Regimes of institutional coordination of economic activities
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Introduction: the role of institutions in coordination
An important topic in the analysis of the institutional structure in the different perspectives of contemporary institutional economics is the coordination of economic activities and the predominant role that institutions play in this process. From this point of view the central aspect of institutional economics is not a matter of efficient, atomistic and instantaneous allocation of resources, but of sequences of coordinated activities as concrete processes of interaction of actors with diverse motivations and capacities in specific environments that happen in historical time. Coordination in this sense is co-ordination or formation and application of orders in different levels as a consequence of and at the same time a condition for action and interaction of economic actors.

Following a brief revision of literature on the topic of coordination and institutions in the contemporary institutional economics literature (section 1), it is suggested to develop a shared comprehension of "institutional coordination" as different, but related forms of linkages between actor and institution (section 2). "Institutional coordination" is furtheron defined as a multi-level process of dissemination of information, formation of capabilities and structuring of interactions based on institutional arrangements and their generation (sections 3 and 4). The problem of institutional coordination of specific groups of economic activities is situated in a framework of complex systems, that are introduced like "regimes of institutional coordination" (section 5).

1. The notion of institutional coordination in contemporary institutional economics
Institutional coordination is in the first place the construction and application of different types of orders, based on the interrelation between actors and institutions, that affect the realization of economic activities by individual actors, but also in the coordination of organizations, industries and economies as a whole. The rules that guide the actors in an individual level form patterns of behavior that explain to an important degree the cohesion and change of groups of activities.
In the general context of institutional diversity, in new institutional economics two basic types of economic orders exist: a spontaneous, anonymous and multilateral market order, and another intentional type based on bilateral and private ordering (Williamson, 2005). The transactions and their execution in these "islands of coordination" (Richardson, 1972, 1998) depend on the existence of different types of given institutions in the environment and of their quality; from existing property rights to specific governance mechanisms. Transactions generated *ex ante* according to the formal institutional arrangements available are being organized and defended *ex post* in their execution, establishing orders with different characteristics and qualities: "[...] alternative modes of governance effect good order (adaptation) during the ex post contract implementation interval." (Williamson, 2005: 2)

The selection of organization alternatives relates to the solutions of these two basic types of coordination: the provision in the free market through spontaneous arrangements, where the "resources are allocated to their highest value as the marvel of the market works its wonders." (Williamson, 2000: 598)— or the controlled, hierarchical and administered execution of a production plan in the interior of a firm. By definition, one of the institutional alternatives that are presented in Williamson's "capitalism" —whether the market or the firm— is chosen for the purpose of economization of transaction costs. The governance of contractual relations leads to the construction of order in the economy: "[...]governance is the means by which to infuse order, thereby to mitigate conflict and realize mutual gains" (Williamson, 2005: 3).

Following evolutionary approaches of institutional enquiry, the coordination maps that emerge guide the options of behavior on an individual level, achieving the formulation of connected solutions that often cannot be reached with isolated individual and egoistic decisions alone, in absence of preliminary existing institutions and social preference sets: "[...] the coordination of intrinsically complex elements reduces the individual degrees of freedom, but can lead to emergent behavior at some higher level that the individual elements are not capable of" (Jost, 2005: 7). As the Hardin example of the prisoners' dilemma shows (Bowles, 2004: 27), the pursuit of individual interests in absence of built and accepted institutions leads frequently to unfavorable solutions for the actors that are involved. This kind of social dilemmas suggest a ubiquity of social preferences and the importance of the (evolutionary) formation of institutions in order to build up orders that finally determine the productive results of an economy. It is important to emphasize in this context that the institution building does not only
affect the intentional order of bilateral interactions, but also the formation of the institutional framework on higher levels, including the market spheres itself.

Widening the perspective in "older" traditions, institutions matter in the construction of orders because action is always related to shared habits of thought and behaviour and embedded rules (Hodgson, 2001: 295). Institutions link actions carried out in the past as references for present and future action and create thus the structures of behavior that facilitate coordination.

The coordination problem not only reflects the importance of institutions as "data" for action, but shows their impact in economic activity through the processes of their formation. In this sense, the "good order" of an economy can be understood as the dynamic aspects of coordination, that is to say not only the characteristics of the institutions in a certain moment, but the capacity of the actors to create institutions in different levels and forms.

But the actors geneally do not have a direct control of the processes of creation of institutions and there is not a guarantee that the selection of institutions be efficient in the long run. Institutions show evolutionary dynamics and emerging properties that do not respond directly to individual purposes, even if the assumptions are maintained that the actors are in conditions to carry out activities without (strong) motivational or rational distortions.

We are talking about self-enforcing and self-diverging structures of interaction that create diverse patterns of individual and collective coordination. Because of the stability of the institutions, the understanding of their origin can derive from continuous and interdependent processes, where the private arrangements are part of a formed social substance.

All in all, the orientation of the individual actions and the bilateral coordination of interactions support the ordering of the activities in the higher levels of a firm, of an industry or of a market that describe the dynamics of the economy as whole. The intention to find an adequate level and content of analysis for these independent processes is expressed in the term of "regimes" of institutional coordination, as we will put forward in another section of this paper.

The resulting orders and their range of varieties in terms of characteristics and quality can be explained from different points of view, where "good" orders help to reduce the global levels of transaction costs, lead to successful adaptation processes of the actors and create coherent structures of incentives; where the emerging orders offer
collective solutions with benefits for the individual actions and bilateral interactions that
not (always) they can be established in lower levels, and where the process of formation
of the institutions can be more significant for the comprehension of the coordination
that the description of its static way role.

2. **Actors, institutions and institutional coordination**

In general terms, in institutional economics actor and institution affect each other
mutually. But it is important to revise the conceptions of these variations in their
interdependence, their stability and their degree of determination, as the degree of
freedom that is granted to an actor in a specific environment to make decisions and the
way the institutions structure decision making and action. Different types of analysis
distinguish themselves in the degree in which they put the emphasis in individual
aspects of the actor or in the recognition of collective aspects of the environment,
among other elements.

The degree of complexity in the institutional theory grows with the degree of
additional freedom granted to the influence of the environment on the preferences and
the cognitive processes. But the general or universal formulation of theories that
represent an optimum based on given preferences, information and market structures is
not possible neither desired in the context of institutional economics. Nevertheless,
there do exist important differences in the conception of the relation between the actor
and the institution, related either to a one-way, an emerging or an interdependent
character.

A first important aspect in the relation between the actor and the institution is the
intentional selection of institutional arrangements by actors with bounded rationality.
The actors in new institutional economics compare the institutional arrangements that
are available and choose the most convenient one in terms of the economization of
transaction costs. This type of relation between actor and institution is characterized by
an extensive autonomy of an actor who selects the most adequate institutional
arrangements for the execution of its activities (Williamson, 1991). The contributions
of the new institutional economics to the analysis of coordination schemes concentrate
on the intentional and goal-oriented search and selection of immediate solutions in
stable institutional environments.
In the new institutional economics the autonomous and intentional actor selects with bounded rationality the available institutional arrangements that are more convenient in order to save transaction costs. The available institutional arrangements as the prototypes of alternative forms of governance and the mechanisms of their establishment and reinforcement depend on the characteristics of the prevailing institutional framework.

From an evolutionary point of view, the relation between actor and institution can be explained by combinations of emerging, interdependent processes of intentionality on the one hand, and of referentiality on the other: with intentionality we refer to purposeful actions institution formation; referentiality implies that the actor follows tendencies formed in his environment. Routines and other social institutions influence in the activities of the individuals, forming patterns or trajectories of action (Nielsen, 2001). The current and future actions depend on past actions by the same actor and by other related actors that are being transmitted through diverse institutional arrangements. Emerging properties and profiles arise based on the historical behavior and the interaction with other actors.

As a consequence, the actors can be conceptualized in a reciprocal relationship between actor and institution, where the institutions provide information, orientation and cultural ingredients for the actions. The actor and their theoretical representations, like the functions of preference and production, are malleable, as the individual actors are the producers and at the same time the products of their circumstances (Hodgson, 1998). The institutions and the institutional environment in general (trans-)form itself with the actions of the actors. The institutions exist as social phenomena that reproduce themselves: "Institutions are simultaneously objective structures 'out there', and subjective springs of human agency 'in the human head'. [...] Actor and structure, although distinct, are thus connected in a circle of mutual interaction and interdependence." (Hodgson, 2001: 297).

The individuals are socialized in a world with institutions. The economic activity develops inside an economic society with laws, rules and existing habits, that in the course of time change with the impact of the own activity. "We are all born in a world of pre-existing institutions, 'conferred' by history. History provides the resources and the restrictions, in each case material and cognitive, inside which we think, we act and we create" (Hodgson, 2001: 297).
3. **Levels of institutional coordination of economic activities**

From the review of the conception of the coordination in the different perspectives of institutional economics, particularly understood as relation between actor and institution, we can derive a model of coordination as process in different levels of analysis.

An interdependent relation between the actor and the institution reflects an extensive approach, given that the actors receive supplies of information, cognition, problem solution and cultural configuration in a more extensive sense. The conceptualization of this type of problems is advancing, but has certain natural limitations because of the complexity of the processes involved and its non-linear and open character. Conceptually, its strength lies in the combination of ascending causative processes ("upward causation") and descending causative processes ("downward causation") (Hodgson 1998).

The ascending and descending causative processes can be reflected in an analysis that does not imply a general specific, complete, and continuous integration, but a specific description of relations between the actor and the institution in different levels of analysis. This kind of conception considers the diverse characteristics of the actors and institutions, of patterns of individual action and systems of rules, in emerging schemes of institutional coordination in different interdependent levels, that represent the different ascending and descending causative and interrelated processes (see diagram 1).

In the first place, the actor is conceived with bounded rationality and cognitive capacities in formation according to the available institutional resources (Nelson et al., 2002; Williamson, 2005).

The first level of coordination is the unilateral level of coordination of individual behaviour, guided by habits and other institutions of cognition and of decision making. The individual cognitive models order the possibilities of action and create stable patterns of behavior in relation to the available arrangements in the environment.
The application of arrangements as contracts involves a bilateral level of institutional coordination. This second level covers all the immediate and mutual interactions between actors oriented by institutions like routines. The routines affect the rule systems at the unilateral level and, at the same time, the institutions at the first level sustain the routines while creating individual devices that stabilize the effect of the routines in patterns of individual behavior (Hodgson, 2006: 7). The coordination in the organizations is located in this second level of institutional coordination.

In the third level are located the institutions of market and environment that facilitate the multilateral institutional coordination. All three levels are related with each other and with the actor. The institutions at the bilateral level depend at the same time of the multilateral institutions as the law system and its mechanisms of reinforcement. The complex relationship between the actor and the different
institutional levels is represented in diverse forms of embeddedness and institutional formation. The linkage between the different levels represent ascending and descending (re-)constitutive causative processes, supported by intentional processes of construction and formation based on the decisions and actions of the actor, on the one hand, and the embeddedness and feedback of the organizations and of the actors through stable institutional structures among others elements of inculturation, by the other.

4. Forms of institutional coordination of the economic activities
As coordination based on the institutional arrangements the "institutional coordination" is in essence result of the dissemination of information, the formation of capacities and the structuring of the interaction.

In the first place, the institutional coordination is the structured diffusion or dissemination of information by means of the institutional arrangements. The processes of dissemination of information reduce uncertainty, economize cognitive resources and form stable expectations of behavior. The shared systems of rules reduce uncertainty through an extensive and structured revelation of information ("information disclosure") that is fundamental for individual decision making in the realization of contractual solutions (Williamson, 2005: 11), but also for the response of actors to all kinds of signs, stimuli and incentives. Based on the existence of rules and other institutions that support the processes of coordination, individual decision making is "informed decision making" (Richardson, 1998: 46).

With the existence of the institutions expectations of behavior are created that facilitate the coordination of the activities. Details about how to carry out specific activities that are stored in the information carried by institutions, are the base for the the behavior of other actors and of the continuity of processes: "The action that any participant chooses is going to depend of what this participant expects that the other participants will do" (Richardson, 1998: 46).

Part of this information relates to the reputation of the actors that have a record of shared activities (Williamson, 1989), but also the ones that plan to interact directly among them without including specific previous circumstances. It can be considered for example information about actors' credit risk. The institutions as backups, filters and files of information are crucial to evaluate and to carry out an action in a partly
known and understood environment. The institutions are thus at the same time restrictions and resources for action.

Secondly, the institutional coordination is the structured creation of cognitive, rational and action capacities. To create these capacities, institutions are formed, selected and applied as guides of action: "[the actor] needs to learn how to identify different contexts, as well as a set of context specific guides to action, or find a broad guide to action that works reasonably well in all or most contexts he will face" (Nelson, 2005: 6). The stability of the institutional arrangements contributes to the compatibility of this kind of guides of action that are the fundamentals for coordination.

Cognitive capacities are the coordinates of the interpretation of the disseminated information. Integrating mental models for the adaptation to recurrent cognitive problems, the mind forms specialized capacities. By its open character, this formation process of capacities can be modeled in complex and parallel systems of cognition (Holland, 2004: 48-49). The institutions orient the formation of the cognitive capacities and they contribute thus to coordination.

Due to dispersion and fragmentation of the knowledge in the economy (Antonelli, 2005: 67), the institutions influence in a determinant way in the generation of diverse but compatible cognitive capacities: "The coordination of specialized activities requires distinctive capacities in complex systems" (Foss et al., 1998: 2). It is an essential question "[..] how real economies are capable of achieving to a certain degree a successful coordination given the dispersion of knowledge that is represented in the diversity of capacities" (Idem: 2).

Through institutions the selection of activities that involve actors with levels of different knowledge is achieved which determines the degree of its compatibility. Basically, the actors develop the ability to discriminate among different tracks that create "histories", "theories" or "maps" of exploration based on the knowledge acquired (Nelson, 2005: 4). From this perspective the economy is "a coordinated system of distributed knowledge " (Potts, 2001: 413).

Taking into account the creation of capacities for the coordination is to consider the importance of the cognitive aspects of a creation of meaning as a baseline for coordination. The institutions are dispositions that facilitate "[..] the generation and application of cognitive capacities through institutional arrangements [...]", and they guide "[..] the radical processes of transformation and of individual development specifically related to learning" (Hodgson, 1998: 181). The formation of the diverse
types of capacities in application of institutional arrangements is a continuous creation of connective structures in the economic system (Potts, 2005: 328).

In the third place, the institutional coordination is the structuring of interactions among the actors, whether as immediate answer to the necessity to control specific sequences of behavior, or through the stability of the prevailing institutional arrangements in the linkages between the activities of various actors: “[...] in order to achieve co-ordination from decisions taken independently a certain stability in the economic environment is necessary” (Richardson, 1998: 47).

As stable devices, institutions facilitate the coordination in established patterns of interaction that are selected and modified in evolutionary processes of replication and selection (Hodgson et al., 2004). Depending on the focus of analysis, the institutions can be conceived like inert reference points that permit coordination, guiding the autonomous individual actions.

These reference points, like contracts or the way they are being formulated and executed in a specific environment, they permit the creation of mutual commitments and promote the confidence among the actors. A dense network of respected and enforceable institutional arrangements potencializes the economic activities.

The dissemination of information, the creation of capacities and the structuring of interactions are processes that sustain coordination as institutional coordination in the relationship between the actor and the immediate institutions in their environment, but also in the complex patterns of formation of institutions in different levels.

5. The regimes of institutional coordination of economic activities

How can we describe and to analyze the processes of formation of the stable plans of institutional coordination in relation to the actor and its environment? What are the main elements for the analysis of this type of schemes? To locate the interdependence between the actor and the different levels of institutional coordination of the economic activities we refer to "regimes of institutional coordination".

The institutions as connections of the system link the economic activities according to the different interdependent levels of multilateral, bilateral, and unilateral coordination in information dissemination processes, formation of capacities and structuring of the interactions. The connections that exist and emerge determine the configuration of the regime. The connections are of a special importance in complex and open systems as non-integral spaces with an explicit topology (Potts 2001), result of dynamic processes of continuous (trans-)formación.

These processes express the emergence of the regime configuration in function of the existing institutional connections. Because of their differentiated characteristics, among the diverse types of processes can be distinguished basically the coordination of known —also called coordination of exploitation or synchronic coordination—and the coordination of new or innovative activities —equivalent to the coordination of the exploration or diachronic coordination.

In the different systemic levels different characteristics like emerging properties can be observed, that include different forms and levels of complexity, order, homogeneity (global or local), conectivity, proximity, responsiveness, etc. An important emerging property of the coordination of complex institutional systems is expressed for example in the level of governance of the activities (Nooteboom 2000, Loasby 2001, Antonelli 2005).

The emerging regimes link specific sets of related activities, like certain types of organizations, with differentiated potentials of coordination. The logic of the complex systems permits a conception of the different degrees of determination of the actor and his rational capacities, depending on the consideration of the ascending and descending causative effects. This perspective is convenient for the study of the levels, the structures and the evolutionary sequences in the institutional coordination of the activities in dynamic and specific economic environments.

The purpose of the introduction of the regimes of institutional coordination is to include a tool of analysis that permits to express and to delimit the different aspects and roles of the institutions in the coordination of productive activities, like they are reflected in the emerging forms of coordination as a group of related activities, typically called "industries" in the contemporary institutional economy (Richardson, 1972: 888, Williamson, 1989: 408, Nooteboom, 2000: 95, Hodgson, 2001: 261). The number and the type of the activities of a regime can vary, but is limited for the relations among
the complementary activities that require of specific capacities for their execution (Richardson, 1998: 56).

In the interior of a regime of institutional coordination can be conceived diverse coordination schemes in processes dominated by the level of the individual actor (ascending causative processes), but also by the stability of the connections in upper levels (descending causative processes). One of the main purposes of an analysis of regimes as a complex system is the combination of these different logics of origin, formation and effect of the institutions in its contribution for the evolutionary construction of orders.

Conclusions: the actor, the institution and the coordination of the economic activities

In the analysis of the institutional structure the central problem is not one of allocation of scarce resources but of coordination of activities as formation and application of orders in the organization of the production.

Based on the characteristics of the actor —diverse motivations and bounded rationality— and the characteristics of the environment in which the actors operate —uncertainty and information asymmetry— an institutional diversity is generated that can be expressed in the basic forms of interaction in the market and in the organizations with detailed nuances in the diverse institutional arrangements and its specific characteristics. This institutional diversity is the origin of the ordering of economic activities, generating orders of diverse kinds and qualities. The interaction and cooperation among the actors, as for example presented in game theory, permits to overcome the social dilemmas of strictly individual solutions. At the same time, the generation of rule systems is not a neutral process, but characterized by specific dynamics of allocation and delimitation of asymmetric powers and different degrees of stability or rigidity of the institutions.

In the context of institutional economics, the origin of coordination is constituted with the relation between the actor and the institution. Basically given actors select basically given institutions as governance forms in order to achieve a decrease in transaction costs. This basic scheme is expanded according to changes in the characteristics of the actor and the institution, to introduce on the one hand accelerating ascending causative effects, that imply adjustments in the stock of available institutions
through the decisions and individual actions. On the other side the existence of descending causative effects and the reconstruction of the actors is recognized by the dissemination of information and the cultural context according to the specific institutional environment.

The resultant complex interrelations can be shaped like emerging processes of the relation actor-institution including interdependent causative effects. This proposal integrates the different perspectives of contemporary institutional economics, based on a general scenario of stability of actors and institutions with predominancia of the ascending causative effects. Depending on the problems to analyze, additional elements can be introduced that are reflected in a growing importance of the descending causative effects among the different levels of institutional formation. This implies a reconstruction of the institutions and of the actors, as in activities of innovation that imply individual learning and organizacional and therefore dynamic changes in the cognitive capacities and the mental models involved.

From this point of view, the formation of the institutions in permanent interaction with the actors can be introduced. Different conceptual tools of institutional analysis make visible that –ahead of any efficient auto-organization of the institutional framework– institutions as systems of rules are formed and maintained in processes in which the individuals participate without being able to determine their result. And at same time the institutions affect the behavior of the actors without being able to determine their action.

Coordination as we understand it here is an "institutional coordination" like the one that is based intrinsically in the existing institutional arrangements and its impact on the behavior of the actors. We consider that the institutional coordination that results of the interdependent processes of actor-institution relations in different levels is characterized by the ordering of the activities in three forms: the dissemination of the information, the creation of capacities and the structuring of the interactions, including the specificities of the same environment, particularly reflected in the levels of prevailing trust.

The institutional coordination is dissemination of information, as it implies a structured access to information with a preconfiguration of the individual answers to the chronical problems of access to information. The dissemination of information is determinant for informed decision making, but also for the creation of incentives and other signals, and the formation of expectations of behavior.
In the second place, institutional coordination is the result of the creation of diverse forms of capacities in actors and in organizations. The behavior of the actors does not unfold in agreement with the application of fixed and rational rules and customs, but guide itself by the capacities acquired in the interactions. The cognitive capacities for example orient the deliberation and decision of the actors. Given the heterogeneous dispersion of information and knowledge, the compatibility and coordination of the activities arises because of a compatibility of the cognitive capacities through institutions as guides of action or critical routes that create systems coordinated of distributed knowledge. While accumulating cognitive capacities in learning processes, the actors are formed and transformed. The institutions are the connective structures in the processes of capacities formation.

In third place the institutional coordination is turned out of the structuring of the interactions. The systems of rules frame and resolve the coordination games. The institutional structure promotes or inhibits the coordination through the generation of trust among the actors. The dispositions of action are also dispositions of interaction.

The analysis of coordination in the institutional structure goes beyond an abstract interaction between actor and institution in a given environment and suggests in an explicit way schemes of analysis for the configuration of orders for the coordination of the activities. Sets of microprocesses of institutional coordination are integrated in more extensive patterns of order. The "regimes of institutional coordination" of the economic activities constitute a theoretical proposal of analysis of the formation of orders. In a regime of this kind the economic activities are connected through institutions in open and complex systems. The systems are transformed into evolutionary processes of formation of the diverse states generating emerging properties in different zones or in the entire regime.

The conceptualization of the coordination in the institutional structures based on regimes of institutional coordination of the economic activities provides with a framework of general analysis that permits to describe and to shape problems of coordination in structured spaces. Particularly the intermediate levels of bilateral institutional coordination inside the organizations as a consequence of ascending and descending causative processes introduces novel elements of mesoeconomic interdependence that can be used to achieve a better understanding of the emergence of specific organizational forms in particular institutional frameworks without neglecting the individual decision and deliberation capacities.
Firms are concrete examples of emerging forms of organization, given that they are involved in diverse processes of institutional coordination. On the one hand the business activities are consequence of decisions about the selection of institutional arrangements as alternative ways of governance (ascending causative processes), with implications for the conformation of individual businesses and of sectors of business activity as a group as for the generation of private orders. On the other side the plans of coordination that apply in the businesses of an industry particularly are consequence of the specific characteristics of the institutional environment and the business existing or prevailing institutions (descending causative processes). Firms as stable forms of organization of productive activities emerge consequently of the interdependent processes of institutional coordination.

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