place are being replaced by the sense of space (anywhere, anything, anytime). The "Internet time" is the same everywhere in the world, as is the timespace. From marketplace to marketspace and from businessplace to business-space are the trends of free network participants, spelling the demise of intermediaries, agents, dealers and middlewomen (and middlemen). Move from value chains (and its intermediaries) to value networks, disintermediate as fast as you can. All nodes of the network are "intermediaries" to each other. About the only new "go-betweens" are intelligent agents and cybermediaries, infomediaries (aggregators and syndicators of electronic contents).

8. *No Harmony, All Flux.* A sense of turbulence, chaos and instability, continuous churning of the environment can be counteracted only by the harmonizing and synchronizing effect of innovation. But equilibrium is dynamic and chaos is a highly harmonious order, just slightly beyond the edge of traditional human perception and understanding. So, the rule should be Dynamic Equilibrium, Harmony through Chaos – as the world of biology teaches. The harmony of chaos, the other word for complexity, has to be grown, not installed.

9. *Relationship Tech.* Traditional productivity is a nearly meaningless byproduct in the network economy. Relationship amplification is the main economic event: the cause of productivity. Linkages and relationships enhancing technologies – soft technologies are replacing the hard technologies of the hardwired world of the past. Self-service, not service, is the mode of the New Economy. Producing and consuming has fused into a single economic process: prosuming. Relationship and

connection enhancement is the new technological frontier. Interconnectivity generates trust; trust is the basis of free-market economy.

10. *Opportunities before Efficiencies.* Being efficient in performing a known, well-defined task cannot beat the inefficient discovery of new opportunities for new tasks. Opportunity is the source of new wealth. It is better to be inefficient in a powerful innovation than to be efficient in an out-of-date routine task. Only innovation creates the space for more innovation. Producing new opportunities is better that optimizing the existing ones, designing optimal systems is better than optimizing existing systems, productivity is therefore the wrong goal to pursue in the New Economy of opportunities. To be productive in the wrong job is much worse than to be less productive in the right job.

3. Global Management Paradigm

One can compare the 10 rules of the previous section with the Global Management Paradigm (GMP):

1. Horizontal Corporation;
2. Reengineering of the Process;
3. Mass Customization;
4. Autonomous Teams or Cells;
5. Customer Integration;
6. Intracompany Markets;
7. Supplier Integration & Co-location;
8. Elimination of Tradeoffs;
9. Open-Book Management;
10. Corporate Kinetics.

The above 10 dimensions represent technical, non-metaphorical characteristics of the New Economy.

Another set of the rules for the New Economy can be derived from the GMP, complementing the "Kelly rules" as follows:

1. *Networks and networking.* Information technology and systems (IT/S) allow new levels of connectivity between businesses, producers, customers and providers, as well as among employees. Market-type networks thus penetrate corporate boundaries and guide communications and economies within companies. Networks have become the base of new Organizational theory and practice in a new economy.

2. *Customer is the strategy.* No more useless exercises in strategic planning at the highest levels: customer determines and drives the strategy of all enterprise. It cannot be any other way. The role of management is to "read" customers' strategy correctly and implement it properly. Customers, not "strategists" have most knowledge and can best judge what they want and thus what should the corporate strategy be.

3. *Knowledge and capabilities is the main capital.* Modern corporation needs knowledge; they buy other corporations to gain knowledge and strategic abilities, not to derive short-term financial payoffs. New ideas, innovation, vigorous managerial skills are the most expensive and the hardest form of capital to engage and to maintain. Money, technology and labor gravitate towards knowledge, are driven and guided by it, not vice versa.

4. *Teams and teamwork.* In a New Economy, teams and teamwork are no more cliches and oxymorons they used to be in traditional command hierarchies. Teamwork and alliances with partners and associates (previously employees), suppliers and customers, based on trust and team rewards create new organizational space capable of dealing with global hypercompetition. Partnership and trust are derived from mutually assured advantage.

5. *Sharing of wealth.* Wages and salaries of individual employees are becoming less important than co-ownership of corporate equity. Stock options are being extended to all employees, not just to executives. Employee stocks and profit sharing are also on the rise. Each employee becomes a capitalist, engaged and involved with his enterprise as an owner, not just a hireling.

6. *Personal, informal cooperation.* Informal environment, creative chaos and incessant innovation spawn self-organization and self-management. Managers become coaches, mentors, advisers and partners or associates.

4. Biological imperative

Economies, markets and organizations are organisms, not mechanisms, and biology, rather than physics and engineering are proper metaphors and paradigms for its investigation and understanding – and increasingly so. Biological systems are communicating networks, mechanisms are not. Among the earliest propo-

nents of the biological imperative in economics were F. von Hayek and O. Morgenstern.

Oskar Morgenstern used to say that if you throw a monkey wrench into a machine, it stops. If you do the same to an economy, it adjusts, like a biological organism.

Chaos, complexity and autopoiesis are invading predominantly Newtonian and Descartian economic universe. Economies do not work as clocks or machines, but as ecosocieties. Instead of energy, materials and land, information and knowledge are becoming sources of value. Instead of command, control and feedback, there is autonomy, self-organization and self-production. Hierarchies and division of labor are being replaced by self-organizing teams, synthesis of minds and unity of purpose. Creativity, innovation, adaptation and trust are becoming "hard" strategic realities of economics, business and management – neither of them very machine-like.

Instead of linear, mechanical models of input, output and feedback, we are appreciating the circularity, organizational closure and essential autonomy of economic systems. Wheels and cogs, accelerators, multipliers and other artifacts of mechanical engineering are being rapidly replaced by diffusion, propagation, self-production, self-sustainability, and evolutionary adaptation.

All modern businesses are in two kinds of "business": (1) to produce and consume something else than itself, i.e., output, product, service or information – through *heteropoiesis*; and (2) to produce and consume itself, i.e., its ability to coordinate action, in order to produce goods, services or information – through *autopoiesis*.

In order to produce something, corporation has to be able to *produce itself*, i.e., recreate and renew its ability to produce, to coordinate its own action.

Like with any living organism, in order to produce "else" – product, replica, copy – a corporation has to first produce "self", the main prerequisite for producing "the other". The self-production of corporation, its ability to coordinate its action, is autopoiesis.

At certain stages it is heteropoiesis that dominates business concerns: what, where, how much and when to produce. At other stages it is autopoiesis that dominates the focus: how and why to produce *anything, anywhere, anytime*.

Information is the input of heteropoiesis; knowledge is the stuff of autopoiesis. Modern corporation (self-renewing network) produces knowledge first, product second. Traditional hierarchy produces product first and knowledge-production is left to spontaneous forces, not explicitly managed and not viewed as main competitive advantage.

Autopoiesis or self-production can take place when there are distinct and autonomous individuals or agents interacting and communicating in a specific environment and according to specific behavioral *rules of conduct and interaction*.

Autopoietic organization then can be defined as a network of interactions and processes, involving at least:

(1) *Production (poiesis)*: the rules and regulations governing the entry of new components, such as emergence, input, birth, membership, acceptance.
(2) *Bonding (linkage)*: the rules governing associations, arrangements, manufactures, functions and positions of components during their tenure within the organization.
(3) *Degradation (replenishment)*: the rules and processes associated with the termination of membership, like death, separation, consumption, output and expulsion.

Network organizations are autopoietic, based on the circular closure of above three self-feeding and mutually adjusting production processes.

Biological imperative has been considered very carefully. There is an entire school of "biological economics" or "bionomics" which applies traditional mechanistic economics to biological systems (profit maximization, economizing, feedback, entropy, utility maximizing, etc.) and then re-imports the results back into economics or business management. That is not what the New Economy needs: further amplification and re-importation of neoclassical concepts of economics. Biological systems are autopoietic and self-organizing, exquisitely coupled with their environments – they are not economizing and profit-maximizing machines.

It is less than desirable to import old mechanistic economics into biology. It is sorely needed to import good systems biology into the new economics.

5. Conclusion

New Economy has emerged. Its new rules are still in the flux, churning back and forth like the economy itself. No doubt that the US economy is entering its uncharted waters with full force and determination. High

productivity growth rate, strong HDP growth, low unemployment, soaring markets, disinflation, strong net job creation, self-service, home office, telecommuting, consumer community and all-pervasive Internet characterize this entry.

Silicon Valley thrives because it follows the principles of network interactions. Individuals switch from one company to another, but their companies form a range of informal alliances, sharing their core competencies, keeping the knowledge capital in the region. Productivity in the IT/S era is measured by *added value* (the revenue earned from products less all the costs of making the products).

While added value per employee in Computers and communications is about $100,000 in the US, it is over $250,000 in Silicon Valley. The same difference exists in Semiconductors and equipment, Software, Innovation services, Bioscience, Military and aerospace and Professional services: Silicon Valley leads the US pack. The key is Silicon Valley Network Inc., a coalition of corporate and civic organizations.

IT/S is trying to keep pace with the network economy. Small entrepreneurial businesses are booming. The uncharted waters of the New Economy are becoming clearer and more manageable every day – an invitation for the still hesitant and still reluctant nations and regions.

Milan Zeleny
Fordham University, New York

Further reading

[1] K. Kelly, *New Rules for the New Economy*, Viking, New York, 1998.

[2] T. Petzinger, Jr., *The New Pioneers*, Simon & Schuster, New York, 1999.

[3] C. Shapiro and H.R. Varian, *Information Rules*, Harvard Business School Press, Cambridge, 1998.

[4] M. Zeleny, The decline of forecasting?, *Human Systems Management* **16**(1) (1997), 153–155.

[5] M. Zeleny, Amoeba: the new generation of self-managing human systems, *Human Systems Management* **9**(2) (1990), 57–59.