Real-World Economics Today:
The New Complexity, Coordination, and Policy
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Abstract

More realistic economics has to start out from the most basic socio-economic phenomena and processes, i.e., dilemma-prone interdependencies and strong uncertainty among agents that have become ubiquitous phenomena in the world today. In the reality of the “new” economy these are represented by functional and spatial fragmentation of value-added chains, global de-regulation and disembedding of the most powerful economic agents on the one hand, and increasing complexity and high integration of goods and services and net-based tele-IC-technologies on the other. All of these rather new phenomena entail ubiquitous actual or potential coordination failure, either in the form of conventional “market failure”, with a complete mutual blockage of action, or of "wrong" coordination, or technological "lock-in". Both forms are indicative of an insufficient capacity of the coordinated action required. In contrast, capability of sustainable innovative action in a broad sense requires new forms of coordination beyond “market” and “hierarchy”. Economics thus has to be defined more than ever as a science of effective coordination and the generation of innovative and sustainable collective action capacity. The global corporate economy has developed individualist arrangements to cope with that new coordination problem, such as local clusters and hub&spoke networks, which all have severe shortcomings. Against this background, the paper develops a setting with ubiquitous direct interdependencies, net-externalities, "strategic" strong uncertainty, and ubiquitous (latent) social-dilemma problems. It discusses the possibility of an ideal decentralized and spontaneous coordination through emergent institutionalized collective action, specifically of “well-governed” network cooperation. In conclusion, it is argued that only a hybrid system of networks together with a new public policy role, supporting collective learning and emergent institutional coordination, i.e., an “interactive” and “institutional” policy approach, is capable of solving the coordination problems of the "new" economy.

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The characteristics of the „new“ economy are not evidenced so much by the hypermania of its high-tech stock markets nor by the new productive forces of information as such. They are evidenced rather by the more fragmented, de-regulated and disembedded, net-based technological, uncertainty-prone, and spatially clustered character of the real economy. This all entails a considerable intensification of direct interdependencies among economic agents, where the outcome for A directly depends not only on its own decisions but also on the behavior of B, and vice versa. Direct interdependencies have always been at the very core of the economy and have always been anticipated by socio-economists of all perspectives. However, the interdependencies have become so intense, obvious, and ubiquitous that they even can no longer be ignored either by mainstream economists or by corporate agents and policy makers.

Situations of direct interdependence are genuinely complex, and complex situations, in turn, cause complex coordination problems. They require direct interactions where agents have to be aware of the actions and reactions of others. These can not effectively be conceptualized, or performed, by the ideal “markets” of mainstream economics - with their arm’s length relations and short-run maximizing behavior of individual agents who allegedly are coordinated (indirectly, i.e., without any agent-to-agent contacts) through (equilibrium) prices. Ideal price vectors are dependent only on the decisions of all other agents taken together and do not account for direct interdependencies.
or interactions among agents. “Markets” and prices, therefore, are incapable of generating and diffusing information, and the formation of future expectations, required to effectively coordinate agents in those problematic situations. As they fail in such complex situations, they cannot generate the coordinated action required – and, in this way, entail potential social costs in the forms of mutual “blockages” of action, information diffusion and innovation. This, by and large, also applies to real-world “markets”, and does increasingly so since "neo-liberal" de-regulation and disembedding has decreased the capacity of institutional arrangements to care for collective action capacity and in this way to manage complexity.

This paper discusses real uncertainty and coordination failure in the “new” real-world “market” economy, i.e., its increasing lack of collective action capacity, involving either (1) complete (latent) collective blockages of action (i.e., complete lack of coordination) or (2) technological lock-ins on inferior paths of development (i.e., "wrong", "old", or "outmoded", "petrified", or "sclerotic" coordination, another indication of lacking coordinated action), against the background of increased complexity in the “new” economy. It discusses new and more effective forms of coordination, and the opportunities for their emergence, creation and design.

Complete blockages of collective action can indeed become "de-blocked", or (technological) lock-ins be "un-locked" if a problem-solving, future-oriented collective action becomes feasible. We are speaking here of action capacity for generating shared information and for a sustainably high rate of innovation in a wide sense (i.e., technological and organizational innovation).

I) The New Complexity
De-Regulation, Disembedding and Uncertainty

Why have information, expectations, complexity and coordination gained such prominence in the "new" economy? First, "neo-liberal" globalization is a political and administrative project of selective strategies of de-regulation, liberalization and empowerment of capital and corporate concerns and of national and local regulation, bureaucratization and authoritarian control of more general societal concerns (s., e.g., Elsner 2003). The global layer of exclusive activities has become highly disembedded from the social institutions that used to exist in the nation-states and in national and local cultures. The "neo-liberal" construction and regulation of the global space has deliberately reduced collective action and social control in the general interest. In this way, it has become a system of social fragmentation, in addition to spatial fragmentation, and exacerbates existing disparities in power (s., e.g., Markusen 1996a; Standing 2001; Biswas 2002). The "neo-liberal" global system, thus, also can be called a system in "institutional disequilibrium", entailing an excess demand for international public goods, i.e., while demand increases their supply decreases (Padoan 2001).

Being "under-socialized" this way, the global economy does not provide enough "structure". This is true even for the most powerful individual corporate agents. Hence, the corporate economy faces an increased level of uncertainty and turbulence. As a result, instability and transaction costs have considerably increased, specifically, information costs.

Consequently, powerful corporate organizations find it necessary to increase their power even more to keep control over their environment and, thus, the global system has increasingly become a power-based and redistributive mechanism. The global corporate system generates ubiquitous negative externalities on third parties, the social and the
natural commons, rather than working for more comprehensive and sustainable innovations and capacity enhancement. Increased uncertainty, instability and turbulence, indeed, prove to be counter-productive for any collective problem-solving.

Note that we are talking here of “strong uncertainty” which we understand as being "strategic" in the sense that the individual agents, being interdependent, basically cannot know at the outset of their interactions nor calculate with a certain probability the "strategic" choices of other agents (s., e.g., Dequech 2001, 919f.; Ritzberger 2002, 210; Casciaro 2003 defines this as “partner uncertainty”).

**Fragmentation and Technological Complementarity**

Second, the construction of an exclusive global space has increased momentum towards vertical disintegration of corporate hierarchies in an effort to reduce labor costs and to gain control over an enhanced, world-wide labor force. Value-added chains in this way not only have been spatially fragmented by selecting labor and suppliers at optimal locations on the globe, they have also become functionally fragmented.

On the other hand, products, goods and services, have become ever more complex and highly integrated artifacts. Functional fragmentation thus increasingly is in contrast with the requirement of securing technological compatibility and complementarity in the chain and to coordinate for quasi-integration (s., e.g. Langlois 2003). Corporate restructuring, thus, is as much a struggle over the problem of uncertainty through new forms of coordination as it has been the provision of cheaper labor, resources and new sales opportunities (s., e.g., Ruigrok, van Tulder 1995; Raikes et al. 2000). Also this has involved individualistic, power-led “market” solutions on an hierarchical basis such as the
transnational corporation with its centralized hub&spoke supplier networks (s., e.g., Jones 2000).

Specifically, manufacturing and services have become separated into autonomous units and, thus, also directly interdependent in that collective learning processes are required that ensure a high level of coordination. Here, again, effective action is not feasible unless governed by a coordination mechanism that can deal with increased complexity (s., e.g., Rabach, Kim 1994; Bennett et al. 2000).

**Cumulative Information, Net-Technologies, and Lock-Ins**

Third, the technological basis of the “new” economy is characterized by digital, microelectronic and net-based technologies. Thus, no decision can be made that does not have a technical dimension, and no technology-related decision can be made that does not require a technical compatibility with the decisions of others. Every decision has to be considered relevant to the ability of agents to communicate and effectively interact with other agents. In this way, no decision can be made and no information or innovation can be generated that does not involve potential positive (net-)externalities. Any information and innovation basically has a cumulative characteristic.

This is but one example of the fact that most information increasingly displays the features of a collective good. Basic information, in a societal or general economic perspective, has always been characterized by non-rivalry in consumption and non-exclusion. Regardless of the fact that generating and exploiting asymmetric information is a dominant and "rational" opportunistic strategy in an individualist environment, joint use (joint consumption) of information is welfare-enhancing and in fact increasingly becomes a basic necessity for social co-ordination. It is well known even in mainstream economic
theory that the total benefit of information, as with collective goods in general, increases with the number of its users. Information that is crucial for coordination in fact has to be collectively used in order to be useful at all. Basic information, thus, is systemic - and it is normally generated collectively from billions of interrelated acts of behavior and learning. Against this background, technology, innovation and production have become systemic as well.

Digital microelectronic technologies, though, have added another characteristic to the collective-good property of information. The opportunities to produce, process, store, reproduce and disseminate information have drastically increased so that the (re-) production of information takes place at near-to-zero marginal costs (involving high economies of scale of such knowledge-intensive production or innovation). The "new" economy, thus, has entered a stage of informational abundance which bears little resemblance to the conventional mainstream economic assumption of scarcity. (This, in turn, also causes the problem of strong uncertainty in that decision makers confront both excess and deficiency of information, i.e., both too much and too little information to make effective decisions. Information overload is discussed with its systemic impacts e.g. in Hodgson 1999, 179 ff., 228 ff., 253 ff.).

Further, the technical facilities for reproducing information have become so widespread that they are no longer under control of the original producer. Digital microelectronic information has virtually become subject to non-exclusion, rendering information a full-fledged collective good (s., e.g., Gallaway, Kinnear 2002).

This is also related to the fact that information and technological knowledge are increasingly user- and context-specific and tacit, and must be developed, acquired and learned in a dense common interaction process.
In all, net-externalities and cumulative information have come to govern the dynamics of the "new" economy - and the “efficient” neoclassical isolated individual maximization is becoming a near-to-irrelevant exemption (if it ever was a relevant reflection of behavior in real socio-economies). However, coordination beyond prices and authority turns out to be a highly non-trivial problem.

With accelerating innovation and competing (and, initially, non-standardized) technologies, uncertain, reluctant and passive, or even completely blocked agents have become an ubiquitous latent feature of the economy (s., e.g., Tirole 1995, chp. 10.6; Wettengl 1999). The introduction of color TV, video-systems, high-definition TV and computer operating systems are notorious examples of the recent industrial history that demonstrate the ubiquity of latent collective blockages and, thus, of impeded dissemination of new technologies. In a world of net-technologies, the dissemination of new technology becomes feasible only when the problem of generating a standard has been overcome. In complex systems with its non-deterministic, idiosyncratic, path-dependent processes, the standard that emerges will be anything but “optimal” (s., e.g., the classical sources: Arthur et al. 1985; David 1985). In a world of uneven power distribution, a standard may well be imposed by large “champions” (s., e.g., the Windows operating system standard, vs. Apple’s OS or vs. Linux). Thus, there are pervasive tendencies in the "markets" to generate innovation at "sub-optimal" levels (s, e.g., Miller 2001; Weitzel, Westarp 2002 for many other case studies).

The presence of competing suppliers with different technologies thus implies that problems of standards, interfaces and protocols have become ubiquitous. The hierarchical, bureaucratic and power-based solution is obvious: Huge international private-public bureaucracies have been established to assist the development of technological standard-
setting, interface definitions and transfer protocols in order to prevent potential blockages from becoming effective (s. again, e.g., Weitzel, Westarp 2002).

Obviously, it has become more difficult under these circumstances to collect profit in the conventional commercial way. The technically warranted potential abundance of information with its collective good and cumulative character reduces the commercial producers' abilities to collect revenue in the "markets". The corporate efforts to change conditions in order to secure and increase profits, in turn, endanger a continued process of generation of new information, knowledge, and cultural material (s., e.g., Gillespie 2004; Adkisson 2004). Here we may have to face "the simple choice between profits and production" (Gallaway, Kinnear 2002, 443).

Increased complexity reflects the overall socialization of production and innovation, in the face of a fragmented and de-regulated economy. The “need, then, is for new institutions ...” (id., 446). The “limitations of information as a commodity now have come to the fore, both in economic analysis and in policy matters” and call for a "thoroughgoing innovation in organizational design" to include "a very high level of collaboration" (Lamberton 2001, 115, 117f.).

This renders real-world economics a science of (the joint learning of) appropriate coordination rather than a science of isolated individual maximization, general equilibrium and "optimality" (s., e.g., Friedman 1994).

**Lock-Ins and Social Dilemmas**

Against this background, there is ubiquitous (latent) coordination failure "in the markets" out there. Collective goods may cause complete blockages of action, i.e., ideal "market failure" involving no co-ordination. Coordination failure, however, may also assume the
form of "wrong" or outmoded institutionalized coordination, namely technological lock-ins on technologically inferior paths, a case connected with "old", "petrified" networks and conventional forms of restrictive collusion. In reality, coordination failure will occur, specifically, in de-regulated individualistic "market" cultures. The more individualistic the more the capacity of collective action to generate continuous problem-solving and innovation in a broad sense, and to evade the blockage or lock-in, will be lacking. In the absence of effective coordination through a more comprehensive and deliberate collective action, any established technology and economic path may unintentionally become inferior at some point of time (for the famous QWERTY case and other cases, s. above; there has been some discussion on the lock-in "paradigm", with objections from a standpoint more favorable towards market allocation and flexible processes; s., e.g., Liebowitz, Margolis 1995; s. a response in, e.g., David 2001).

In effect, most production and innovation have become "complementary", "systemic" and societal, and information cumulative, and display the features of collective goods. These we can formulate as social dilemmas. Here, individual agents have to cooperate in order to generate a more effective collective outcome, but at the same time have individualistic incentives not to do so, and even to gain an extra one-shot profit by exploiting others, specifically if these contribute to the collective outcome. Cooperation thus means abandoning a potential individualistic short-run maximum gain. This is the complex situation where coordination is highly non-trivial.

II)  “Market” Reactions
Power, Hub&Spoke Networks, and "Intellectual Property Rights"

In order to generate solutions to compensate for the strong uncertainty in disembedded "markets" and individualist cultures, the global corporate economy deploys conventional restrictive forms such as the use of market power and monopolistic positions, hierarchy, collusion, political lobbying for "intellectual property rights" and for international private-public standard-setting in the interest of the most powerful champions (s., e.g., Block 2000, 55ff.).

This is but an indication of the fact that essential features of the "new" economy provide a textbook case of "natural" monopoly. This case we call the Microsoft paradigm, where a powerful hierarchy commands considerable proportions of a relevant core technology and global demand. It typically organizes large hub&spoke structures throughout the global economy. Hub&spoke structures are the result of power and hierarchy interfering with basic structures of direct interdependence. As has been widely analyzed, the new digital and net technologies have pushed "power-ization" and centralization throughout the "new markets" (for telecommunication, s., e.g., Miller 2001; for the mass media industries, s., e.g., Champlin, Knoedler 2002).

Notably, this entails a tendency towards an artificial "construction of scarcity" of information which could easily, and should have to, be provided as a public good and largely be available for free (s., e.g., Gallaway, Kinnear 2002; May 2002, 125ff.). The enforced power structure, thus, "is increasingly at odds with technological reality" (Gallaway, Kinnear 2002, 446).

Local Clusters and Networking, Hub&Spoke-Type
The corporate economy, however, also develops new forms of coordination such as local clustering. Local clustering, with its recurrent, stable and long-termed interactions with near-by located suppliers, service providers, customers, competitors and different societal and public agents, has become a new kind of spatial organization for the most advanced, high-tech, globalized and fragmented parts of the corporate economy (s., e.g., Feser 1998; Maillat, Grosjean 1999; Breschi, Malerba 2001). The famous prototypes of local clusters, such as the Silicon Valley, Boston’s Route 128, or the districts of the “Third Italy”, together with their relative strengths and efficiencies as spatial organizational forms, have been widely discussed in the literature throughout the eighties and nineties. Thus, in spite of its rhetoric of globalization, the corporate economy is striving for spatial and cultural proximity through some form of local re-embedding, structure, certainty and collectivity (s. also, e.g., Gertler et al. 2000; Torre, Gilly 2000; Perraton 2001).

Clusters are "functional" systems of supplier relations that stem from, and largely adhere to, "markets" in the sense that they emerge from spontaneous, volatile arm’s length spot-relations (s. Elsner 2000, 413ff.). At the same time they partially outgrow the "market" in that they establish more stable and frequent or “dense” interactions. They partly drop "market" relations as relations get increasingly resistant against competitive low-price offers from outside the cluster. This is because their recurrent and stable interactions lead them to develop parallel and similar ways of thinking, planning, expecting and behaving, better knowledge of each other - and in this way more stable expectations about the others' future actions, i.e., some form of "trust". Those expectations and mutual trust outweigh low-price offers from "outside". Without necessarily being conscious of it, the agents enter into processes of collective learning of correlated behavior that coordinates
them in a non-"market" way and helps them solve some collective dilemma problems (s. also, e.g., Steiner 1998; Dupuy, Torre 1998; Elsner 2000).

However, power and "hierarchy" will normally enter and "conquer" clusters. Global corporate agents organize fragmented value chains on global and local levels on the basis of power, hierarchy and centralization. They control information flows, entry and access to resources and play their roles as key agents in regional clusters, following the postulates of large-scale production under the conditions of global fragmentation of resources, production chains, and customers (s. also, e.g., Dunning 1996; Swyngedouw 1997; Raikes et al. 2000, 392ff.). Against this backdrop, clusters adopt structures of hub&spoke, "satellite platforms" and other hierarchical and power-based forms (s., e.g. Markusen 1996b). In this way, clusters may become more "regressive".

Consequently, the effectiveness and innovativeness of clusters must not be overestimated. Hub&spoke clusters may be highly innovative as long and as far as the powerful hub forces innovations in his own interest. However, the more power-based, hierarchical and hub-centered a cluster is the more risky and precarious it will become, i.e., prone to early downward swings and accelerated premature aging (s., e.g., Tichy 1998).

Clusters are the basis for more consciously developed kinds of coordination, i.e. ("strategic") networks, normally established by some subset of firms in the cluster, and on the basis of the trust that (unintentionally) has emerged in the cluster. Networks are consciously contracted, project-based, multilateral and mid-term oriented cooperative coordination mechanisms (for a definition, s. again Elsner 2000, 413ff.). As such, they might even more effectively assist in the solution of the collective and dilemma problems and in the promotion of collective learning and coordination-building. We are talking here of ideal, "progressive" networks that are supposed to be problem-solving coordination mechanisms.
mechanisms, i.e., they include structures and governance rules meant to solve the problems defined above, to promote a sustainable high degree of innovation in a wide sense. That is, they do not to generate and protect any power bloc or collusion that has been a most common form of "networking" in industrial-capitalist history. To make an operational distinction between "progressive" and "regressive" networks one might refer to a set of properties that define the position of the (small and medium-sized) corporate agents affected in the life-cycle of their products, technologies, industries and regions. Thus, we may define problem-solving networks with reference to the size and relative life-cycle position of their members, their structures, governance and performance.

Nevertheless, also potentially "progressive" networks out there in the real-world “markets” are insufficient substitutes. Being private solutions, unregulated networks, not embedded in a larger societal context, similar to clusters, display tendencies towards exclusion, collusion, and hub&spoke structures in the reality of power-based economies, thus tending to hamper comprehensive and sustainable innovation if assuming traditional hierarchical hub & spoke structures (s., e.g., Baker 1996; Pratt 1997; Armstrong 1998; de Laat 2004).

Networking, Open-Source-Type - "Good" Network-Governance and Self-Sustaining Coordination?

A promising network type is what we call the Linux paradigm. At its core is a radical open source strategy vis-à-vis the whole (internet) public. That is, its structure is characterized by decentralization, few power disparities, and hubs which assume the minor role of technical organizers and moderators only (s., e.g., Cohendet et al. 2001; McKelvey 2001; Raymond 2001). The largely public and communicative, near-to-ideally anarchistic, Linux
network is one of the biggest success stories of the digital economy. Its unprecedented and sustainably high speed and quality of innovation obviously exceeds that of the powerful hierarchical structure of Microsoft, i.e., the MS-DOS/Windows operating system.

Indeed, a core finding of "hackerdom" seems to be that structures of low levels of power and hierarchy and corresponding governance rules aiming at open and cumulative information flows and non-exclusion may be network properties favorable to a culture of effective learning of coordination and, subsequently, to fast and sustainable innovation in the broadest sense (s., e.g., Foray 1998). If network "structure plus governance" is conducive to high performance, then we may conclude that the principles developed and applied here may be highly relevant as a model of networking.

A large amount of literature has developed "good governance" principles favorable to effective collective action so that networks can avoid a collusive character that could make them vulnerable to sharp external changes, premature aging or retarding rather than innovative behavior. Among these principles are openness, guaranteed entry, parallel and redundant action among participants, an effective "voice" mechanism, "reciprocity", and others. These ensure continuous learning and institutionalization of cooperative action, with the incentive of superior effectiveness of everyone involved, and, subsequently, an abundance of innovations (s., e.g., Ostrom 1990; Maggioni 1997, 238-49; Elsner 2000, 450ff.; Lazonick 2001). Networks of this kind could well be “ineffective” in the short-run for powerful individual agents, because of the high learning investment required, while powerful hubs might command “their” networks more effectively in the short run, thus possibly generating negative repercussions in terms of hierarchical rigidities and “non-learning” in the long run.
However, in the reality of power-centered de-regulated "market" economies even these networks may become dominated by powerful corporate agents. Under given conditions, their structures and rules may become vulnerable vis-à-vis the exertion of power and hierarchy. Specifically, against the background of the increasing dominance of conventional powerful industrial players, state-administrative control in favor of commercial marketing interests and “intellectual property rights”, and commercial interests to make money by exploiting the “externalities” of open-source products, the future of largely self-regulated and fast learning networks in the internet economy has become highly questionable (s., e.g., Dolata 2002; de Laat 2004). The recent attack of the Intel-Microsoft "Trusted Computing Platform Alliance" (TCPA) on open source and competitive operating systems (namely Linux), and the recent wave of governmental “copyright acts” obviously is the most comprehensive challenge of informational liberties and of self-organized and self-sustaining processes through a public-private collusion of the most powerful agents in the whole microelectronic era (for the case of the Digital Millennium Copyright Act and other new certification and control acts, s., e.g., Anderson 2003).

Therefore, we must take a closer look at the possibility of meeting the complexity and coordination challenge of the “new economy” through spontaneous, decentralized, self-sustained private coordination.

III) Complexity and Coordination Through "Self-Sustained" Institutions-Building?

Complexity and Coordination
Complexity is defined as a property of a system that contains at first a large number $N$ of agents with direct relations $R(N)$ between each two of them. Here, $R(N)$ is a square function $R(N)_{\text{max}} = N(N-1)/2$, so that, with moderate numbers of $N$, “real-world” agents, who have to deal with the potential maximum number of $R$ in their social lattices will perceive this as “near-chaos”. In the face of a level of turbulence that is too high, the individual agent, as has been discussed above, indeed, is incapable of being innovative in a comprehensive, deliberate and sustainable way (s. also, e.g., Setterfield 1996; Schreyer 2000, 287ff.).

Ideal "markets" can not cope with complexity in this sense as they are systems of isolated individual agents with man-good relations only, determined through a (equilibrium) price vector that, in General Equilibrium Theory, in fact, is governed by an auctioneer. Agents are indirectly interdependent in that the (equilibrium) price vector depends on the aggregate quantities of supply and demand of all other agents taken together, where bilateral interaction at non-equilibrium prices is not allowed and in this way in fact is senseless.

Even Hayekian evolutionary “markets” that do allow for bilateral (direct) interaction turn out to be “heroic” artifacts as they presume that (non-equilibrium) prices contain enough information load to allow for effective competitive coordination processes.

Indeed, the acknowledgment of real-world direct interdependencies and interactions implies complexity to become a core property of both the object and theory of economics (s., e.g., Maggioni 1997; Rycroft, Kash 1999; Delorme 2001; Dequech 2001, 912 ff.). However, real worlds of social dilemmas are complex rather with their multiple relations $R_i$ among each two agents. This can easily be illustrated by a simple Prisoners' Dilemma.
(PD) structure with $N=2$, two pure strategies, a cooperative one, $C$, and a defective one, $NC$, and a symmetric payoff space:

\[
\begin{array}{cc}
C & NC \\
C & a, a \\
NC & b, d \\
\end{array}
\]

with $R_i = [R_i(C,C), R_i(NC,NC), R_i(NC,C), R_i(C,NC)]$.

As every single decision in any kind of "market" has to contribute to some collective framework good, i.e., the (re-)production of the environment of social rules where any "market" must be embedded in to some minimum degree (s., e.g., Callon 1998, for the "framing" discussion; s. also MacEwan 2000, chp. 4, on "The Social Construction of Markets"), the PD structure reflects the most basic fact that the real world economy is a socio-economy and that production, exchange and innovation always include a collective, societal dimension.

In view of complexity, effective action becomes feasible only by way of effective complexity reduction. The conventional device to reduce complexity in real-world "market" economies, again, is to resort to power, hierarchy and hub&spoke structures. $R(N)$ can be reduced to $N-1$ and even $R_i$ reduced to some $R_k (k \in i=1,\ldots,n)$ in hierarchies and hub&spoke structures, but these then will entail the shortcomings previously discussed.
With social dilemmas, non-hierarchical reduction of complexity indeed requires some decrease of the number of potential multiple relations. The ideal, non-authoritarian complexity-reduction device basically is some collectively learned institution of cooperation. This may lead, under certain conditions, and in an evolutionary process, to a reduction of the multiplicity of relations:

\[ R_i \rightarrow R_f = R(C,C) \]

This solution, then, must be "systemic" in the sense of establishing a supra-individual context ("frame") that prevents individuals from acting in their short-run self-interest. It turns out that this requires recurrent interaction and the emergence of stable and mutually consistent expectations (about others' actions and expectations), i.e., futurity and "trust". The behavior which would result, then, habitually excludes or restricts the strive for "rational" short-run maximization, i.e., a social institution of cooperation may emerge in spite of, and indeed overcoming, continuing incentives to defect. The reconciliation among these "mixed" (i.e., partly competitive, partly consistent) individual interests is only conceivable as a commonly accepted habitual rule (s. again, e.g., Dequech 2001, 922 ff.). Institutions, thus, turn out to be informational and "expectational" devices that inform the individual about what kind of behavior is expected from him/her and what he/she then can expect from others. We will consider this in some more detail in the following section.

Complexity, then, may be reduced to a level where individuals can reasonably be expected to act effectively, that is, to manage a then reduced level of uncertainty. In this way they become capable and even inclined to innovate, i.e., to develop more comprehensive and continuous problem-solving, through a more future-bound behavior. Capacity of action will then be gained collectively (as it can only be gained collectively).
Game theory, as has been indicated, may provide some deeper insight to this solution.

**Spontaneous Coordination Through Evolutionary Institutional Emergence?**

Coordination failure here will be represented in a social setting characterized by

- direct interdependence of the individual agents, i.e., a genuinely social situation;
- a social dilemma structure of the PD type, i.e., a largely individualistic culture at the outset; "neo-liberal" "market" conceptions have made cultures more individualistic in the past decades; thus, the individualistic behavior represented in a PD, and assumed at the outset, can be taken as a "worst case" view of a reality in which the social institutions of cooperation are weakened (implied here is perfect information of each player on the payoff structure, mutually perceptible actions and sufficient knowledge of each player on all individual decisions already taken);
- recurrent interactions, i.e., infinitely or indefinitely-repeated interactions, between the same players; this implies that more than two players form the population, so that exactly the same pair of players will meet with some given probability;
- "sequentiality" of rounds of decision-making, i.e., the opportunity for processes of collective learning and institutionalization; this implies that individuals may change their strategies in the sequence of rounds of the game.

The PD then also reflects why "markets" fail in worlds of direct interdependence with any collective goods present, even those framing, and connected with, every private
good, specifically, why they fail in a relatively individualistic, disembedded culture. As is well known, coordination failure is demonstrated in a one-round PD or a PD with a finite and known number of rounds. The collective good is inaccessible, then, to the individualistic private agents.

However, if we define a private good as a good that can self-sustainingly be produced by the interacting private agents, then the transition from a one-or finite-round PD to a supergame (being repeated infinitely or in an indefinite number of rounds), as is well-known from game-theoretic arguments, may well imply the potential transition to a “private” good.

A simple static “single-shot” supergame solution of that simple PD is the following (s. the matrix above, with \( b > a > c > d \), and with \((b+d)/2 < a\), to exclude alternating combinations of cooperation and defection). The same players will meet again in the next round with a probability of \( \delta \), \( 0 < \delta < 1 \), the common discount parameter.

Cooperative agents, interacting with each other, will normally gain

\[
C_{(C,C)} = a + \delta a + \delta^2 a + \ldots
\]

\[
= \frac{a}{1 - \delta} . \tag{1}
\]

The cooperator here is defined as a player who always begins cooperating and then plays what the other one played the round before, i.e., the famous TIT FOR TAT or TRIGGER strategy. While one cooperates, the other, defecting, agent may gain, as a maximum, the following:

\[
NC_{(NC,C)} = b + \delta c + \delta^2 c + \ldots
\]
\[ c = \frac{b-c}{1-\delta} \] (2)

Accordingly, when a C player meets a NC player he will receive \( C_{(C,NC)} = \frac{\delta c}{1-\delta} + d \); and NC players interacting with each other will receive \( NC_{(NC,NC)} = \frac{c}{1-\delta} \).

Cooperation may pay if \( C_{(C,C)} > NC_{(NC,C)} \). This can be postulated as \( (1) - (2) > 0 \), or

\[ \delta > \frac{b-a}{b-c} \] (3)

This formal solution indicates that the superiority of cooperation basically depends on the relative pay-offs of \( a, b \) and \( c \), i.e., the incentive structure, and the discount parameter \( \delta \), i.e., futurity. Cooperation will be feasible only when the future plays a sufficiently large role in relation to the incentive structure. A basic connection appears, then, between the collective action capacity, or coordination success, and the long-run perspective, i.e., sustainability of action. We will return to this result later to discuss some of the policy implications.

Obviously, the superiority of cooperation, determined in a comparison of what \( C,C \)-encounters gain compared to what \( NC,C \)-encounters may achieve, also depends, in a population with changing partners of interactions, on the portions in which the different strategies (or “cultures”) are represented in the whole population and the relative probabilities of their encounters. This also determines the superiority of cooperative strategies in an evolutionary process, i.e. the evolutionary feasibility and stability of cooperation.
However, this result is based on a static, so-called single-shot, supergame with fixed strategies in which only a single calculation and decision is made by the agents. Because we have, in contrast, assumed a process of sequential rounds, we have to show how cooperation emerges, and how it would even from the worst-case initial condition of a population of neoclassical non-cooperators. This means that we permit, and expect, an individual to change his strategy, and we would have to show how individuals change their behavior through (collective) learning (i.e., individual learning in direct interactions). Under favorable conditions, this may lead to a reduction of the complexity of potential types of relations to one, i.e., $R(C,C)$. Obviously, game theory is not very encouraging on the resulting dynamics and the probability of the evolution of the institution of cooperation. Here, however, we will only roughly refer to the literature.

As a first step we may refer to Axelrod’s solution (s. Axelrod 1984, 1997). He employed a simple replicator mechanism for the interactions of each two strategies for PD-supergames which were performed in great numbers in a population which, however, consisted of given portions of more than 60 different strategies for the PD, obviously the model of a quasi-evolutionary process, not quite the ideal we have required. After all, he demonstrated the stable superiority of the relatively simple co-operation strategy, tit for tat. This result has been interpreted as illustrating, at least, the emergence of the institution of cooperation. The replicator here is interpreted to reflect a learning process. It assumes the differential selection of the individuals, and a new individual who assumes the place of an old one, who has ceased to exist, is interpreted as an individual who has changed his behavior through learning. The conception of cultural evolution, nevertheless, requires a more explicit conception of the search and learning mechanism (s., e.g., Stein 1997). Of
course, the object of differential selection and differential reproduction here is the type of behavior (i.e., the institution), not the physical agent.

There are many approaches and models to formalize cultural-evolutionary processes which employ mechanisms of "selection", "crossing", "mutation" and individual adaptation through learning (from one's own experience, through imitation, etc.). They formally approach considerably towards cultural evolution in dilemma-prone settings and indeed often may result in the emergence of institutions of cooperation (s., e.g., Schotter 1981; Liebrand, Messick (Eds.) 1996; Franke 1998; Fudenberg, Levine 1998; Kirman 1998). These results also might support "neo-liberal" policy advisors’ great expectations for the evolutionary "efficiency" of a decentralized, i.e. "market" economy.

The strict game-theoretic argument, however, has always maintained that the PD cannot be solved since the pure NC strategy (i.e., ALWAYS NC) will always be dominant and the setting has only one Nash equilibrium, if seen as a sequence of rounds or stage games. A solution, therefore, was considered along the line of transforming the PD into a different game, the so-called assurance game or stag hunt. The transformation is achieved by calculating single-shot supergame payoffs for the four strategy combinations as indicated above. These form a new payoff matrix which displays the “condensed potential histories” of the PD:

<table>
<thead>
<tr>
<th></th>
<th>C</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>a₁,a₂</td>
<td>d₁,b₂</td>
</tr>
<tr>
<td>NC</td>
<td>b₁,d₂</td>
<td>c₁,c₂</td>
</tr>
</tbody>
</table>

with $a₁>b₁$, $a₂>b₂$, $c₁>d₁$, $c₂>d₂$, $a₁>c₁$, $a₂>c₂$.

This “condensed history” matrix has two Nash equilibria (in pure strategies). So the problem had been transformed into the – apparently less difficult – problem of how to
motivate players to change to the C strategies and achieve the Pareto-superior equilibrium – an equilibrium, at least, in contrast to the Pareto-superior non-equilibrium in the original PD case. Seemingly, learning and reputation mechanisms could be applied in a more comprehensible way here (for the stag hunt discussion, s., e.g., Skyrms 2001).

Sen developed the idea that, as far as players can be assured or reasonably expect, that the others will cooperate, the Pareto-superior situation will become an equilibrium at the same time. So, the degree of subjective assurance was brought into the setting (s. Sen 1967). Whether a solution really can be advanced by Sen’s suggestion of a Rousseauian “contract social” is questionable. In fact, we are referred back to a more complex evolutionary process of joint learning of institutions of coordination and cooperation. Generally speaking, it seems more intelligible that the indicated supergame logic supports the maintenance of an institution after it has been established (and has become a culture in the population, at some portion at least). This, indeed, is what the Axelrod approach has demonstrated: institutions of cooperation that already did exist in a certain portion, proved to be astonishingly resistant and even expansive even starting from small minority portions. The question then arises as to the minimum portion of cooperative institutions in the range of initial cultures so that cooperation not only could be maintained but spread and become dominant. Here we are thinking of a situation where a cultural process of institutional emergence has already taken place, and we face full-fledged institutionally cooperating agents, which institutionalist theory has always taken as the starting point of evolutionary reasoning, i.e., institutional change rather than institutional emergence.

In contrast to institutional change, institutional emergence, from a “worst case” culture of short-run maximizers, cannot easily be made sensible through the simple supergame logic. As game-theoretic modeling of social dilemmas supports skepticism
about the feasibility of such emergence, any reasonable explanation will have to add more elements to the formal argument above, such as some emerging search (on the background of repeated frustration because of the results common defection, i.e., the dilemma experience), learning, imitation, experimentation, random mutation, and some kind of first offer and signaling of cooperation, with all risks included.

In this paper, we do not need to delve any deeper into this since the overall argument is supportive of our argument that the process of emergence and/or of maintenance, and further development (institutional change) in game-theoretic reasoning as well as in “real-world” experience in fact is not per se self-sustaining. We will pick out a major argument for this, bringing public rationality and policy in now.

In fact, a problem that remains, and cannot be solved through any individualistic rationality, is the continuing existence of the basic social dilemma. The dilemma-prone structure will always remain in the background as a behavioral option, however latent or virulent. This is reflected by the fact that spontaneous evolutionary processes, reflected in endless simulations, may be highly time-consuming and fragile, if not blocked completely. The more individualistic a culture is, that is, the stronger the dilemma structure in terms of the relations of $a$, $b$, $c$ and $\delta$, the greater the incentive will be to defect, and even to deviate from an established institution. Simulations have illustrated that hundreds or thousands of interactions may be necessary to establish cooperation as a rule of behavior and that, even then, cooperation may be unstable and occasionally collapse because of small external changes or – in more complex models – of some internal dynamics (s., e.g., Lindgren 1997).

This can be comprehended then as an individualistic culture in a "market"-economy that increases the probability of an insufficiently developed collective action and, thus, of
the continuation of a locked-in institutionalized coordination where collective action capacity is not sufficiently developed to un-lock the situation and to leave the inferior path.

In a more dynamic, and even increasingly turbulent, environment, collective action capacity is required even more to transcend any coordination form achieved earlier, when conditions have changed. Coordination certainly is some form of a static phenomenon. In a turbulent environment, coordination has to be performed as a dynamic mechanism as well, i.e., permanent high collective action capacity to organize change and “traverses” towards new paths. However, this conception differs considerably from the “uncoordinated”, “market”, or “neo-liberal” conceptions of abstract “flexibility” maximization. In addition, there is a flexibility/turbulence vs. stability/coordination trade-off and economic conceptions and real-world coordination mechanisms have to be based on a more balanced impact analysis than the flat “neo-liberal” “flexibility” postulate.

However, this new, and more dynamic institutional balance cannot be achieved in a setting with dominant private agents only. An agent with a different logic of action must be effective in the system to broaden the spontaneous, decentralized “market” logic, making a hybrid governance feasible and, in this way, contributing to a greater system resilience.

Finally, there is no guarantee that the collective goods which even the best-governed networks may generate are confined to the limits of these networks. On the contrary, collective goods normally are functionally, personally and/or spatially more far-reaching than the boundaries of any private-agents networks as for instance the global success of the Linux case has demonstrated that even has become part of the latent US-European trade conflicts.
It seems necessary, therefore, to introduce a more comprehensive and more deliberate supra-individualistic rationality into the spontaneous, decentralized, evolutionary processes. Specifically, a public-policy frame-setting is needed in order either to initiate (i.e., de-block, un-lock) or to accelerate and stabilize processes of institutionalization which cannot be brought forth with sufficient certainty, speed and stability by individualistic rationality alone. Generally speaking, the societal character of production and innovation requires an integration even of "well-governed" networks in a larger, namely public environment.

IV) **Hybrid Coordination and "Institutional Policy"**

**A Leaner Policy**

In "neo-liberal" policy prescriptions, the collective-good problem is dealt with by removing transaction costs, empowering the "markets," and enlarging their range through "de-regulation" and "privatization". This, however, renders the latent coordination-failure problem ubiquitous. This is increasingly demonstrated by the cumulating global problems today.

On the other hand, the "collective-good" problem is regarded as a purely public task in conventional economics. (But then, in turn, neoclassical "public choice" theory, which is meant to cover those areas that the "market" leaves aside, is facing the same individualistic problems of coordination that are faced by the market’s individualistic dilemmas, i.e., neoclassicists stress all sorts of “state failure” to protect the “market” against intervention.) The conventional collective-good view has unduly shifted responsibility away from the private agents, who – in pursuing their own individual
economic interests – face considerable incentives in contributing to solving the problem, as the simple PD structure makes obvious.

Private agents indeed have a positive interest in the production of the collective good, regardless of the fact that it cannot be adequately produced by them, because coordination failure is inherent in their spontaneous "market" interactions. Thus, the public agent can request the private agents to contribute to a social solution. This basically allows for a leaner policy approach.

A related insight from the PD-structure is that the "collective good" problem, or the dilemma structure, can be seen as a gradual problem. If the public agent would subsidize cooperative behavior to such a degree that \( a > b \) and \( d > c \) in the above mentioned PD, so that cooperation is clearly more attractive than non-cooperation, then the dilemma is dissolved. However, this might well involve a costly public policy. Social problem-solving, in contrast, can be promoted by gradually weakening the dilemma structure and, in this way, permitting a more collective and coordinated culture. In a numerical example, say \( \delta = 0.9, \ b = 4, \ c = 2 \) and \( d = 1 \), equation (3) indicates that cooperation would already be superior to defection with \( a = 2.2 \) [note that \( a \) would have to be greater than 2.5 in the example in order to meet the additional condition \( (b+d)/2 < a \)]. This illustrates that small rewards for cooperation (far less than the condition \( a > b \)) can be effective. Generally, with gradual changes in the incentive structure, the probability of cooperative solutions may increase. That is, cooperation may come into existence with increased probability, speed and stability.

A leaner policy becomes possible because the approach allows for a clearer definition of the relative interests, or benefits, as well as a clearer allocation of the relative
responsibilities, or costs, of the private and public agents - as opposed to fuzzy “public-private partnerships” that have come into fashion recently.

**Meritorization**

We will assume that the potential outcome of the private interaction process can be related to a policy objective in such a way that it can be subject to social valuation or "meritorization". The private agents are assumed to be capable of collective production of a "good" that has a potential public value in addition to its private values.

The conception of the merit good has been revived since the eighties, and it has been considerably developed (s., e.g., Brennan, Lomasky 1982; Musgrave 1987; Ver Eecke 1998) into one that substantiates public meritorization on the basis of "community preferences" that have evolved from historical processes of interaction outside the "market" (s. Musgrave 1987, 452). This implies a social evaluation of the outcome of the "market" through some kind of social decision-making which is broader than, independent of and superior to the "market".

We define a merit good as a good which is a collective good at the outset, but basically may be produced by the spontaneous interaction process described above (i.e., a "private good" as defined). It will be evaluated then through a social decision-making process with respect to its quantity, quality, relative price, and – as new dimensions discovered in deficient individualistic interaction processes – the time span needed for its production as well as the certainty and stability of providing it through private interaction.

Specifically, the conception of the negotiated economy has been elaborated to show that the "market" has to be deliberately embedded in a wider socio-political process and that this is workable (s., e.g., Commons 1934/1990, 612ff., 649ff.; Ramstad 1991; Nielsen
We will not delve into this discussion any deeper here (for a more detailed argument, s. Elsner 2001) but will simply assume an economic policy agent who is legitimzed through a process of participatory democratic decision-making. In this process, then, public policy objectives can be developed which provide the criteria for the "meritorization" required.

**Instruments**

The first complex of instruments aims to change the incentives in order to increase the relative rewards for cooperation or the opportunity costs of defection (or decrease the opportunity costs of cooperation and the net benefits from non-co-operation). Here, it is important to note that the incentives for cooperation, in real worlds, may largely consist of non-pecuniary benefits (for more detail, s. Elsner 2001; Elsner 2004).

Equation (3) shows that the more successful the public agent is in involving the private agents into a future-bound process, i.e., the higher the discount parameter $\delta$, the less the increase of the incentives needs to be. The second complex of instruments, thus, refers to the "futurity", i.e., the probability for private agents to meet again. The discount parameter can be interpreted not only as the weight allocated to a future pay-off but – equivalently - also as the probability of a future interaction among the agents. Cooperation can be promoted if future interactions become more probable. This, in turn, will typically be the case in “medium-sized” groups and platforms (regions, clusters, networks) as $\delta$ decreases with the group size. In this way, local and regional clusters and networks are confirmed as being important objects, targets or addressees of an institutional policy in the “New” Economy (s., e.g., Bellandi 2003).
This condition can, indeed, be made subject to policy control. As Axelrod has already pointed out, the public agent can increase the importance (i.e., the probability) of future interaction, for instance, by making cooperation more permanent through more frequent meetings, dividing projects into several sub-interactions, connecting different projects so that the same agents will meet in different arenas and become more aware of their common future.

Generally speaking, there is opportunity for the public agent to deliberately shape the conditions of interaction to promote collective learning and institutionalization of cooperation. This policy approach helps to change the behavior and expectations of the private agents by changing the pay-off structure and time horizon of their interactions. Thus, it interacts in a specific way with the interaction process of the private agents (for the basics of the "interactive" or "institutional" approach to economic policy, see, e.g., Hayden 1994; Elsner, Hufschmid 1994). This has been elaborated into operational policy conceptions (see, e.g., Jessop 1994; Mizrahi 1998; Rycroft, Kash 1999, 211-223; Block 2000; Yu 2000).

V) A Case Study: Coordinated Industrial Change

A practical case of hybrid coordination to manage a major, severe and sudden structural change in a region has already been presented in the literature (see, Elsner 1995, 2001, 2001a; Accordino, Elsner 2000). This has been the case of managed industrial defense conversion in the German state of Bremen during the nineties. It was acknowledged in the EU as a major success of regional industrial transition from a largely defense dependent regional industry to a much more civilian, diversified, stable and future-bound structure. The region had been a major defense industry center in Germany with a big portion of
high-tech (electronic) branches and leading electronic defense companies and plants. The largest part of industrial R&D in the region was done through defense companies. The major part of regional industrial R&D was vulnerable to the end of the cold war in the early nineties, and the region was severely hit.

The normal individual(ist) reactions of the corporate agents (firms) would have been (as was the case in most other regions that were in a comparable situation) only to react towards the drastic decrease of the defense market and to try to muddle through this situation, or to wait and try to survive, which would certainly have meant drastic firm downsizes and lay-offs of workers, maybe together with firm closures, mergers and acquisitions, and increased national and international concentration – probably at the expense of the number of firms, plants and employees in the region under consideration here.

The individual(ist), uncoordinated action, however, would have prevented firms from access to certain options to increase their competitiveness by maintaining jobs through diversification, development of new civil market segments and strengthening their common location factors. With individualistic behavior, the firms would have worked against each other by behaving reactively rather than proactively – and, finally, becoming relatively worse off. Their high technical competences would not have been used to enter civil markets or develop new civil market segments as their “old-defense” bureaucratic organizational structures would have largely been unchanged. Organizational action capacity and cost thresholds could not be adjusted on an individualistic basis as the uncertainty of their future options had drastically increased. The uncoordinated individualist option would have meant a severe job loss in the firms and the region, and a
severe loss of industrial R&D capacity, technical competence and headquarter functions for the region.

On the other hand, each of the companies of the defense-electronics cluster, that partly had vertical supplier relations with each other, and partly were competitors for the same products, systems and public procurement orders. They could expect to be considerably better off the more competitors (and even suppliers) would shutdown since those surviving would receive a bigger portion of the shrinking pie.

Finally, coordinated action would have reduced uncertainty (and transaction costs) for each company entering the process of diversified product development and organizational change in order to become fit for new civil markets. A general expectation, therefore, was justified, at the outset, i.e., that coordinated behavior for some collective good, yet to be specified, would leave the firms and the whole region – better off than individualistic strategies.

However, there were considerable thresholds to surmount for new options and thus a considerable incentive to struggle for survival until a competitor gave up. The individual firm might have been even better off compared to the other options available. Also, if other firms would have made some effect for “coordinated” actions with the external effect of improving the whole region’s situation, each firm that did not contribute to that collective good) could expect to be best off - compared to all the other options.

While this problem could quite easily be reconstructed as a PD-type decision problem of the firms, the main task was to get a better grip of the collective good involved. Obviously, the regional firms were not interdependent in a PD-structure in every aspect. They made business in national, European and international markets, partly being
competitors there, partly being in different market segments. So the difficult question was to specify around which collective problem the PD structure was present – with its effect of a collective blockage of action and, thus, no action to improve the individual position through the improvement of some common regional conditions of production.

The collective good could be thought of as the regional industrial structure of this whole industry and related branches. This formed an important locational factor, and a cost and competitiveness factor, too, for their businesses. The industrial structure had a collective good dimension since it was a common local factor favorable to their individual business and the whole region, but not accessible to their individualist behavior.

It was quite an easy task to define the public interest in that collective good, that is, improved locational conditions, in terms of a more viable and competitive regional industrial structure and of improved infrastructural location factors, and to meritize this regional social objective. However, it was a more difficult task to identify the action dimensions through which the individual firms could contribute to it, in their very own individual interest, if the incentives were set right and the individual blockages surmounted.

The collective good defined (i.e., an improved regional industrial structure with a smaller portion of products in the defense market and a higher portion in new civil high-tech markets) had a twofold action dimension with respect to firms. The first dimension was to improve the individual output, organizational and human capital structures and the regional industrial structure at the same time – indeed a general common location condition – through coordinated parallel action. That is, this dimension involved the simultaneous individual efforts to change the firms’ products, organizations and human
capital according to the requirements of modern civil high-tech markets, to apply their core
technologies to the development of new civil products and systems, and to open up new
markets and market segments.

The second dimension was to improve a set of relevant common infrastructural
location factors through direct strategic and project-based cooperation of the firms.

To these dimensions the regional public agent had to apply his instruments of an
interactive and institutional industrial policy. (The national public agent in fact rarely
showed up during the critical years, to provide support for the fundamental regional
industrial processes involved. However, the EU considerably supported regions affected
for nearly a decade with objective-2-funds and with the community initiative KONVER.
So, together with some regional money, some funds and coordinated public action were
brought together for a whole decade to set up the instrumental complexes of (1) changing
the incentive structure and (2) increasing the significance of the common future for the
firm agents. Indeed, it turned out that it was not the funds in the first instance that were
responsive for the success of that jointly and collectively managed industrial change.

The economic policy approach that was developed then started in a conventional
way to offer project subsidies for individual defense conversion and diversification
projects to apply the defense core technologies to civil developments, and for related
organization and qualification changes. It proceeded to support cooperative and joint
projects among firms, including research institutes.

However, the approach was quickly developed to introduce non-pecuniary
incentives such as the supply of exclusive and early information on regional public
planning, including EU-plans for the region, future EU requirements for firms’ projects to
be submitted, early access to top administration and political representatives, increased public appreciation of the firms’ efforts, etc. All in all, it turned out, a considerable non-monetary incentive to make coordinated, parallel individual (and sometimes even cooperative) behavior for firm-based diversification and structural improvement was made feasible.

Thus, the incentive structure of the private agents apparently could be changed in favor of a new behavioral option, i.e., to make company diversification efforts less risky and more feasible through coordinated, parallel action. This option would not have been accessible to the firms on an individual(ist) basis, for reasons of strong uncertainty, i.e. prohibitive transaction costs.

Parallel to this a set of public policy measures was developed that, in fact, entailed an increasing significance of the common future for the companies. For the individual firm level, the regional industrial conversion program requested firms to develop mid-term diversification and restructuring plans and to establish intra-company restructuring councils or officials. So, there could some mid-term self-commitment of the firms get established. The employee representatives – most of them involved in a long-standing regional diversification network – played a major role to commit their managements for a mid-term restructuring process, also committed to the region as a whole. Employee representatives, trade unions, the university, R&D institutes and other societal agents, indeed, played a major role to commit the firms’ managements. There were also top managers of firms who played peer roles.

The regional public agent also had to demonstrate that he committed himself on a mid-term basis to support the efforts of the firms. There was a publicly declared and
politically approved mid-term programmatic and fiscal self-commitment for support of coordinated and cooperative firms restructuring. Funds and projects were committed for more than one legislative period.

Furthermore, there was regional networking established to increase the significance of the common future for the private agents. A whole set of industry-, or cluster-specific, infrastructural projects, such as R&D-transfer agencies, agencies to support international conversion cooperation projects with Eastern Europe and a common marketing agency was developed in cooperation with the firms, with public support and guided by project committees of representatives of private agents involved.

Finally, there was a general industrial restructuring council established at the regional level, with representatives of the trade associations, unions, chambers and different societal agents, including the public agent. A general regional official was appointed to coordinate all activities, provide mediation for interacting firms, distribute funds to the firm projects, etc.

Apparently, strong uncertainty and prohibitive transaction costs could be considerably reduced to open up behavioral ("strategic") options that had not been accessible to firms before. In this way, they overcame collective action blockages and initiating a regional process of innovative technical, marketing, organizational and qualificational change that made individual firms more competitive and improved and diversified the regional industrial structure, maintained technological capacities and, finally, jobs in the region. The application of the general conclusion on policy instruments to this case is illustrated in the following table.
Table: Instruments of a Hybrid Governance Approach: Interactive Policy

Instruments for Coordinated and Cooperative Structural Change

<table>
<thead>
<tr>
<th>Group of Instruments</th>
<th>Changing the Incentive Structure (Rewarding Coordinated Behavior and Cooperation)</th>
<th>Increasing the Probability of Future Agent Interaction and Long-Run Commitment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public: Entire Regional Economy</td>
<td>(Result: Maintaining and creating jobs through an improved industrial structure.)</td>
<td>• Mid-term political and fiscal self-commitment for support of coordinated and cooperative industrial restructuring.</td>
</tr>
</tbody>
</table>
| Private Companies | • Project funding for firms’ R&D, qualification, marketing and organizational change.  
• Improved information: providing, early and exclusive information; improved coordination with public planners.  
• Increased public appreciation for firms diversification efforts.  
• Improved access to public R&D. | • Mid-term firm restructuring plans.  
• Intra-firm restructuring councils and officials.  
• Support for cooperative and joint firm projects. |

Conclusion: Hybrid Coordination and Interactive and "Institutional" Policy

Most of the features of the "New" Economy have considerably increased complexity, with direct interdependencies, collective-good problems and social dilemmas. It is a world of de-regulated globalization, disembedding, fragmentation of value-added chains and
locations, increased complexity of products and net-technologies. Problems of strong uncertainty have come to the fore. Many information have become cumulative and collective goods and innovations have become "systemic", a fact that largely reflects the increasing collective and societal character of any production. The problem of comprehensive and sustainably innovative action capacity has become a dominant issue of the modern economy, and of economics as well. And it puts the question of coordination beyond “markets” and hierarchies at the core.

The "market", with its dominant price-based information and coordination, cannot solve these problems. This is increasingly the case as the "markets" are de-regulated under “neo-liberal” postulates and, hence, disembedded from institutional structures. These primarily reduced uncertainty and stabilized expectations and in this way, assisted collective learning and cooperation, reduced complexity and cared for a high level of coordination and, thus, economic effectiveness. With their reduced effectiveness, the "market" loses its ability to broadly and sustainably innovate, and mechanisms of power and redistribution (rather than capacity enhancement) have come to the fore.

The global corporate economy has developed different spontaneous private/individualist substitute forms to reduce complexity to manageable levels. Among these are local clustering and networking, and public-private collusion for standard-setting, besides the conventional collusive and power-based strategies. These, however, seem to be incapable, by and large, of appropriately dealing with the new complexity challenge. Clusters and networks, especially, appear to be largely hub&spoke-typed and highly dependent on the short-run interests of powerful hubs. Inadequately structured and governed networks, in turn, tend to prematurely age and lose innovative capacity. Effective coordination, thus, is either completely blocked or processes become locked-in
through "wrong", "outmoded", or "petrified" institutionalized coordination where a new progressive change is not feasible through collective action capacity.

Evolutionary game-theoretic arguments may contribute some insights into the process of direct interaction and can demonstrate that self-sustaining processes indeed may lead to the emergence of institutions of cooperation through collective learning. However, in a largely individualist culture, these processes also tend to be highly time-consuming and fragile, if not blocked completely. Specifically, in an individualistic culture and "market" dominance, with an insufficiently developed (i.e. insufficiently comprehensive, deliberate and sustainable) collective action, spontaneous, decentralized evolutionary processes will tend to entail lock-ins on inferior paths.

A "hybrid" system of effective coordination, a "New New Deal" for an enhanced collective-action capacity, with "good" (self-) governance of well-structured cooperative (network-) arrangements, and a new public policy approach has been outlined here. The latter interacts in a specific way with that private interaction process and shapes conditions to support related private learning processes. It employs different kinds of incentives and shapes the expectations of the private agents about the future of their interactions so that their common future becomes more important. It focuses on collective learning of coordination and institutions-building in dilemma-prone decision settings. It relates, through the meritorization of the goods structure, with the public objectives defined in a negotiated-economy framework, certain policy measures to the "private" interaction system. It also permits the combination of strengths through a clear-cut allocation of responsibilities and benefits of private and public agents.

We have not claimed here that the “market” is failing under each and every condition but demonstrated (and illustrated in the case study) that the dilemma-prone
situations are ubiquitous and related to any private good, but nevertheless have carefully to be specified. Nor did we claim an unconditional superior rationality of each and every policy action. The latter also has to be qualified. In this way, we may expect that a hybrid system is a combination of strengths of both types of rationality rather than their weaknesses. Note that the role of the state is much more limited and specified in this paradigm than in the current practice. Note also that we have argued for limited networks rather than maximally inclusive cooperation and that we are aware of the potential petrifications of network cooperation, or lock-ins of any institutionalized arrangements. These have to be broken up in a systematic way, and on a regular basis, depending on the change of external or internal conditions, through a sustainable collective action capacity.

All this implies that we neither share the “market” euphemisms along neoclassical, Hayekian, or Coaseian lines, nor the state pessimisms along “neo-liberal” and social choice theory lines. While mainstream theories one-sidedly linger at the “flexibility” end of the stability-vs.-“flexibility”-trade-off, we have developed a governance approach here that is much more balanced, taking into account a much broader balance of causes and effects, and challenges in the “new” economy.

This approach allows for sustainable and broad systemic innovation, as far as it enables recurrent interactions to occur in a more stable framework, for common collective learning processes, the stabilization of future expectations, and publicly negotiated deliberation, and the time required for all this. The new problems of the "new" economy can be fruitfully dealt with in this framework.

Further analysis, particularly analysis of empirical material and case studies, against this background, should focus on (1) the structure of the basic interdependence and coordination problems, (2) actual or potential cluster- and network-structures, together
with their learned institutions, governance rules and “cultures”, (3) the publicly meritorized goods structure and the role of the public policy agent to shape incentives and expectations, and, finally, (4) the (“residual”) roles of power, hierarchy and the "market".

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