

Crisis and transformation: On the *corso* and *ricorso* of human systems

Milan Zeleny^{a,b,*}

^aFordham University, GBA, NY, USA

^bThe Tomas Bata University in Zlin, Czech Republic

Abstract. Advanced and mature societies are undergoing a fundamental transformation of their economic, political, technological and social lives. Developing countries are rapidly catching on and accelerating their participation in the transformation which is equally rapidly becoming global. Yet, at the same time, the process of globalization itself is exhibiting signs of a reversal towards relocalization, i.e. rebounding after the strong global outbound of the past fifty years. The change of paradigms and change of dominant business models accompany such transformations. Yet, transformations get naturally confounded with ongoing recessions and crises. Disentangling the phenomena of crisis from those of transformation remains a challenge, especially for politicians. In this paper we primarily address the issues of unemployment and the changing nature of employment in mature economies.

Keywords: Crisis, transformation, relocalization, reintegration, corso and ricorso, autopoiesis, unemployment, self-service, disintermediation, mass customization, technology cycle



Milan Zeleny, Professor of Management Systems at Fordham University, New York City, has been recently ranked No. 1 among Czech economists, according to Hirsch citation index. In his new book *Human Systems Management: Integrating Knowledge, Management and Systems*, World Scientific, 2005 (2nd edition 2012), he summarizes knowledge as purposeful coordination of action and its implications for the global economics and management. Recently also a Visiting Professor at The Tomas Bata University in Zlin, Czech Republic,

Xidian University in Xi'an, Fu Jen University in Taipei, Indian Institute of Technology, Kanpur, and IBMEC, Rio de Janeiro.

Among recently published books are *Information Technology in Business* (Thomson International), *New Frontiers of Decision Making for the Information Technology Era* (World Scientific). Currently working on *The Biocycle of Business: Managing Enterprise as a Living Organism*.

Zeleny has served as the Editor-in-Chief of *Human Systems Management* for 30 years and is on editorial boards of *International Journal of Information Technology and Decision Making*, *International Journal of Mobile Learning and Organization*, *Prestige Journal of Management and Research, Economics and Management*, *Information and Operations Management Education*, *International Journal of Multicriteria Decision Making (IJMCDM)* and

International Journal of Innovation and Learning, Strategic Decision Sciences, etc.

Earlier books include *Multiple Criteria Decision Making* (McGraw-Hill), *Linear Multiobjective Programming* (Springer-Verlag), *Autopoiesis, Dissipative Structures and Spontaneous Social Orders* (Westview Press), *MCDM-Past Decades and Future Trends* (JAI Press), *Autopoiesis: A Theory of the Living Organization* (Elsevier North Holland), *Uncertain Prospects Ranking and Portfolio Analysis* (Verlag Anton Hain), *Multiple Criteria Decision Making* (University of South Carolina Press) and *Multiple Criteria Decision Making: Kyoto 1975* (Springer-Verlag).¹

1. Introduction

As God's truth is what God comes to know as he creates and assembles it, so human truth is what man comes to know as he builds it, shaping it by his actions. Therefore science (scientia) is the knowledge (cognitio) of origins, of the ways and the manner how things are made. Giambattista Vico [25].

*Corresponding author: Fordham University, GBA, NY, USA; the Tomas Bata University in Zlin, Czech Republic E-mail: mzele-ny@fordham.edu; mzele-ny@quick.cz.

¹ The author is most grateful to Prof. Nicholas Georgantzas for his useful comments and patient editing.

“In the long run we are all dead” – so goes the infamous quote of Lord Keynes, harking from a totally different era, very long time ago [10]. Yet, it is the long run, not the short run that determines economic fortunes of individuals, families, businesses, economies and nations. Moreover, *the long run is getting shorter*, and so is the short run.

The current global crisis is confounded by a broader and larger *transformation*, still virtually unseen or ignored, being overwhelmed by persisting conventional wisdom that this crisis is cyclical, that things will return to the “old normal”, jobs can and will be created by governmental stimulus, or that economy is a machine, which can be jump-started at will by money. Although a crisis is always cyclical, socio-economic transformation is always *unidirectional*, never returning to its point of inception.

When the two phenomena occur in parallel and intertwined, as is the case today, current politicians and economists lack the tools and experience to draw a proper distinction between them.

2. Corso and ricorso

According to Vico’s *New Science* [25], human systems – economic, political, social and others – evolve in alternating cycles of expansion and contraction, out-course and recourse, out-swing and in-swing, proliferation and scarcity – in short, *corso* and *ricorso*.²

Humans cannot fully know and understand such natural processes because they did not construct them but were born into them, are a part of them and can come to know them only in terms of their own experience, only as a practical knowledge. In addition, such cycles are often long, spanning over many generations and so even the experience is incomplete and indirect, based on descriptions and interpretations rather than direct observations.

The Corso & Ricorso (C&R) concept is based on three essential phases: ascent-stasis-descent (or production-growth-destruction, crisis-action-catharsis, birth-life-death, etc., depending on the domain of discourse). Figure 1 shows a simplified sketch of generalized C&R concept.

There are significant differences from Vico’s original intent. Our *ricorso* does not mark a return to anything,

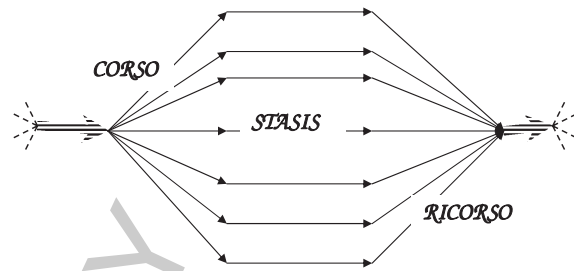


Fig. 1. The cycle of C&R.

but a creation of the new; certainly not a regression, decadence or demise, but a new and unprecedented phase of renewal, rebirth or *rinascita*. All three phases are interwoven in an overlapping sense, they are not strictly sequential. Every corso contains the seeds of ricorso, and every ricorso carries the legacy of the old corso as well as the premonitions of the subsequent one. We can think in terms of a string of C&R cycles, a pattern of expansions and contractions – a sort of a *pulse of history*.

The C&R cycle is of course only an outward structural manifestation of the underlying organization of causes. Some trends could be self-reinforcing and self-accelerating, but, *per se*, C&R pattern is nothing more than a consequence of causal biological, societal and socio-economic *drivers*. The underlying, relentless and embodied driving causes create and sustain the C&R patterns.

Finally, there is an issue of duration. Some R&C cycles are quite rapid (especially in technology) and a pattern of such “pulsating” change is quite discernible in our lifetimes. Other cycles stretch over many decades, centuries or even millennia. Some cycles have only started their stasis or ricorso for the first time since the beginning of humanity. In any case, *C&R cycles* represent the long-term manifestations of persisting systemic and transformational causes, while *crisis cycles* are short-term responses to specific, contextual and ephemeral causes.

Serious problems arise when long-term transformation and short-term crisis phenomena coincide for one generation, theories and experience for telling them apart are missing, and “quick fix” measures of the crisis are stubbornly misapplied to the inevitabilities of transformation – where recognition, adaptation and pursuit of new opportunities are the only intelligent responses.

The C&R cycle’s *pulse* is self-producing and self-sustaining as long as the causal drivers persist. A more effective and modern expression would fold C&R cycle

² Although we refer to some Vico’s concepts, their interpretation and use here are thoroughly modern and no attempts for preserving their historical or philosophical verity have been made.

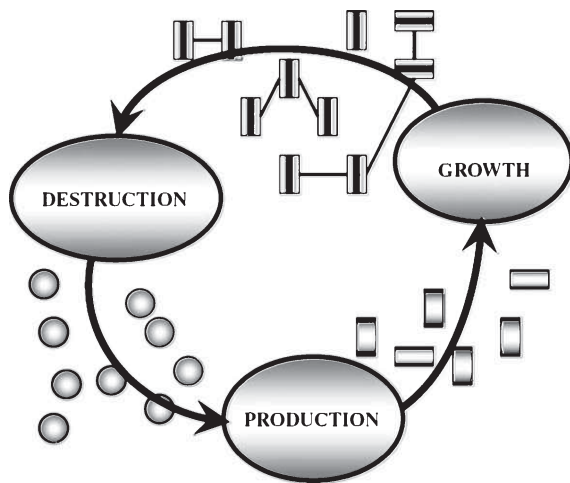


Fig. 2. Minimal autopoietic cycle of C&R.

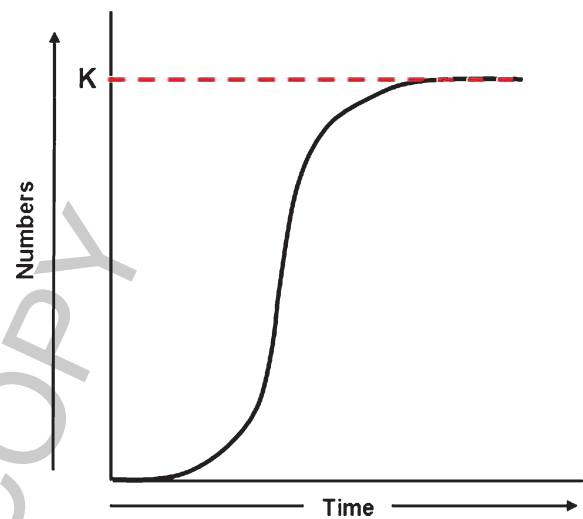






Fig. 3. The S-curve behavior pattern C&R system.

upon itself, into a circular organization [8] of the three key components or stages of *autopoiesis*, as it is known from biology [11, 24]. This *autopoietic* cycle of self-production or self-renewal forms the organization of all living and self-sustaining systems, i.e., not man-made. The self-renewing system of cycles, traversing at higher and higher levels of *corso* and *ricorso*, is presented on Fig. 2.

For example, in the domain of business self-renewal, we could entertain the following interpretation of the three stages [42]:

1. **Production** (*construction*): new entrepreneurs  create new businesses 
2. **Growth** (*networks, structures*): businesses grow, divide, connect into networks 
3. **Destruction** (*deconstruction, exit*): networks, their components and individual companies are deconstructed or go bankrupt; new entrepreneurs reallocate released resources  and enter the recursive cycle of human endeavor

These representations are not dissimilar from so called “invisible hand” of A. Smith or “creative destruction” of J. Schumpeter [18]. They just make them visible and open to analysis and formal modeling.

All these patterns are faintly reminiscent of the S-curve (cumulative numbers against time), a well-known descriptor of general dynamics in natural systems, both living and inanimate, capturing their inception (emergence), acceleration (build-up, growth) and the eventual slow-down, stagnation and demise.

On Fig. 3, we again discern the three phases of the C&R cycle. As before, the key is the underlying *causal driver* of the S trajectory, not its recurrently simple and ultimate S manifestation.

Any “progress”, no matter how punctuated by short-term recessions, crises and reversals, is ultimately self-limiting and subject to its long-term transformation.

As any new idea, at its starting, is in a minority of one, so any truly new thing begins as a local anomaly, a region of misfit within the *corso* of preexisting organization. As C. S. Smith [21] observed, the first nucleus of the new is all but indistinguishable from the few fluctuations of the old – all to be erased by gathering transformation of *ricorso*. Once growth from a fertile nucleus is well under way, it becomes driven by the very type of interlock that at first opposed it. This is also true of the processes of technological, economic and social change. People eventually come to accept the new as naturally as they had first opposed it, and they adapt and modify their lives, interactions and investments accordingly. But the growth itself has its limits. Eventually the new structure will have grown to its appropriate size in relation to the things with which it interacts, and a new balance (or new normal) will have to be found and established. The end of growth, like its beginning, is embodied within system’s organization and is hard to predict at first. For every thing there is a season.

These observations apply to evolution, development and history in physical, biological, social and human world, and so to the problems addressed in this paper as well.

3. Unemployment and evolution of economic sectors

Advanced economies are experiencing protracted and persistent unemployment levels which are significantly resistant to governmental interventions, stimuli and bailouts [7]. Just in time for Labor Day 2011, the U.S. Labor Department reported that the nation experienced *zero net job growth* during August – the first time since 1945. It has been later revised slightly upwards: the probability of hitting a straight zero in economic “numbership” is eerily improbable.

Such problems of persistent unemployment are inaccessible through the lens of cyclical crisis and must be examined through the lens of long-term transformation and evolution of economic sectors. Employment is not an averaged, static and timeless category, but a result of changing role and contexts of specific sectors and their interactions.

Economic sectors evolve. They all undergo their emergence, *corso* of employment expansion, stasis of equilibrium, *ricorso* of employment contraction, and their exit as a source of creating new employment opportunities. The driver of the long-term sector employment is *productivity growth rate*. Producing consistently more product with a smaller number of employees (per person, per hour worked) is a prerequisite of declining product costs, improving standards of living and holding up to global hypercompetition. Due to productivity growth rate, according to the S-curve: sectors *emerge, expand, plateau, contract* and *exit* in terms of the *percentage of workforce* employed in a given sector.

Thus, *agriculture* has emerged and declined (as a source of employment). Today only 0.5 per cent of total workforce is employed in US agriculture – the most productive sector of the economy. Similarly, *manufacturing* sector had emerged, peaked and contracted. *Services* have emerged, peaked and started contracting – always due to incessant productivity growth. Each sector undergoes the *corso* of *extensive* employment expansion, then its stasis or stagnation and, inevitably, its *ricorso* of *intensive* employment contraction.

3.1. Crisis or transformation?

The conventional wisdom is that the developed world is undergoing mere cyclical recession or crisis with temporary spike in unemployment – all to return to the previous “old normal” of economic performance. All governmental efforts are therefore directed

towards “creating jobs” via “re-starting” or even “jump-starting” the economy.

An alternative view is that the crisis coincides with the acceleration of long-term transformation towards a “new normal” of doing business, state governance and ways of life. Crisis is its parallel, accompanying phenomenon, subject to different causes, rules and dynamics. While crisis is a cyclical recession or slowdown within the same paradigm – most activities resume along the same lines – transformation is a paradigmatic change in the “way of doing business”: things never return to where they ended, but move towards a new standard and quality, in a *unidirectional*, non-recursive way. While many changes in market systems are cyclical, there are also evolutionary changes which are *unidirectional*, i.e., transformational. For example, the transformation of the US economy from agricultural to industrial was not a crisis but transformation with many crises and recessions along the way. Interpreting both crisis and transformation as a single phenomenon brings forth the growing confusion, uncertainty and inconsistency of today.

There is sufficient evidence that a strong economic phenomenon behind all recessions of the past thirty years. When we look at major US recessions since 1980 s, as on Fig. 4, it is clear that they are getting deeper and longer in terms of the initial employment recovery. Only the first one is classical V shape, there are some W, U and finally current L shape. There is an underlying causal phenomenon which is getting stronger and more persistent over time: transformation.

There is even more support for transformation if we look at jobs reports since April 2000—using the *Employment-Population Ratio* (EPR) rather than the

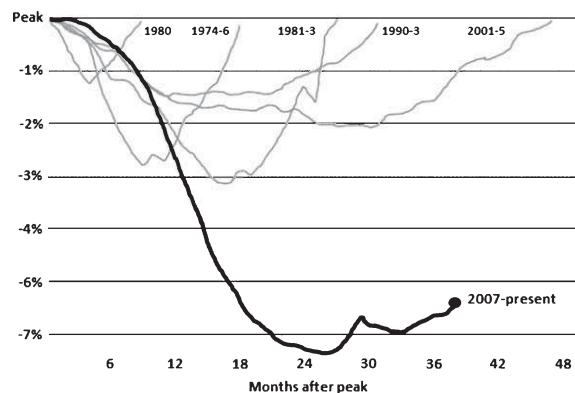


Fig. 4. Comparison of major US recessions of past 30 years (Source: Bureau of Labor Statistics).

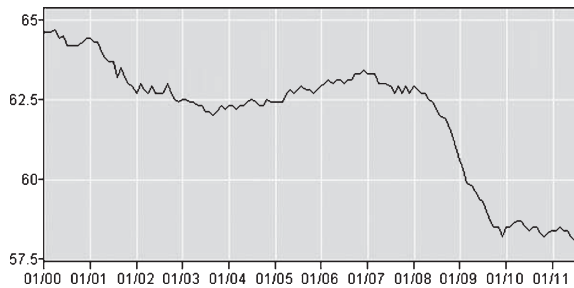


Fig. 5. The Employment-Population Ratio from 2000.

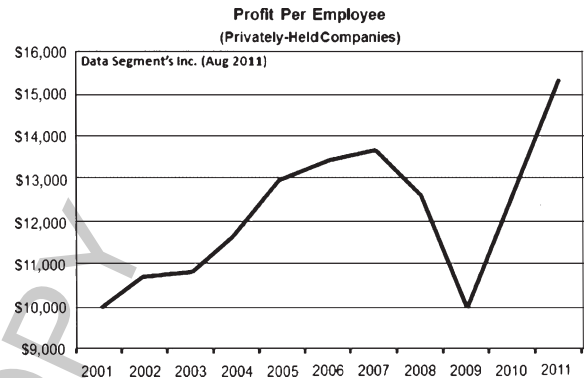


Fig. 6. The Profit per Employee since 2001.

seasonally adjusted and manipulated by the “Birth Death Adjustment” unemployment figures. EPR measures the percentage of people over 16 who have jobs in a current population, displayed on Fig. 5. EPR is now at a 30-year low of 58.2% (from 64.7% in April 2000). That means 41.8% of the working-age population don’t have jobs in 2011; roughly 15.4 million jobs are missing.

The EPR on Fig. 5 reveals that the decline in job participation started a long time before the 2008 recession. Again, there is an underlying phenomenon not related to the current recession.

Finally, the graph on Fig. 6, displaying Profit per employee in privately-held companies, indicates the growth in profit productivity since 2009. This and similar trends show that both productivity and profitability are recovering quite sharply (after the initial drop in 2007), indicating that most of the lay-offs are not coming back due to corporate adjustments in terms of technology, organization and new business models employed after the onset of the crisis.

All three graphs together (Figs. 1–3) strengthen the observation that a long-term transformation has already taken its root way before current recession.

3.2. Where are the jobs?

We have already described the corso and ricorso of agriculture, industry and services sectors due to the accelerating impact of productivity growth rates. All three sectors have already peaked in terms of their percentage of workforce employment levels (see Fig. 7). The relevant question is: what comes after the *service economy*?

As can be seen on Fig. 7, historically there was always a new sector emerging in order to absorb the employment slack of the previous high-productivity sector (i.e., industry after agriculture, services after industry). Also today, a new sector has emerged: *government, welfare and unemployment* (GWU), absorbing the unemployed,

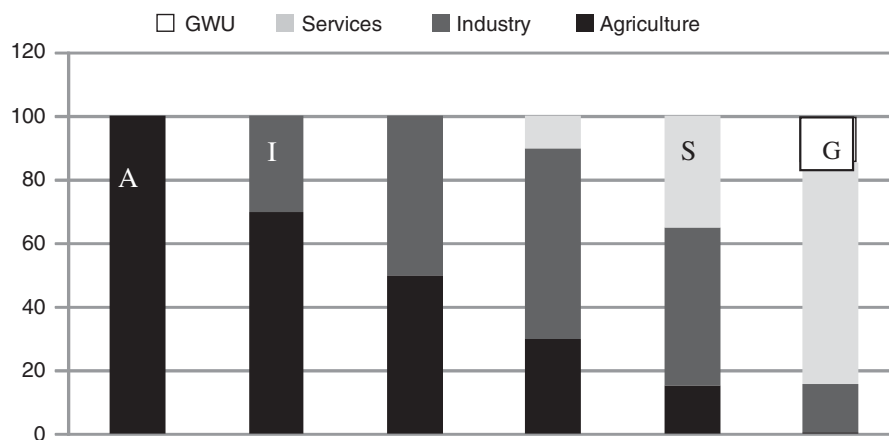


Fig. 7. Long-term sector employment dynamics in the U.S. (A-agriculture, I-industry, S-services, G-GWU sector).

creating jobs, etc. Except this time the growth of the new sector is not sustainable.

Sector GWU is based on taxes-financed consumption rather than added-value production; it is sheltered from market forces, producing products and services outside market tests of “risk & return”. The GWU sector has already started causing great difficulties: unsustainable growth, unbridled spending, high indebtedness, unbalanced budgets, rampant corruption, active unionization, out-of-control incomes, arbitrary budget cuts, and so on. All products of GWU are paid from taxes and fees, employment growth is too expensive and unsustainable, political pressures to reduce GWU employment are mounting, and productivity gains lead to further losses of jobs. Resistance, demonstrations and revolts are spreading around like wildfires. The GWU sector has lost its capacity to expand jobs at around 17% of the workforce. (see Fig. 7).

The same C&R principle guiding the evolution of sectors (driven by productivity growth) is also driving the economy as a whole. Economic sectors emerge, persist and decline, and initially undifferentiated economy builds up sector differentiation. Initially agricultural societies build up their industrial, services and GWU sectors, then they gradually lose them (in terms of employment potential) to productivity growth [36, 42]. Poor economies remain agricultural, developing economies are industrializing, and developed, mature economies reach maximum differentiation, as for the U.S. on Fig. 7. Evolutionary differentiation of the economy into economic sectors has reached – in the most advanced economies – the point of reversal; turning from the *corso* of differentiation and division into the *ricorso* of reintegration, unification and synthesis.

The economy of Fig. 7 has reached not only its transformation point but also the end of its sectoral evolution: the US is now hovering at the *transforming cusp*.

Under the conditions of Fig. 7, there is no amount of artificial job creation (“roads and bridges”), stimulus or quantitative easing which could create self-sustained net job growth in agriculture, industry or services (80% service workforce was the peak). The reason is simple:

There are only *four essential activities* humans can do economically:

1. *Produce food (A)*
2. *Manufacture things (I)*
3. *Provide services (S)*
4. *Depend on the State (GWU)*

U.S. economy has exhausted (from employment viewpoint) all three market-based (private) sectors and

has reached for the 17% of “employment” in GWU.³ The same holds true for EU and Japan. Their attempts to “create” employment in GWU have failed, leaving heavy overall debt, growing budget cuts and social discontent.

What about the currently fashionable policy of debt reduction, balancing budgets and reducing employment in GWU sector? Although desirable in itself, the employment picture is unlikely to change fundamentally. On Fig. 8 we separate the last workforce bar taken from Fig. 7 and observe the impact: *no significant improvement*.

If all four sectors, **A**, **I**, **S** and **GWU** continue their productivity growth and employment reduction, utilizing the emerging high technology, digital technology,⁴ new knowledge and organization as well as new business model innovations – which they must and should do to remain globally competitive – then the outcome is preordained: all sectors are subject to *accelerated* productivity growth rates in the near future. The only expanding space of the workforce is the grey region labeled “?” of Fig. 8. This is the space of a new transformation. This is the space for those missing 15.4 million from Fig. 5. That is where those who lost their unemployment registry must gather.

Even when the recession ends, the transformation shall continue. Pressures for increasing productivity growth rates and budget cuts shall accelerate. Due to automation and digitization, levels of sector GDP can grow even under the conditions of declining employment (employment level is not a part of GDP). Since 1891 the U.S. is now experiencing the slowest GDP growth *per capita* ever – certainly for the period 2007–2027. With declining employment the growth in productivity can not translate into higher standards of living.

4. Transformation - towards what?

Transformations are not engineered by governments and they cannot be stopped by government. Economic systems evolve the way they do in spite of short-term

³ Registered unemployed are viewed here as “employees” of the State, with zero productivity. More significant are the “unemployed” who have left (or been forced off) government registers.

⁴ Sign of the times: because New York State laws allow electronic gambling at racetracks, New York City’s first casino opened at Ozone park, with 5,000 video gambling terminals and electronic table games – without any human dealers; even cards are shuffled by robot-like mechanical arms. Not a single new job created!

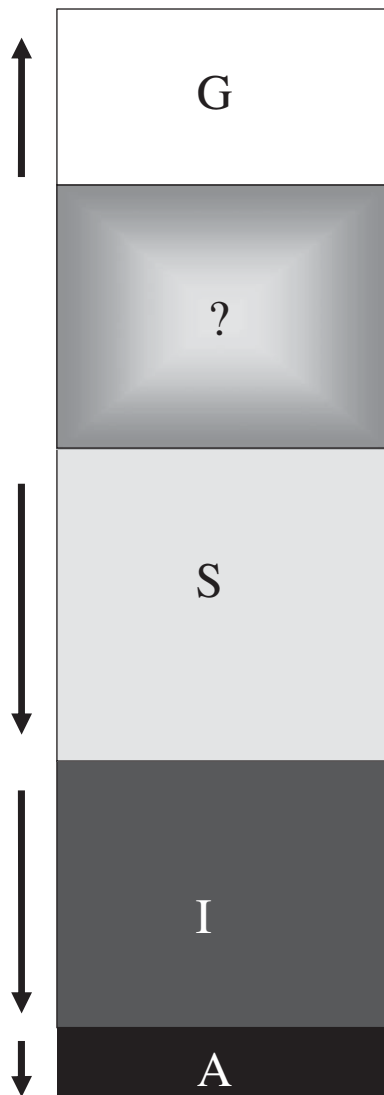


Fig. 8. Decrease in employment in all four sectors due to productivity growth or budget reduction.

governmental interventions. Trying to stop the Industrial Revolution was as futile as stopping the service economy or the government (GWU) from emerging. We are in the midst of one of the most powerful transformations in history, its *corso* gathering its contour strengths on the *ricorso* of the previous cycle. Historically, there was always a new sector emerging to absorb the new unemployment. This time there is no new productive sector coming, the market system seeks to reinstate its new balance through new modes of doing business (as long as the state does not interfere in protecting and fixating the “old ways”).

The self-organizing principle of the ongoing transformation remains the accelerating productivity growth rate. *Different* productivity growth rates in different sectors are accompanied by virtually *uniform* growth rates in wages and salaries across all sectors, as brought forth by free-market forces. As a consequence, the goods of high-productivity growth sectors (food, manufactured things) are getting cheaper and the products of low-productivity growth sectors (health care, education, insurance) are getting relatively more expensive. In developed economies, the higher the productivity, the cheaper the product, and the lower the productivity, the more expensive is the product.

Rational economic agents tend towards *substituting* relatively cheap and capital-intensive manufactured goods for relatively expensive and labor-intensive services. So we observe the emergence of automated teller machines instead of bank tellers, self-service gas stations instead of full-serve stations, self-driving instead of chauffeurs, do-it-yourself pregnancy kits rather than hospital test services, self-handled optical scanners rather than cashiers, and so forth. These trends accelerate towards RFID-based autonomous shopping, Zumbox instead of post-office service, customer-driven digital economy, and so on. *Outsourcing to customer* is becoming a way of life in mature economies.

The driving forces of this transformation are therefore *self-employment*, *entrepreneurship*, *self-service* and *do-it-yourself*. The *outsourcing to customer* is a natural and necessary phenomenon, including the processes of *disintermediation*, *customer integration* and *mass customization*, all driven by productivity growth at the cusp of transformation. Households are becoming primary investment/production units. Individual, small and medium-sized businesses are the new sources of employment, including “work at home” and self-employment, relying on home office, telecommuting, neighborhood networks, virtual office, mobile telephony, cloud computing and similar technologies.

5. Other accompanying C&R transformations

We have described the transformation of employment patterns and economic-sectors differentiation. This is only one of many manifestations of productivity-driven C&R based long-term trends in developed and mature economies. Accompanying C&R transformations include also *specialization – reintegration*, *technology – high technology*, *globalization – relocation*, and closely related phenomena like *self-service*,

disintermediation, mass customization, business-model innovation and support-net bypass, among others. Next we provide key characteristics of some of these emergent tendencies.

5.1. Specialization – reintegration

Humans have always specialized in terms of their product or service according to their talents and skills as well as their geographical circumstance (less in villages, more in cities and nations). The production process itself remained integrated and embodied in one person or a small group of craftsmen. After a long span of such integrated production, humans have started on the corso of specialization and division of labor within the production process itself. Especially during the Industrial revolution, processes were broken down and atomized into smaller and smaller pieces, peaking in the mass production of the first half of the 20th century. Then the ricorso of reintegration started to assert itself.

Mass production needed masses of less skilled workers, coordinated by an ever growing hierarchy of managers/coordinators. In the process of dividing the task and labor, knowledge became atomized from knowing the process to the point of knowing one small operation only. The cost of process coordination and management started to exceed the cost of production.

Clearly, there are internal systemic limits to the old processes of task, labor and knowledge division. As coordination of atomized components became more difficult, more costly and more complex, reintegrative processes gathered their momentum:

1. Reintegrating task: Combine smaller process sub-tasks and subactivities into larger, integrated units and packets. Reduce the number of parts, components, segments and constituents comprising products and processes. There is a clear charge of this *ricorso*: reduce the number of parts in products and operations in *reengineered* processes.
2. Reintegrating labor: *prepare* workers to perform and coordinate larger rather than smaller portions of the process. Encourage multifunctionality, job rotation, despecialization and process ownership. Automate or eliminate simple tasks. There is a clear charge: let people work in autonomous teams and coordinate an integrated process rather than laboring individually on atomized and linear mass-production *processes*.

3. Reintegrating knowledge: Workers must know (i.e., be able coordinate successfully) *larger* sections of the process and product, *not smaller* portions. Knowledge is the ability to coordinate one's action purposefully [12, 13]. If one is specialized, atomized and reduced to a machine appendage, one cannot coordinate action, but only carry out simple commands. The charge is clear: the integrated rather than specialized education, training and skills acquisition.

Such processes (of division and reintegration) are long term and close to Vico's *corsi e ricorsi* in the evolution of social systems [33, 34]. The processes of the division of task, labor and knowledge, through their own internal dynamics and self-organization, transform spontaneously into the subsequent processes of the reintegration of task, labor and knowledge [5, 6]. This is closely related to the changing nature of technology, manifested through its technology – high technology C&R cycle.

5.2. Technology – high technology

Every specific *technology core* (hardware, software, brainware) is embedded and coupled with its requisite TSN and gives rise to an evoked set of relationships among people: initiators, providers and maintainers of the necessary interflows in cooperative social settings. Every technology is a form of a *social relationship* brought forth from the background of broader environment.

Different changes in hardware, software and/or brainware will have differentiated impacts on the requisite TSN. Based on the nature of such changes, the following definitions apply:

1. *High technology* is any technology core that changes the architecture (structure and organization) of the components of TSN. High technology changes the *qualitative* nature TSN relations, including physical, energy and information interflows. It changes the skills required, roles played, styles of management and coordination – the organizational culture itself. It allows and requires to do things *differently* and to do *different* things.
2. *Regular technology* is a technology-core change that activates only *quantitative* changes over the qualitatively preserved architecture of the TSN. It allows users to perform the same tasks in the same way, but faster, more reliably, in larger quantities, or more efficiently. Regular

technology allows doing the same thing, in the same way, but more efficiently.

3. *Appropriate technology* refers to core-changes essentially preserving TSN, qualitatively and quantitatively; its effects are *neutral*. It allows users doing the same thing in the same way: preserving and protecting TSN is its purpose. Appropriate technology is very important in situations where the stability of the support net becomes primary for financial, political socio-cultural or environmental reasons.

There is an evolutionary C&R life-cycle emerging from the use and development of any technology or business [32, 41]. On Fig. 9 we sketch a diagram of the self-renewing cycle of technology:

Observe that at the stage of appropriate technology the conditions (commoditization, ineffective innovation, stability) exist for a new high-technology core to emerge. This challenges the existing TSN which becomes increasingly defended and protected by its owners and stakeholders. At some point the old TSN is disrupted and forced to either co-evolve with or be bypassed by the new one. New versions of the core are introduced and fitted, first qualitatively, then quantitatively, into the co-evolving and increasingly appropriate TSN, with high-technology effects continually weakening and dissipating. High technology becomes Regular technology, with more efficient versions fitting the same TSN. Finally, even the efficiency gains diminish,

emphasis shifts to tertiary attributes (appearance, style, reliability, habit) and technology turns into the TSN-preserving appropriate technology. This technological equilibrium or stasis becomes fixated and stable, resisting again to be interrupted by a technological mutation – until new high technology appears and the cycle is repeated.

For example, internal combustion automobile was high technology with respect to the horse carriage, it then evolved into regular technology and finally into appropriate technology with a stable, unchanging and heavily protected TSN. Today, the main high-technology advance takes the form of electric car or electromobile, ultimately extracting heavy economic “revenge”⁵ from the inertia of protectors of the old TSN.

5.2.1. TSN – barrier to innovation

New high technology is often resisted by defenders of the old TSN. New inventions are not permitted to turn into innovations in the fear of disrupting the heavily invested, stabilized and reliable TSN. Its stakeholders protect their money, jobs, political power, property, comfort and habitual way of life. The electric car is resisted by gas-station operators in the same way automated teller machines (ATMs) were resisted by bank tellers and automobiles themselves by horsewhip-makers. The proverbial “Resistance to change” is not a universal human trait. In fact, humans mostly like change, seek it out and thrive on it – as long as the change preserves the support network they are being part of.

The accelerating capabilities of electromobiles, are bypassing the entrenched internal combustion engine TSN towards the high technology transformation of the automobile [19].

Example. The idea of electromobile and its distributed engine is a century-old concept of the Bohemian designer Dr. Ferdinand Porsche. In fact, electromobiles preceded gasoline engines by some ten years. In the early 1900s, a 25-year old Porsche of Hofwagen-Fabrik Jakob Lohner & Co. developed electrically powered wheels and used them in roughly 300 different vehicles. In Amsterdam, for instance, both the fire brigade and “Amstel” brewery trucks briefly drove with his distributed-engine type of traction.

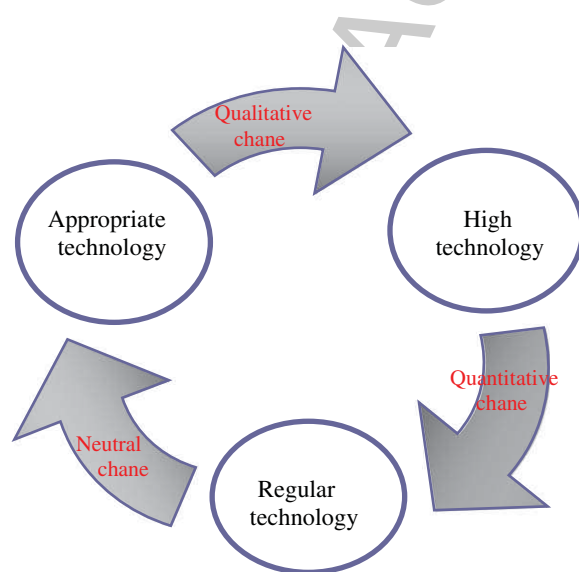


Fig. 9. C&R cycle of High-Regular-Appropriate technology change.

⁵ In Chris Paine’s new film *Revenge of the Electric Car* (the sequel to his 2006 movie *Who Killed the Electric Car?*) the struggle for TSN is well documented. After GM destroyed over 5000 *EVI* electromobiles, it had to be bailed out by taxpayers, went bankrupt and now, after ten years, it is getting ready to produce all-electric subcompact *Spark*. The cost of fighting against the *corso* of history is staggering.

All these innovations, later upstaged by the low cost of gasoline engine, have disappeared from automobile evolution for some hundred years. The gasoline-based TSN has proved to be an insurmountable barrier to any electric advances. Countless inventions and improvements have ended up in the safes of automakers and Big Oil capital interests.

Among the most famous victims of the TSN-barrier were, for example, the Czech “elektromobil” EMA-1 from 1969 (<http://www.stream.cz/video/296931-elektromobil-ema-1>) and the General Motors electric vehicle EV1, evolved from the ZEV (Zero Emission Vehicle) mandate for California of the 1990s. In this case the power of TSN interests was so ruthless that in late 2003, GM officially cancelled the EV1 program, despite the growing waiting lists, positive feedback from the users and accelerating movement towards ZEV laws. All EV1 leases required return of the vehicle at lease end; the last private EV1 lease expired in August 2004. All of the vehicles were scrapped and destroyed at the GM Desert Proving Grounds in Mesa, Arizona, much to the protest of their former users. GM similarly disposed of 492 copies of its Chevrolet S10EV electric pickup truck. In 2003 Toyota stopped production of its advanced RAV4-EV, recalled and destroyed most of them by 2006. Battery patents were sold to Chevron-Texaco/ Similarly, in 2006 Nissan scrapped all electric Hypermini in Pasadena, CA. Such is the power of the TSN inertia and big oil lobby that even the most successful inventions cannot become innovations; even at the cost of the squandering potential technological advantage. Instead, we have predatory hybrids and biofuels sponsored by big-oil companies...

So, how does one encourage effective innovation of the high-technology type? The focus must be on *bypassing the existing TSN*. It is not sufficient to be creative and inventive. Instead of waiting “100 years” one has to concentrate not just on hardware-software-brainware core, but on the *main barrier to innovation*, the TSN itself,

So called *continuous improvement* is not facing TSN obstacles: it is continuously adjusting and fitting innovation to the *existing* TSN. Through the myriads of daily improvements, it ultimately achieves a perfect fit between technology core and its support net, the appropriate technology. Such continuous tiny advances end up in changing shapes, names and colors, while preserving TSN investments ad infinitum. One cannot continually improve a horse carriage and somehow stumble upon an automobile. The only outcome of such innovation is an „incredible horse carriage“– all

titanium and carbon composites, with golden initials, overwhelming gadgetry and shimmering colors, but still a horse carriage.

5.2.2. TSN-bypass strategy

What is needed for meaningful innovation is *discontinuous improvement* leading to high technology, disrupting the old ways and old interest, lifting up human spirit and advancing human condition in leaps and bounds. That is where the TSN-barrier becomes visible, active and powerfully defended. That is when bypassing the existing TSN becomes the only way out for mankind, barring catastrophic price changes in resources and inputs of the old technology. Such widespread changes, transforming companies into innovation factories [17], cannot be resisted and ultimately dismantle the old TSN and transform the interests. But waiting for such spontaneous processes could become a long and wasteful wait indeed.

In the meantime we end up with a Toyota-type car with 30.000 different parts, screwed and soldered together, mechanical, electronic, glass, wood and metal all. One missing part and the whole supply chain gets disrupted, in failing part and the whole contraption goes out of kilter, subject to endless recalls. We end up with a far cry from an integrated, solid state electromobile, with few mechanical components, no moving parts other than wheels (generating their own electricity), modularly designed and assembled, easily maintained and repaired, quiet and clean with respect to the environment.

Yet, the technology and knowledge for such a “laptop-kind” design is widely available and accessible for decades and the only serious obstacle was the gasoline-based TSN and its overinvestment. A good example is Mate Rimac’s *Concept_One* supercar with a new propulsion concept, All Wheel Torque Vectoring. With a curb weight of 1650 kg, and 1088 HP, the *Concept_One* can reach 100 km/h from a standstill in 2.8 seconds and continue to accelerate to the limit of 305 km/h. The 92kWh of energy in the Battery Modules delivers enough electricity for up to 600 km of range.

The *TSN-bypass strategy* of innovation is emerging on all front of human endeavor, not just in automobiles.

5.3. Globalization – relocation

The most important C&R cycle, still only at its inception, is the *Globalization – Relocalization* tendency. It is still mostly hidden and rarely discussed, but it is

already gathering strength and accelerating its visible symptoms.

Like any other social process, globalization emerged, expanded, peaked and entered its reverse – *ricorso* towards new localization. The lack of clear and operational definition of globalization implies that the word simply means what the users wish it to mean. Yet, it is not international trade or political “power grab”, or similar ancient phenomena that preceded globalization by millennia. Theodore Levitt first used “globalization” in his 1983 Harvard Business Review article. He defined the term as the changes in social behaviors and technology that allowed companies to sell the same products around the world. But the term was used since the early sixties to express the sense of the weakening of localized entities of nation-state, national economies, and national cultural identities - and their merging into a “global village”.

Because globalization is clearly a *natural* phenomenon, we should be able to trace it to the natural evolution of national economies. All economies are undergoing the same sector-differentiation process as described on Fig. 7. However, due to differential productivity growth rates they progress at different speeds and are at different levels of sector differentiation and employment. On Fig. 10 we schematically display generic sector-employment profiles of typical economies, ranging from one-sector *agricultural* through *industrial* and *services*, up to the final four-sector *mature* (left to right).

So, not only are the individual national economies differently sector-differentiated, but the global economy is composed of economies interacting at different

levels of dynamics. It is the mature economies of U.S.A., Western Europe and Japan that are facing the most severe challenges of transformation (confounded with the crisis). Developing economies (like BRICS) are in the industrial or services stages, still accelerating to catch up with the mature-economies pattern within a decade or two.

As the most productive economies develop capacities way beyond their local and national scale, they start seeing global markets as their appropriate and natural outlets.⁶ But their high standard of living and high rate of salaries and wages prevents them from developing products and services accessible to consumers in developing countries. They are bound to counteract this predicament by using even more high technology and outsourcing their processes to the cheaper wage rates and human resources abroad – *globalization emerges* as outsourcing of low added-value local production structures and supply chains into the global space, scope and scale.

Globalization is therefore to be understood as a restructuring of the initially distributed and localized world economy into spatially reorganized processes of production and consumption across the boundaries of national economies and political states on a global scale.

In the *corso* of localization – globalization, it is the local producers and consumers who are becoming *embedded* into the structures of global economy. In the *ricorso* of globalization – relocalization, it is the global experience and knowledge that is becoming *embodied* in local communities. So, the corso-ricorso of socio-economic transformation is properly captured by a triad of *localization – globalization – relocalization*. In globalization, national-state boundaries and autonomy are ceded upwards to supernational institutions, unions and assorted leagues; in relocalization, national-state boundaries and autonomy are distributed downwards to subnational regions, localities and communities.

Either way, it is the nation-state, its traditional party-based political systems, and its “too large to fail” inflexible giant corporations that are weakened by both globalization and relocalization. New economic and political systems are emerging, favoring small and

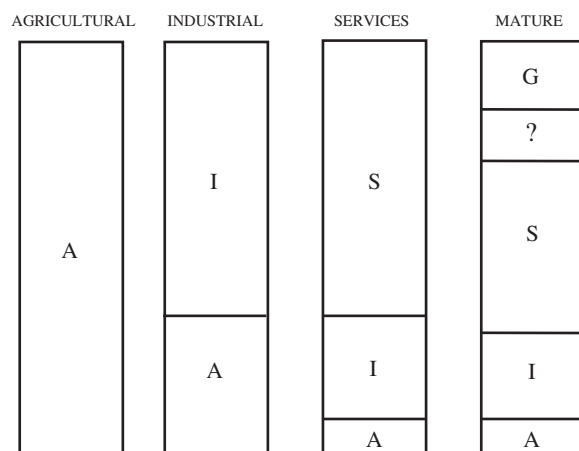


Fig. 10. Agricultural, industrial, services and mature economies.

⁶ High-productivity companies in small economies outgrew their local markets and entered larger global markets very early. The first (and the largest) truly global company was *Bata Co.* in Zlin, Moravia. It has successfully weathered the Great Depression of the 1930s and established its shoe manufacturing dominance in China, India, Africa, North and South America, all of Europe, etc., stopped only by the Nazi and Communist takeovers after 1939. See for example [43].

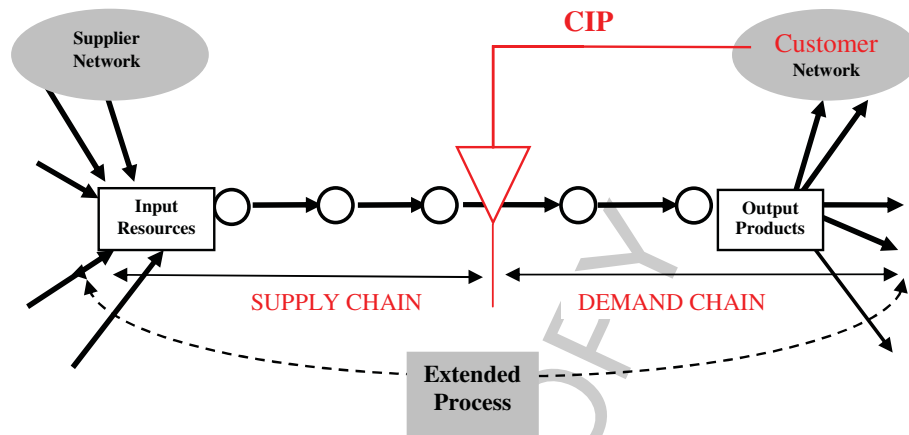


Fig. 11. Customer Intervention Point and the shift to Demand chains.

medium enterprises (SMEs) which are better equipped to carry through the transformational change [37].

Integral part of the ongoing *relocalization*, is a return to the original slogan of “Think globally, act locally” which we interpret as exploiting global information and knowledge in a local action under local conditions and contexts.

The ricorso of relocalization accelerates when a critical mass of mature economies (U.S.A., Western Europe and Japan) find themselves on the transformation cusp: facing the increasing wage rates of developing countries, growing prices of traditional energy sources and commodities, and having exhausted employment-growth potential in all four generic sectors of economic activity. At that point the cost of global production and logistics increase, supply chains become complex and vulnerable and consumers start preferring local products again.

With relocalization, an entire new cycle of societal *ricorso* is brought forth. Local services, local production and local agriculture, based on distributed energy generation, additive manufacturing and vertical farming, are enhancing individual, community and regional autonomy through self-service, disintermediation and mass customization. Both requisite technologies and business models necessary for relocalization are already part of our daily business and life experience.

5.3.1. Mass customization

During relocalization there is a growing need not only for simplification and shortening of supply chains, but also due to continuous replacement of supply chains by *demand chains*. As is *customer intervention point* (CIP) moving steadily to the left (mass- and

self-customization), customer-controlled demand chains are taking over [38].

The CIP phenomenon simplifies value chains coordination and favors more localized food, products and services as time becomes an increasingly important attribute of customized satisfaction (time, quality and cost). As long, unreliable and costly supply chains were the hallmark of the corso of globalization, so are the fast, simple and cheap demand chains drivers of its ricorso.

In the ricorso of globalization, all the initial outsourcing to companies and to developing economies is being gradually *pulled back* according to ever changing gradients of cost, speed, quality and reliability, ultimately to be replaced by *outsourcing to customer*, the most effective added-value strategy for approaching relocalization.

6. Democracy: Socio-political prerequisite

All the outlined driving and derived transformation cycles are natural and spontaneous, based on human pursuit of higher productivity within a free-market framework. Powerful governmental efforts to stop the history and promote the old at the expense of the new are thus bound to fail [7].

However, successful economic transformation requires effective framing within the requisite political adjustments and transformation of current form into *authentic democracy* [4]. These are not natural and spontaneous processes, but engineered and controlled interests of the inertia of political power. Analyzing requisite political frames goes well beyond the intentions of this short-summary paper. So we limit

ourselves only to a necessary outline.

In the era of global internet and communications, enhanced information and knowledge, and increased political self-awareness, practiced authentic democracy should have at least the following features:

1. *Direct democracy and one person-one vote.* All popular votes should be direct and of the same value. Political-district based and “winner takes all” voting degrades the value of voting and reduces participation (if 51% takes all, then 49% citizens – certainly not a minority – are rendered useless and wasteful). It is the total number of individual votes that defines direct democracy.
2. *Non-partisan representation.* Political parties are not necessary for functioning democracy: they bring in ideology, block voting, money and corruption, inaction and dissolution of individual responsibility. Politicians should be directly selected, non-partisan individuals, directly responsible to their voters.
3. *Crucial NOTA option at all levels.* To increase participation, vote option “None of the above” (NOTA) is crucial for defining the actual effective “mandate” of a representative. Non-voting population is not necessarily passive or not-caring, but could be demotivated by the options available.
4. *Take money out of politics.* The 2012 Election will cost \$6 billion. What voters get for it is just anti-ads and smear campaigns. This is obscene at the time of economic crisis and sky-rocketing debt. Legalized corruption of *super PACs* of anonymous financing ... democracy should have never been put for sale and representation taken away from the *res publica*.⁷
5. *Term limits.* To curtail the curse of incumbency, special interests and corruption lobbies, term limits have to be enacted. Fresh blood, ideas and energy should regularly circulate throughout the system. Veritable “spider nets” of sustainable arrogance, corruption and political privilege would lose their self-production capabilities.

None of the above can be brought forth by politicians alone: their first allegiance is to their party and to their sources of money; all the rest is just a speech.

⁷ Greek *dēmokratía* stands for “government by the people”. The Romans used *res publica*, as “representation of the public.” The Athenians had both direct and representative democracy. American Constitution of 1787 says: “The United States shall guarantee to every state in this union a republican form of government . . . ” (Article IV, section 4); no mention of democracy.

So called “unholy alliance” of OPM (Other People’s Money) government and banking sectors shall protect its well-being by all available means.

Many citizen initiatives and movements, even relentless street demonstrations, will be necessary and characterize the *era of transformation* before independent politicians-individuals take root in a new democracy. However, the ongoing and inevitable economic transformations of the C&R-cycle type will bring forth their own requisite socio-political support net.

7. Summary of technology-based drivers of transformation

The stream of new high-technology innovations is accelerating across the globe. They all have certain dominant characteristics in common [38], indicating the drivers of the corso and ricorso of local, regional and global society:

1. *Reintegration.* After the centuries of specialization and division of labor, task and knowledge, we have now experienced the inefficiencies and risks of approaching the limits. The *process of reintegration* is accelerating, leading to a smaller number of workers, operations and product parts needed.
2. *Self-Service and Self-Help Empowerment.* We are witnessing the most powerful and massive form of outsourcing taking place on a global scale: the *outsourcing to customer*. Customers are increasingly performing the traditional services more effectively and more efficiently.
3. *Disintermediation.* There is an increased need for direct communication between producers (providers) and their customers, leading to the *elimination of the middle man*. Direct access of users to information is rapidly making assorted agents, dealers and intermediaries increasingly redundant.
4. *Mass- and Self-Customization.* Proliferation of mass-produced variety is becoming unsustainable. Overloaded retail space, impaired decision making, high prices and lack of individualized customization are ushering in an era of mass customization and particularly *self-customization*: customer becomes integrated into the production and delivery processes.
5. *High-Technology Impact.* There is a wave front of new technologies with high-technology impact:

qualitatively restructuring and disrupting old technology support networks and infrastructures. So called continuous improvement has spent its charge and *discontinuous improvement* of products, services and business models [9] is now driving innovation processes [39].

6. *Support-Net Bypass*. Because of the (determined and fierce) resistance of technology support net owners, investors and stakeholders, equipped with money, political power and inertia of habits, new technologies have to effectively *bypass existing support nets* and create their own in parallel and autonomously by outsourcing technology support to customers and users themselves.
7. *Digital economy*. Digitization is a technology which is contributing most to productivity growth rates enhancement in services, government customer empowerment. Digital economy is gradually complementing and ultimately replacing traditional service-based economy.

These technological drivers bring forth vast changes in economic, social and cultural determinants of business behavior, customer habits and lifestyles.

Take for example the self-serve gas station. Where customer self-serve is introduced massively, like in Eastern Europe, the gas station becomes a roofed, carpeted, heated “shopping mall” with restaurants, specialty shops and entertainment – all directed to customer comfort. Additional local businesses thrive around the gas station. Whenever the self-serve is illegal (like in New Jersey, USA), gas stations remain unroofed, dirty and desolate places “designed” to keep the customer inside the vehicle. The difference between the old and the new could be staggering, the loss of business and jobs amazing. Similar transformations of business and lifestyle accompany all other high-technology change drivers.

The new wave of transformational high technology [1] includes, for example, *Distributed Co-creation*, *Open-source innovation and Co-ware*, *Social-network based organization*, *Collaboration Technology*, *RFID-based Internet of Things*, *Enterprise as a Laboratory*, *Self-sustainable company*, *Production as a service*, *Multi-sided business model*, *Smart Grid*, *3D-printing and desk-top manufacturing* [3], *Technology-enabled innovation in emerging markets*, *Vertical farming* [2], *Distributed energy generation (Bloom box)*, *Digital Post Office (Zumbox)*, *Home and mobile health care*, *Telemedicine*, *RFID portal*, *Google Wallet*, *Rent-anything Apps*, *Pay-for-access (not ownership)*,

I.B.M.'s Watson, and so forth. Workers are losing their jobs to machines and it is hopeless to compete with machines. It is useless to list all transforming technologies, they are emerging daily. The world will never be the same; it is autopoietic, self-configuring, self-organizing, self-healing and self-renewing [29, 30] – in spite all the counter-efforts of modern politicians and their parties.

8. Conclusion

There is a transformation going on from globalization to relocalization. It is preceded by a number of accompanying precursor transformations: 1. Final differentiation of economic sectors, rooted in accelerating productivity growth rates and characterized by high levels of unemployment; 2. Transition from specialization and division of labor to reintegration of labor, task and knowledge; 3. Emergence of new high technology, based on system integration and digitization; 4. Political renewal of failed democracy towards authentic, direct and non-partisan *res publica*.

Relocalization is the fifth, all-encompassing and integrative ricorso brought forth by the other four transformations. Among the many emerging drivers of this global realignment are self-service (outsourcing to customer), disintermediation (removing the middle man) and mass customization (empowering the customer), at al. The most suitable environment for the economic, social and political empowerment of the citizen-consumer and prosumer is more accessible, transparent and manageable local space and its local community.

Local community (LC) is a natural social order, sharing the same space, territory or locality, like house, neighborhood, city, area, region, or other form of geography. This human microworld or microcontext is formed and ordered by the rules of physical proximity. LC has a great productive, creative and cooperative potential. Members of LC have vested interests in the quality of their natural, economic and social environment.

Yet, their potential has mostly dissipated through centralization, commuting and globalization. The right to manage and govern their LC economic, social and political interests has been taken away. Without such rights they will continue to wither into dependency on others, losing their autonomy, functionality and natural human comfort of a microcontext.

Reversing such trends, exploring and re-establishing local potentials, is the natural outcome of relocalization. When members of all LCs gain freedom and ability to manage and develop their own microworlds, then and only then will also the society at large restore its freedom, democracy and economic autonomy.

References

- [1] J. Bughin, M. Chui and J. Manyika, Clouds, big data, and smart assets: Ten tech-enabled business trends to watch, *The McKinsey Quarterly*, McKinsey Global Institute, August, 2010.
- [2] D. Despommier, *The Vertical, Farm: Feeding the World in the 21st Century*, Thomas Dunne Books, 2010.
- [3] T.A. Easton, The 3D Trainwreck: How 3D Printing Will Shake Up Manufacturing, *Analog* **128**(11), (2008), 50–63.
- [4] N.C. Georgantzis and G.D. Contogeoris, SME-driven economies might lead to authentic democracy, *Human Systems Management*, **30**(3) (2011), 125–136.
- [5] F.A. Hayek, Economics and knowledge, *Economica* **4** (1937), 33–45.
- [6] F.A. Hayek, The use of knowledge in society, *American Economic Review* **35** (1945), 519–530.
- [7] F.A. Hayek, *The Fatal Conceit*, University of Chicago Press, Chicago, 1988.
- [8] F. Jackson, *The Escher Cycle*, Thomson, 2004.
- [9] M.W. Johnson, *Seizing the White Space*, Harvard Business Press, Boston, 2010.
- [10] J.M. Keynes, *The General Theory of Employment Interest and Money*, MacMillan, London, 1936.
- [11] H.R. Maturana, *From Being to Doing*, Carl-Auer Verlag, Heidelberg, 2004.
- [12] R.K. Merton, The unanticipated consequences of purposive social action, *American Sociological Review* **1** (1936), 894–904.
- [13] L. Mises, *Human Action*, L. von Mises Institute, Auburn, 1998.
- [14] O. Morgenstern, Thirteen critical points in contemporary economic theory, *Journal of Economic Literature* **10** (1972), 1163–1189.
- [15] J. Pfeffer and R.I. Sutton, *The Knowing-Doing Gap: How Smart Companies Turn Knowledge into Action*, Harvard Business School Press, 2000.
- [16] J.C. Ramo, *The Age of the Unthinkable*, Little, Brown and Co, New York, 2009.
- [17] P. Rosenzweig, *The Halo Effect*, Free Press, 2007.
- [18] J.A. Schumpeter, *Capitalism, Socialism and Democracy*, Harper & Row, New York, 1942.
- [19] P.M. Senge, Foreword, in: A. De Geus, (1997). *The Living Company*, Longview, Publishing, Boston, 1996.
- [20] Y. Shi, D.L. Olson and A. STAM (Eds), *Advances in Multiple Criteria Decision Making and Human Systems Management: Knowledge and Wisdom*, IOS Press, 2007, p. 407.
- [21] C.S. Smith, *Search for Structure: Selected Essays on Science, Art and History*, MIT Press, 1981.
- [22] T. Sowell, *Applied Economics*, Basic Books, New York, 2009.
- [23] J.E. Stiglitz, *Public Policy for a Knowledge Economy*, The world bank department for trade and industry, center for economic policy research, London, U.K., 1999.
- [24] F.J. Varela, H.R. Maturana and R. Uribe, Autopoiesis: The organization of living systems, its characterization and a model, *Biosystems* **5** (1974), 187–196.
- [25] G. Vico, Principi d'una scienza nuova d'intorno alla natura della nazioni (*Scienza nuova prima*), 1725; Cinque libri di G. B. Vico de' principi d'una scienza nuova d'intorno alla comune natura delle nazioni (*Scienza nuova seconda*), 1730; Principi di scienza nuova d'intorno alla comune natura delle nazioni (*Scienza nuova terza*), 1744.
- [26] T.E. Woods Jr., *Meltdown*, Regnery Publishing, Washington, D.C., 2009.
- [27] P.K. Wright, *21st Century Manufacturing*, Prentice-Hall, 2000.
- [28] J. Young, *The Natural Economy*, Shephard-Walwyn, London, 1997.
- [29] M. Zeleny, *Autopoiesis, Dissipative Structures, and Spontaneous Social Orders*, Westview Press, Boulder, 1980.
- [30] M. Zeleny, *Autopoiesis, A theory of living organization*, North-Holland, New York, 1981.
- [31] M. Zeleny, *Multiple Criteria Decision Making*, McGraw-Hill, New York, 1982.
- [32] M. Zeleny, High technology management, *Human Systems Management*, **6** (2), (1986), 109–120.
- [33] M. Zeleny, La grande inversione: Corso e ricorso dei modi di vita umani, in: *Physis: Abitare La Terra*, edited by M. Ceruti and E. Laszlo, Milano: Feltrinelli, 1988, 413–441.
- [34] M. Zeleny, The grand reversal: On the Corso and Ricorso of human way of life, *World Futures*, **27**(2), (1989), 131–151.
- [35] M. Zeleny, Ecosocieties: Societal aspects of biological self-production, *Soziale Systeme* **1** (1995), 179–202.
- [36] M. Zeleny, *Information Technology in Business*, Thomson, London, 2001.
- [37] M. Zeleny, Autopoiesis (Self-production) in SME Networks, *Human Systems Management*, **20**(3), (2001), 201–207.
- [38] M. Zeleny, *Human Systems Management Integrating Knowledge Management and Systems*, World Scientific, Hackensack, NJ, 2005.
- [39] M. Zeleny, The innovation factory: Production of value-added quality and innovation, *Economics and Management*, **9**(4), (2006), 58–65.
- [40] M. Zeleny, On the essential multidimensionality of an economic problem: Towards, tradeoffs-free economics, *Czech Economic Review* **3**(2), (2009), 154–175.
- [41] M. Zeleny, Technology and high technology: Support net and barriers to innovation, *Acta Mechanica Slovaca* **13**(1), (2009), 6–19.
- [42] M. Zeleny, Machine/Organism Dichotomy of Free-Market Economics: Crisis or Transformation? *Human Systems Management* **29**(4), (2010), 191–204.
- [43] M. Zeleny, Bata management system: A built-in resilience against crisis at the micro level, *Czech Economic Review* **4**(1), (2010), 102–117.