

The "New" Economy: Complexity, Coordination and a Hybrid Governance Approach

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Abstract

The paper starts from the increasing fragmentation of value-added chains, global de-regulation and dis-embedding, and interdependencies among the net-based digital technologies. It develops a socio-economic setting with ubiquitous direct interdependencies, net-externalities, "strategic" strong uncertainty, and omnipresent collective-good and social-dilemma problems. These entail co-ordination failures, either in the form of conventional market failure or of "wrong" or technological "lock-ins" that also are indicative of insufficient ability of collective action. In contrast, sustainable innovation in a broad sense requires an effective collective action competence. This requires a new form of co-ordination. Against this background, the global corporate economy has developed individualist arrangements to cope with that new complexity, such as local clusters and hub&spoke networks, which all have severe shortcomings. With reference to what we call the "Linux" paradigm, the paper discusses the possibility of a spontaneous evolutionary institutional co-ordination through emergent collective action and networks with "good" governance. It argues that only a hybrid system that consists of networks and a new approach towards an "interactive" and "institutional" public policy, supporting collective learning and emergent institutional co-ordination, is capable of solving the complexity and co-ordination problems of the "new" economy by increasing stability and more continuous and comprehensive innovation.

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The characteristics of the „new“ economy are not evidenced so much by the hypermania of high-tech stock markets - which have turned out, with their subsequent deflations, to be rather conventional. They are evidenced rather by the more de-regulated, digitized and net-based, and clustered, character of the real economy. This change entails a considerable intensification of direct interdependencies among economic agents, where the outcome for A directly depends on the behavior of B, and vice versa. Direct interdependencies have always been present in real economies and have been anticipated by socio-economists from all perspectives. However, the interdependencies have become so intense, obvious and ubiquitous that they can no longer be ignored neither by mainstream economists nor corporate agents and policy makers.

Situations of direct interdependence are genuinely complex, and complex situations, in turn, cause highly non-trivial co-ordination problems. Direct interdependencies involve direct interactions of agents. These can not effectively be conceptualized nor performed by the ideal “markets” of mainstream economics - with their arms' length relations and short-run maximizing behavior of individual agents who are co-ordinated indirectly through (equilibrium) prices. Ideal prices are dependent only on the decisions of all other agents taken together and do not account for direct interdependencies among individual agents. Ideal “markets” and prices, therefore, are incapable of generating and diffusing information and the formation of future expectations required to effectively co-ordinate agents. As they fail in complex situations, they cannot generate the collective action capacity required – and, in this way, entail social costs in the forms of

collective “blockages”. “Markets” have become even less effective since "neo-liberal" de-regulation has decreased their capacity to manage complexity.

This paper discusses co-ordination failures, i.e. lack of collective action capacity, involving either complete (latent) collective blockages of action (i.e. complete lack of coordination) or technological lock-ins on inferior paths of development (i.e., "wrong", "old" or "outmoded", "petrified" or "sclerotic" co-ordination) against the background of increased complexity in the "new" economy, and it discusses more effective forms of co-ordination and the opportunities for their creation.

Complete blockages of collective action can get "de-blocked", or (technological) lock-ins be "un-locked" when a problem-solving, future-oriented collective action has, indeed, become feasible. We are speaking here of action capacity for innovation in a wide sense (i.e. technological and organizational).

The new features of the "new" economy force us to reconsider these issues and to re(de)fine our conceptions. It is towards this end that the present paper is designed to contribute.

I) Increasing Complexity

1) De-Regulated Globalization, Social Dis-Embedding, and Uncertainty

Why have information, expectations, complexity and co-ordination problems gained such prominence in the "new" economy?

First, "neo-liberal" globalization is a political and administrative project, regulated, on the one hand, by highly selective strategies of de-regulation, liberalization and empowerment of capital and corporate concerns and, on the other hand, by national regulation, bureaucratisation and authoritarian control of more general societal groups and concerns (s., e.g., Kingston 2000; Rupert 2000; Elsner 2000, 412ff.; Perraton 2001, 678ff.; Elsner 2003). The global layer of exclusive activities has become highly dis-embedded from the historically developed arrangements of social institutions that used to exist in the nation-states and in national and regional-local cultures. The "neo-liberal" construction of the global space has deliberately reduced collective action and social control. It has become a system of social fragmentation (in addition to spatial fragmentation) and escalates unequal power. As such, it is unable to act as an effective mechanism for civilizing the self-interest of the most powerful economic agents (s. also, e.g., Markusen 1996a; Amin 1999; Standing 2001; Biswas 2002). The "neo-liberal" global system, thus, can be called a system in "institutional disequilibrium", entailing an excess demand of international public goods, while demand is increasing and their supply decreases (Padoan 2001).

Being "under-socialized", the global economy does not provide enough "structure". This is true even for the most powerful individual corporate agents. Hence, the corporate economy, being insufficiently co-ordinated, faces an increased level of uncertainty and turbulence (s., e.g., Armstrong 2001, 533ff., 541ff.). As a result, instability and transaction costs (especially, information costs) have increased.

Consequently, powerful corporate organizations find it necessary to increase their power even more to keep control over their socio-economic environment and, thus, the global system has increasingly become a power-based, and thus redistributive, mechanism,

generating ubiquitous negative external effects on third parties, the social commons and the natural environment, rather than a mechanism for comprehensive, sustainable and deliberate innovation and capacity enhancement. Increased uncertainty, instability and turbulence, indeed, are counter-productive for effective problem-solving.

Note that we are talking here of strong uncertainty which we understand as being "strategic" in the sense that, with ever more fragmentation, the individual agent cannot know at the outset, nor calculate with a certain probability, the "strategic" choices of other agents (s., e.g., Dequech 2001, 919f.).

2) Fragmentation of the Value-Added Chains and Technological Complementarities

Second, globalization has increased momentum towards vertical disintegration of value-added chains and the redefinition of the boundaries of corporate organization in an effort to reduce labor costs and to control an enhanced labor force world-wide. Value-added chains not only have been spatially fragmented by selecting labor and suppliers at optimal locations on a global level, they have also become functionally fragmented.

Functional fragmentation requires securing technological compatibility and complementarity in the chain in an effort to co-ordinate for quasi-reintegration and effective production on a now decentralized basis (s., e.g. Langlois 2003). International restructuring, thus, is as much a struggle over the problem of uncertainty and transaction costs through new forms of co-ordination 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).

Again, it has involved individualistic, power-led solutions on an hierarchical basis such as the transnational corporation and its centralized hub & spoke supplier networks (s., e.g., Jones 2000).

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

3) Digital Information, Net-Technologies, Net-Externalities and Market Failure

Third, the "new" economy is characterized by digital, microelectronic and net-based technologies. No decision can be made that does not have a technical dimension, and no technically influenced decision can be made that does not require the technical complementarity and compatibility with the decisions of others. In this way, no decision can be made and no information or innovation can be generated that does not involve positive or negative externalities. Every decision has to be considered relevant for the ability of agents to communicate and effectively interact with other agents.

This is but one aspect of the fact that most information increasingly displays the features of a collective good. Information has always been characterized by non-rivalry in consumption. 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 increasingly becomes a basic necessity for social co-ordination. It is well known in

economic theory that the total societal benefit of information, as with collective goods in general, increases with the number of its users. Basic information, thus, is systemic - and it is normally generated collectively from billions of acts of behavior and learning. Against this background, technology, innovation and production have become systemic as well.

Digital microelectronic technologies 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. The "new" economy, thus, has entered a stage of informational abundance which bears little resemblance to the conventional mainstream economic assumption of scarcity.

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).

The technological basis of the economy has become net-based. Since net-based technologies are the more useful the more agents are in a specific net, each agent with his technological decisions generates positive or negative external effects on third parties. Net-externalities have come to govern the dynamics of the "new" economy - and the "efficient" neoclassical individual maximization is becoming a near-to-irrelevant exemption (if it ever was a relevant reflection of real socio-economies) (s., e.g., Hutter 2001).

Finally, information and technological knowledge are increasingly user- and context-specific and tacit, and must be developed and learned in a dense common interaction process.

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 instances of the recent industrial history that demonstrate the ubiquity of latent collective blockages and, thus, impeded the dissemination of new technologies. Thus, there are pervasive tendencies in the "markets" to generate innovation at "sub-optimal" levels (s., e.g., Miller 2001).

The presence of competing suppliers with different technologies implies that problems of technical standards, interfaces and protocols have become ubiquitous. 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., e.g., Weitzel, Westarp 2002).

All in all, there is no doubt that it has become more difficult under these circumstances to collect profit in the conventionally commercial way. The technically warranted potential abundance of information as a collective good reduces the commercial producers' abilities to collect revenue in the "markets". The 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. Here we may have to face "the simple choice between profits and production" (Gallaway, Kinnear 2002, 443).

As increased complexity basically 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). And, "(t)he 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.; s. also, e.g., Orlikowski, Iacono 2000).

This renders economics a science of (the collective learning of) adequate co-ordination mechanisms rather than a science of individual maximization, general equilibrium and "optimality" (s., e.g., Friedman 1994; Tirole 1995).

4) Technological Lock-Ins, Collective Goods and Social Dilemmas

Against this background, there are different kinds of co-ordination failure "in the market". Collective goods may cause complete blockages of action, i.e., ideal "market failure" involving no co-ordination. Co-ordination failure, however, may also assume the form of "wrong" or outmoded institutionalized co-ordination, namely technological lock-ins on technologically inferior paths, a case connected with "old", "petrified" etc. networks and conventional forms of restrictive collusion. Co-ordination failure will occur, specifically, in individualistic "market" cultures where the capacity of collective action to generate continuous problem-solving and innovation in the broadest sense, and, thus, to evade the blockage or the lock-in, is lacking. In the absence of effective co-ordination through a more comprehensive and deliberate collective action, any established technology and economic path may unintentionally be inferior (for the famous QWERTY case and locked-in technological paths, s., e.g., Arthur et al. 1985; David 1985).

All in all, this boils down to the fact that all production and innovation have become "complementary", "systemic" and societal, and in most cases display the features of, or are connected with, collective goods or social dilemmas (s. section III below). Here, individual agents have to co-operate 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, if these contribute to the collective outcome.

It is a complex situation where co-ordination is highly non-trivial.

II) Spontaneous Individualistic Substitutes to Cope With Complexity

1) Power Exertion, Collusion and "Intellectual-Property-Rights"-Fences

The global corporate economy, in order to establish solutions to compensate for the co-ordination failures and strong uncertainty, namely in dis-embedded "markets" and individualist cultures, primarily deploys conventional and 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.; s. also below section 3).

The features of the "new" economy provide, through falling marginal costs of information and increasing returns of scale and scope, a textbook case of "natural" monopoly. This case may be called the Microsoft paradigm, where an individual powerful hierarchy commands considerable proportions of a relevant core technology and demand. It typically organizes large hub & spoke structures throughout the global economy (s., e.g., Weitzel, Westarp 2002). Note that hub & spoke structures result from power differences and hierarchy interfering with basic 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 agrees with the artificial "construction of scarcity" of information which could easily 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).

2) Local Clustering and Networking

The corporate economy, however, also develops new forms of co-ordination such as local clustering. Local clustering, with its recurrent 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 organisation for the most advanced, high-tech, globalised and fragmented parts of the corporate economy (s., e.g., Feser 1998; Maillat, Grosjean 1999; Breschi, Malerba 2001). In spite of its rhetoric of globalisation, the corporate economy, in this way, 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).

Clusters are "functional" systems of supplier relations that stem from, and largely adhere to, "markets" in the sense that they emerge from spontaneous, volatile arms' 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 about it, the agents enter into processes of collective learning of correlated behavior that co-ordinates them in a non-"market" way and helps them solve some collective dilemma problems (s. also, e.g., Lazonick 1993; 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 (s. again Ruigrok, van Tulder 1995). They control information flows, entry and access to resources and play their roles as key agents, following the postulates of large-scale production under the conditions of global fragmentation of resources, production chains and customers (s. also, e.g., Lazonick 1993; Swyngedouw 1997; Raikes et al. 2000, 392ff.). Against this backdrop, clusters adopt structures of hub-and-spoke, "satellite platforms" and other hierarchical and power-based forms (s., e.g. Markusen 1996b).

Consequently, the effectiveness and innovativeness of clusters must not be overestimated. 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 becomes the more risky and precarious the cluster will become, i.e., prone to early downward swings and accelerates premature aging (s., e.g., Tichy 1998).

Clusters are the basis for more consciously developed kinds of co-ordination, 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, "strategic", project-based, multilateral and mid-term oriented co-operative co-ordination mechanisms (for a definition, s. again Elsner 2000, 413ff.). As such, they will even more effectively assist in the solution of the collective problems and in the promotion of collective learning and institutions-building. (Note, however, that we are talking of "progressive" networks here, i.e. networks whose structures and governance rules are meant to solve the problems defined above, i.e. to promote a sustainable high degree of innovation in a wide sense (technical and organizational), not to generate and protect any "invidious" power bloc that has been a most common form of "networking" in industrial-capitalist history. To make an operational distinction between "progressive" and "regressive" networks one may also refer to a set of properties that define the position of the corporate agents affected in the life cycle of their products, technologies, industries and regions. In sum, we may define problem-solving networks with reference to their structures, governance, performance and relative life cycle position of their members.)

Nevertheless, also "progressive" networks are insufficient substitutes. Being private solutions, unregulated networks, similar to clusters, in the reality of power-based economies display tendencies towards exclusion and collusion, and, thus, hampering comprehensive and sustainable innovation through an hub & spoke structure (s., e.g., Baker 1996; Pratt 1997; Armstrong 1998).

3) Networking, Open-Source-Type - "Good" Network-Governance for Self-Sustained Co-Ordinated Action?

However, other network types have inspired recent contentions about the possibility of self-organized and self-sustained institutionalized co-operation and more comprehensive and deliberate collective action.

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 largely characterized by decentralization, little power differentials and little power exertion by hubs which rather assume the role of technical organizers and moderators (s., e.g., Cohendet et al. 2001; McKelvey 2001; Raymond 2001). Indeed, the largely public and highly communicative, even near-to-ideally anarchistic, process is one of the biggest success stories of the digital economy. Its unprecedented and sustainably high speed and high quality of innovation obviously exceeds that of the system built by the powerful hierarchical structure of Microsoft, i.e., the MS-DOS/Windows operating system.

Indeed, a core finding of "hackerdom" is that structures of low levels of power and hierarchy and corresponding governance rules aiming at open information flows and non-exclusion are network properties favorable to a culture of effective learning of co-ordination and, subsequently, to fast and sustainable innovation in the broadest sense (s., e.g., Foray 1998). If network structure plus governance makes up for 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 restrictive/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 and

continuous entry, parallel and redundant actions among network participants, the exertion of the "voice" mechanism irrespective of differences of size and power of participants, "reciprocity", and others. These ensure continuous learning and institutionalization of collective action and, subsequently, an abundance, high level and continuity of systemic innovations (s., e.g., Ostrom 1990; Powell, Smith-Doerr 1994; Maggioni 1997, 238-49; Bogason 2000, 49ff., 64ff.; Elsner 2000, 450ff.; Lazonick 2001). Sustainably effective networks of this kind could well be ineffective in the short-run, especially, for powerful individual agents.

However, in the reality of power-centered de-regulated "market" economies even those "well-governed" networks may become dominated by powerful corporate agents. Private ownership of the open software is still well-defined and the interaction, with the incentive of superior effectiveness of everyone involved, is well-organized by the hubs/owners (s. again Cohendet et al. 2001; McKelvey 2001, 222ff.; Raymond 2001, 73ff.). Their structures and rules may easily become vulnerable vis-à-vis the exertion of power and hierarchy. Against the background of the increasing dominance of conventional powerful industrial players and state-administrative control in favor of commercial B2B- and B2C-interests in the internet, the future of largely self-regulated networks in the internet economy has become highly questionable (s., e.g., Dolata 2002). Even formerly well-governed and highly innovative networks may petrify and become locked-in forms of co-ordination - namely under the pressure of powerful private-public collusive structures. The recent attack of the Intel-Microsoft "Trusted Computing Platform Alliance" (TCPA) on open source and competitive operating systems (namely Linux) obviously is the most comprehensive challenge of informational liberties and self-organized and self-sustaining processes through a cartel of the most powerful commercial agents in the whole

microelectronic era, and it is heavily supported by the state through the Digital Millennium Copyright Act and new certification and control acts to come (s., e.g. Anderson 2003).

Therefore, we must take a closer look at the possibility of solving the complexity problem through self-sustained private co-ordination.

III) Complexity and Co-Ordination Beyond the "Market" - The Strength and Weakness of "Self-Sustained" Evolutionary Institutions-Building

1) Complexity and the Problem of Co-Ordination

Complexity is often defined as a property of a system that contains a large number (N) of agents with direct and mutual relations $[R(N)]$ amongst them.

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 turn, 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.

Acknowledging real-world direct interdependencies and interactions implies complexity becomes 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.). This is related to the fact that $R(N)$ becomes a square function: $R(N)_{\max} = N((N-1)/2)$, so that, with moderate numbers of N, real-world (i.e. "bounded rational") individual agents, who have

the maximum number of R in their social lattices of direct interdependencies, will perceive complexity as “near-chaos”.

Real worlds of collective-goods and social dilemmas are even more complex with their multiple relations R_i among each two agents. This can be illustrated with a simple Prisoners' Dilemma (PD) structure.

	C	NC
C	a, a	d, b
NC	b, d	c, c

$$\text{with } R_i = [R_1(C, C), R_2(NC, NC), R_3(NC, C), R_4(C, NC)].$$

As every single decision even in any kind of "market" has to contribute to some collective framework good, i.e., the (re-)production of the environment of social-rules (s., e.g., Callon 1998), the PD structure reflects the fact that the economy is a socio-economy and that production, exchange and innovation have a collective, societal character.

In view of complexity, effective action becomes feasible only by way of effective complexity reduction. The conventional device to reduce complexity in "market" economies, again, is to resort to power, hierarchy and hub & spoke structures. $R(N)$ can be

reduced to (N-1) in ideal hierarchies and hub & spoke structures, but entail the shortcomings previously discussed.

With social dilemma problems, however, reduction of complexity requires decreasing the number of potential multiple relations down to at least one effective coordinated way of behavior. The complexity-reduction device here is collectively learned institutions of co-operation. This may lead, under favorable conditions, and in an evolutionary process, to a reduction of the multiplicity of relations: $R_i \rightarrow R_1 = R(C,C)$.

This solution must be "systemic" in the sense of establishing a super-individual context that prevents individuals from acting in their short-run self-interest. This, in turn, requires the promotion of recurrent interaction and developing mutually consistent expectations (about others' actions and expectations), i.e., with futurity (s., e.g., Delorme 2001, 102ff.). The behavior which results habitually excludes or restricts the strive for short-run maximization, i.e., a social institution of co-operation emerges in spite of continuing incentives to defect. The reconciliation among these "mixed-typed" (partly competitive, partly consistent) individual interests is only conceivable as a commonly accepted habitual rule, i.e., an institution (s. again, e.g., Dequech 2001, 922ff.). Institutions, thus, are informational and "expectational" devices that inform the individual about what kind of behavior he/she can expect from others and what is expected from him/her.

Complexity, then, may be reduced to a level where individuals can reasonably be expected to act effectively, i.e., to manage the now reduced level of uncertainty. In this way they become capable and inclined to innovate, i.e., to develop more comprehensive and continuous problem-solving through future-bound behavior. Capacity of action will then be gained collectively (as it can only be gained collectively)! In the face of a level of

turbulence that is too high, the individual, indeed, is incapable of being innovative in a comprehensive, deliberate and sustainable way (s. also, e.g., Setterfield 1996; Schreyer 2000, 287ff.).

Also, real-world "markets" are effective in this sense only if well-embedded in institutional arrangements that co-ordinate adequately to manage the problems of collective goods and social dilemmas (s., e.g., Callon 1998; MacEwan 2000, chp. 4 on "The Social Construction of Markets").

Game theory, as has been indicated, may provide some deeper insight to this solution.

2) The Possibility, and Improbability, of Spontaneous Co-Ordination Through Evolutionary Institutional Emergence

Co-ordination failure here is 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 co-operation are weakened (note that in technical terms our argument can also be developed on the basis of other social problem structures, such as a co-ordination game);
- recurrent interactions, i.e., infinitely or indefinitely-repeated interactions;

- "sequentiality" of rounds of decision-making, i.e., the opportunity for processes of collective learning and institutionalization.

The PD reflects why "markets" fail in worlds of direct interdependence with collective goods present - namely, in a relatively individualistic, dis-embedded culture. As is well known, co-ordination 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) may imply the potential transition to a "private" good.

A simple representation of a static solution of a two-persons/two-strategies PD-supergame with given pure strategies (co-operation and defection) is the following (s. the fig. above, with $b > a > c > d$, and $(b+d)/2 < a$ in order to exclude alternating combinations of co-operation and defection):

Co-operative agents will normally gain

$$\begin{aligned}
 C &= a + \delta a + \delta^2 a + \dots \\
 &= \frac{a}{1 - \delta}
 \end{aligned}
 \tag{1}$$

where δ is a common discount parameter. A defecting agent may gain, as a maximum (i.e., while the other one co-operates in the first round and also defects from the second round on)

$$\begin{aligned}
 NC &= b + \delta c + \delta^2 c + \dots \\
 &= \frac{c}{1 - \delta} + b - c.
 \end{aligned} \tag{2}$$

Co-operation pays if $C > NC$. This can be postulated as $(1) - (2) > 0$, or

$$\delta > (b - a) / (b - c). \tag{3}$$

This shows that the superiority of co-operation depends on the relative pay-offs of (a), (b) and (c), i.e., the incentive structure, and the discount parameter, i.e., futurity. Co-operation will be feasible only when the future plays a sufficiently large role in relation to the incentive structure. A basic connection exists, then, between the collective action capacity, or co-ordination 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.

Note, however, that this result is based on a static, so-called single-shot, supgame with fixed, idealized strategies in which only a single calculation and decision is to be made by the agents. Because we have, in contrast, assumed a process of sequential rounds, we additionally would have to show how co-operation emerges in a process. This means

showing how individuals change their behavior through (collective) learning (i.e., individual learning in direct interactions). Here, however, we will only roughly refer to the literature.

As a first step we may refer to the well-known Axelrod-solution (s. Axelrod 1984, 1997). Axelrod employed a simple replicator mechanism for the interactions of two strategies for PD-supergames which were performed in great numbers. The well-known result demonstrated the stable superiority of the relatively simple co-operation strategy, "tit for tat". This result has been interpreted as illustrating the emergence of the institution of co-operation in an evolutionary process. This may be justified if a replicator is interpreted to be 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, can be interpreted as an individual who has changed his behavior through learning. The conception of cultural evolution, however, requires a more explicit conception of the search and learning mechanism (s., e.g., Stein 1997). The object of differential selection and differential reproduction here is focused on 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 show that cultural evolution in dilemma-prone (PD-)settings may result in the emergence of institutions of co-operation (s., e.g., Schotter 1981; Liebrand, Messick (Eds.) 1996; Franke 1998; Fudenberg, Levine 1998; Kirman 1998). These results might support "neo-liberal" policy advisors' great expectations for the evolutionary "efficiency" of the "market" economy.

However, a problem that remains, and cannot be solved through 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 the spontaneous evolutionary process may be highly time-consuming and fragile, if not blocked completely. The more individualistic the culture is, i.e., the stronger the dilemma-structure in terms of the relations of (a), (b), (c) and δ , the greater the incentive will be to defect, and, especially, to deviate from an pre-established institution. Lab experiments and model simulations have illustrated that hundreds or thousands of interactions may be necessary to establish co-operation as a rule of behavior and that, even then, co-operation may be unstable and occasionally collapse because of small external changes or internal dynamics (s., e.g., Lindgren 1997).

In addition, an individualistic culture and "market"-dominated forms of co-ordination may also increase the probabilities of an insufficiently developed collective action and, thus, of the continuation of a "wrong", "outmoded" or "petrified" institutionalized co-ordination (i.e., locked-in co-ordination) where collective action capacity is not sufficiently developed to un-lock the situation and to leave the inferior path.

Furthermore, there is no guarantee that the collective goods with which even the best-governed networks deal with and generate are confined to the limits of the networks. On the contrary, collective goods normally are functionally, personally and/or spatially more far-reaching than the boundaries of any private-agents networks.

It seems necessary, therefore, to introduce a more comprehensive and deliberate supra-individualistic rationality into 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 (s. also, e.g., Maggioni 1997; Bogason 2000, 76f.; Elsner 2000, 435ff.).

IV) A Hybrid Co-Ordination Arrangement and "Institutional Policy"

1) Towards a Leaner Policy

In an era of "neo-liberal" policy prescriptions, the collective-good problem is dealt with by removing transaction costs and empowering the "markets" and enlarging their ranges through "de-regulation" and "privatization". This, however, renders the latent co-ordination-failure problem ubiquitous.

In conventional economics, the "collective-good" problem is regarded as a purely public task. However, neoclassical "public choice" theory, which is meant to cover those areas that the "market" leaves aside, basically faces the same individualistic problems of co-ordination that are faced by the market's individualistic dilemmas. This 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 clear.

As the private agents have a positive interest in the production of the collective good regardless of the fact that it cannot be adequately produced by them, because of the co-ordination failure inherent in their spontaneous "market" interactions. Thus, the public agent can request the private agents to contribute to this social solution. This 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 co-operative behavior to such a degree that $a > b$ and $d > c$ in the above mentioned PD, so that co-operation is clearly more attractive than non-co-operation, 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 co-ordinated culture. In a numerical example, say $\delta = 0.9$, $b = 4$, $c = 2$ and $d = 1$, equation (3) indicates that co-operation would already be superior to defection with $a = 2.2$; note that (a) would have to be > 2.5 in the example in order to meet the additional condition $(b+d)/2 < a$. This illustrates that small rewards for co-operation (far less than the condition $a > b$) can already be effective. Generally, with gradual relative changes in the incentive structure, the probability of co-operative solutions may increase, i.e., co-operation may come into existence with increased probability, speed and stability.

A leaner policy becomes feasible 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.

2) Meritorization

We 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, although its basis 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".

For our purpose we will define a merit good as a good that was a collective good at the outset but is now produced by the spontaneous interaction process described (i.e., a "private good" as defined). The good is evaluated 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 or 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 1992; Shipman 1999, 214ff.). 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 legitimized 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.

3) Instruments of an Interactive and "Institutional" Policy Approach

The first complex of instruments aims to change the incentives in order to increase the relative rewards for co-operation or the opportunity costs of defection (or decrease the opportunity costs of co-operation and the net benefits from non-co-operation). Here, it is important to note that the incentives for co-operation, in real worlds, may largely consist of non-pecuniary benefits (for this, s. also, e.g., Klein 1990; de Bruijn, ten Heuvelhof 1995, 173ff.; Elsner 2001, 76-79).

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 δ is 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 also as the probability of a future interaction among the agents. Co-operation can be promoted if future interactions become more probable.

This condition can, indeed, be made subject to policy control. As Axelrod (1984) has already pointed out, the public agent can increase the importance (i.e., the probability)

of future interaction, for instance, by making co-operation 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, there is opportunity for the public agent to deliberately shape the conditions of interaction to promote collective learning and institutionalization of co-operation. 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, s., e.g., Tool 1979; Hayden 1994; Elsner, Huffschnid 1994). This has largely been elaborated into operational policy conceptions (s., e.g., Jessop 1994; Amable, Petit 1996; Mizrahi 1998; Belussi 1999, 737ff.; Rycroft, Kash 1999, 211-223; Block 2000; Yu 2000; Bryant 2001; Elsner 2001).

Conclusion: A Hybrid Co-Ordination Arrangement for More Effective Co-Ordination

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, dis-embedding, fragmentation of value-added chains and locations, net-technologies and complex interaction between manufacturing and services. Also, problems of strong uncertainty have come to the fore. Innovations have

become "systemic", a fact that largely reflects the increasing collective and societal character of production. The problem of effective, comprehensive and sustainably innovative co-ordination has become a dominant issue of the modern economy, and of economics as well.

The "market", with its dominant price-based information and co-ordination, is insufficient to solve these problems. This is increasingly the case as the "markets" are de-regulated under "neo-liberal" postulates and, hence, dis-embedded from their historically developed institutional structures. These institutional structures had often reduced uncertainty and stabilized expectations and in this way, often assisted collective learning and co-operation, reduced complexity and cared for a high level of co-ordination. With their reduced effectiveness, the "market" loses its ability to innovate broadly and sustainably, and mechanisms of power accumulation and exertion, and wealth redistribution (rather than welfare enhancement) come to the fore.

The global corporate economy has developed different spontaneous private/individualist substitute co-ordination forms in order to reduce complexity to manageable levels. Among these are local clustering, networking, and public-private collusion for standard-setting, besides the conventional collusive and power-based strategies. These, however, are incapable, by and large, of adequately dealing with complexity. Clusters and networks, especially, turn out 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 co-ordination, thus, is either completely blocked or processes become locked-in through "wrong", "outmoded" or "petrified" institutionalized co-ordination where progressive change is not feasible through co-ordination and collective action competence.

Evolutionary game-theoretic arguments provide insights into the process of direct interaction and can demonstrate that self-sustaining processes may, indeed, lead to the emergence of institutions of co-operation and co-ordination 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 can entail lock-ins on inferior paths.

A "hybrid" system of effective co-ordination, a "New New Deal" (de la Mothe, Paquet 1999, 85) for enhanced collective-action competence, with "good" (self-) governance of well-structured co-operative (network-) arrangements, and a new public policy approach (that interacts in a specific way with that private interaction process and shapes conditions to support that learning process) has been outlined here. It employs different kinds of incentives and shapes the expectations of the private agents about the future of their interaction so that their common future is important. It focuses on collective learning and institutions-building. It relates, in a specific way (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.

This approach also allows for sustainable and broad systemic innovation, since 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. 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 co-ordination problems, (2) actual or potential cluster- and network structures, together with their learned institutions and governance rules and cultures, (3) the publicly meritorised goods structure and the role of the public policy agent to shape incentives and expectations, and, finally, (4) the roles of power, hierarchy and the "market".

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