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Governance in Network Industries:
Lessons Learnt from New Institutional Economics

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Abstract

Institutional economics provide a useful frame to navigate the fuzzy world of governance structures. Of course markets, firms and relational contracting (or Hybrid Forms) are alternative tools which can complement or substitute each other to frame transactions made among economic agents. However, firms are not a single piece of governance structure as they might handle different transactions very differently. Either inside the firm, such as the day-to-day operational workflow, the hazards of R&D discovery and trials, the long term production of skills and knowledge through organized definition and allocation of tasks, the coordination between today's and tomorrow's operations e.g. between the various levels of management and the interactions with the stockholders, or outside the firm in the interactions with suppliers, customers bankers and the social or professional communities. Truly, those firms are all conglomerates of several governance sub-structures. So are the markets conglomerates of several governance mechanisms. It is why we are able to think about designing/redesigning the markets we have and to move to get the markets that we would like to have. Knowing all that: how to apply it to the existing Network Industries?

Keywords

Institutional economics; governance structures; markets; firms; network industries

1. Introduction

“Institutions matter” (North 1990): “*Markets and Hierarchies*” (Williamson 1975), “*The Firm, the Market and the Law*” (Coase 1988). Within a few words as simple as these, a Copernican revolution occurred in economics. It is known today as “*New Institutional Economics*” (Brousseau & Glachant 2008; Joskow 2008) - a term at least 40 years old- or as “economics of governance” (Williamson 1996) - dealing with both organizations and, more broadly, institutions.

I spent 20 years of my life seeking to understand it to the best of my ability through “learning by doing”. Governance, organization and institutions are territories too vast to be apprehended only in an abstract and general manner. To study real cases, to address reduced enigma, and to operationalise the concepts and the methodology for a single and tractable piece of research permit us to go ahead into the unchartered and unknown even if only slowly and step by step. Today in this paper I would like to share what I understand about “*Governance in Network Industries*” by studying it through “New Institutional” lenses (Brousseau & Glachant 2011 & 2012).

The fact that some industries have some “networks” as structural backbones obviously contradicts the old classical axiom of the “invisible hand” acting from below/behind the market (Finger & Künneke 2011). Something similar is expressed when saying that some industries, their companies and related stakeholders are submitted to strong “network effects”. We expect to see there particular ways of addressing the governance puzzle because we may easily predict that transactions with very particular characteristics will require very particular governance regimes (Ménard & Shirley 2005). However, starting from such a very light and general statement would not bring us too far (Glachant & Perez 2008). What we still need to do before starting any further research in this area is to determine what the key particularities to track there actually are and why (Aoki 2001; Glachant, Hallack & Vazquez 2014; Glachant, Kahlfallah, Perez, Rioux & Saguean 2013).

We need, however, to define a theoretical frame *ex ante* from which to ask research questions articulated in a logical order. This is what I will do in part 2: “*NIE is anything but new: what is it about?*”. I am still not sure that NIE founding fathers (as Coase, North and Williamson) and mother (being Ostrom 1990 & 2005) really say the same about the deepest core of institutional questioning. This being clarified, we will end up with a set of key research questions to be asked to network industries within an institutional frame. However, this does not guarantee that what we call “network industries” in our day-to-day life is also a relevant or even a significant enough phenomenon in an institutional theoretical frame. This is what I will explore further in part 3: “*Do Network Industries exist for NIE?*” Having worked for twenty years in this area, I am presumably self-intoxicated enough to believe so (Joskow & Schmalensee 1983; Levy & Spiller 1994; Glachant 2002). But even so why you too should care? Would you miss that much by ignoring that NIE might provide a working research frame for governance in network industries? It is the last but not least question addressed in this paper in part 4: “*If yes, then so what?*”

2. NIE is anything but new: what is it about?

Reordering institutional economics in a very reduced set of logical questioning is an attractive, but daunting task that (to my knowledge) nobody has succeeded to perform (see Brousseau & Glachant 2002 & 2008). I will then bypass that intractable difficulty by pretending to believe that a good enough proxy is to reduce NIE to four founding fathers (Coase, North and Williamson) and mother (Ostrom). Plus -to make everything really easier- I will also reduce each of these four to a caricature of my own. I do apologize in advance for any oversimplification by reminding you all that simplifying and “black-boxing” are two basic auxiliaries of any reasoning.

2.1 Ronald Coase

Let start with Ronald Coase. I will reduce his theory to three of his own words “*The Firm, the Market and the Law*”. In my mind, a very first typical Coasian statement is that the firm has long been forgotten as a basic institution of capitalism (see Coase 1937). As Coase restated in his final book (*How China became capitalist*, 2012), the firm is a kind of organization which is significantly different from the market, as correctly stated by Alfred Marshall at the end of the 19th century. The firm, therefore, is not a production function. It is a kind of visible hand which departs from the invisible hand of the market. Unfortunately, Coase was still claiming in 2012 (at the age of 102!) that the firm is under-studied and largely unknown (I am not sure that this was a welcome comment for Oliver Williamson...).

Then also comes the Law. Law too has been too long forgotten while Coase –on the contrary- was working with growing success at the Law Department in Chicago. Law is another basic institution of capitalism (see again «*How China became capitalist*» where Law plays a key role) because it gives a set of common and central rules to economic agents that are alternative to the purely decentralized and heterogeneous arrangements negotiated through the so-called «*Coasian bargaining*» (Remember the wrong Coasian economics of Stigler (see 1987); or see Cooter 2007 at Berkeley Law Faculty, a founding father of early and “right” Coasian Law & Economics) .

Parallel to these two first big errors of economic reasoning, for decades (if not a century) the market itself has been long forgotten or misunderstood... by many economists. Market itself is an institution of capitalism. And, as such, it might be adapted, changed, rearranged, repaired, etc. to deal with many of its so-called “*market deficiencies*”. At least some of the deficiencies that Pigou (see 1920) termed at the beginning of the 20th Century as «*externalities*» (literally: as effects being external to the market by nature; also see P. Samuelson (1958) at MIT in the second half of the 20th). For Coase the market can do much more than Pigou or Samuelson believed. Notably, the market can fix many “externality” difficulties if properly designed. Hence, today’s flourishing «*market design*» agenda: with well-designed property rights the radio, the TV (and later on the Internet) can easily bear vibrant markets and flourishing innovation waves. The same goes with airport -or rail- slots. Furthermore, with well-designed property rights a market for pollution allowances can efficiently and effectively cap pollution externality (SO₂, NO_x, CO₂) to environmentally acceptable levels. The market is truly a robust and multiform «*institutional structure of production*» (see Coase’s Nobel speech in 1991) that the Law (or the soft Law called «*regulation*») can seriously upgrade to enhance the social welfare in many “market deficient” industries (See Brousseau & Glachant 2014; Ellerman 2014; Anderson & Libecap 2014).

2.2 Douglass North

With Doug North (see 1990 & 2005) we are not going to walk on a sidewalk: we have to explore the entire world from his institutional space shuttle. First of all, many institutions and certainly all the key institutions (including the software/s engraved into our brains) are long living. We inherit them from the past as they are. There is no *tabula rasa* anywhere (except in the mind of Rene Descartes or the speeches of Mao Zedong). Second, we might aim at changing this or that institution, even all of them if you please. But the rules of the game and the set of incentives for playing the game of changing existing institutions are also coming from the existing institutional endowment. As evolutionary or revolutionary institutional players, we only play a la Tocqueville. You may also think: within «strong path dependency». Thirdly, it is very demanding to really understand what today’s existing institutional endowment permits or not, what a likely «today’s natural institutional outcome» is or what the «actual paths of feasible institutional changes or fixes» are. As there is no institutional short cut and no way out, researchers have to be really realistic with existing institutional settings. Economists in particular frequently know really too little about institutions and institutional change to be able to have credible reasoning before having checked the actual characteristics of the today’s

institutional endowment. As History matters a lot with institutions, the positive approach to institutions should dominate vis-a-vis the normative approach which is too frequently the only methodology economists dare to dignify. Fourth, the key existing institutions are not only economical (again not flowers sent to Williamson) as they are as well legal, political, social (including our beliefs) or cognitive (we humans –practitioners as well as intellectuals- are shaped or bounded by our knowledge and brain processing capabilities). From this we can derive a fundamental institutional research principle: the existing key institutions -as they are- are the first order of magnitude in understanding the world as it is and what one might be able to do within it (again, not welcome news for Williamson).

2.3 Oliver Williamson

Doug North is not so keen on Oliver Williamson who... does not care. It is because “*The economic institutions of capitalism*” do stand on their own, and for thirty years have made many obscure parts of economic life and economic reasoning clearer. Asset specificity, transaction cost, bonded rationality, opportunism, adaptation to unforeseen changes and uncertainty, alignment with governance structures, safeguards and credible commitment, etc. are genuinely mundane today in the economic toolbox. However, the universe being described by Williamson did become more and more diverse along his 20-year long journey from 1975 to 1996.

In his first very big step in 1975, Williamson says that if we concentrate on identifying the key economic institutions of capitalism, there are only two (as seen by Coase as early as 1937). They are: “*Markets and Hierarchies*” («Hierarchies» being a word substituting «firms», characterizing them better vis-a-vis the markets). However, in his second big step in 1985, Oliver basically says “*Oops!*”: there is a third key economic institution: “*relational contracting*”. It is what people do when transforming the Coasian process of decentralized negotiation into a durable frame of bilateral (or multilateral) cooperative agreement. You might also call it a “*credible private ordering*”. A significant private credibility can be added to voluntarily designed agreements by “*using hostages to support trade*” (see 1993). Ten years later in a third important step termed «*Mechanisms of Governance*» (1996), Oliver acknowledged that the logic governing his own set of economic institutions is even more complicated. On the one hand, the legal environment (either the Law or the regulations) as well as the social environment (think Chinese large families) can inevitably change the governance properties of alternative economic institutions, hence possibly favoring or handicapping the market vis-a-vis the firm or the relational contracting, etc. On the other hand, it also happens in fact that a so-called “single” governance structure -as a firm- has to articulate a whole bunch of connected but different transactions. Williamson rightly quotes what Aoki does with the «*Japanese Firm*» (see Aoki 1988). A firm which combines at least four related but very different components: 1- a governance of the workers’ tasks flows at the workshop level; 2- a governance of the managers’ behavior at the corporate level; 3- a governance of financial risks and investment financing by allied banks acting as long term close stakeholders; and 4- a governance of input supply flows from affiliated suppliers acting as another long term close stakeholders. Aoki himself added other institutional dimensions by distinguishing alternatives in organizing the production of skills and knowledge into the industry’s or the firm’s RD&D “technology innovation” process.

2.4 Elinor Ostrom

Notice that all these four founding fathers and mother finally got a Nobel Prize in (institutional) economics. But, Oliver Williamson having been so successful within our profession, another key institutionalist, Elinor Ostrom, had to protect her own research territory by asking us to forget Oliver: “*forget markets & hierarchies*”. Why? What for?

From Elinor’s perspective (see 1990 & 2005), it is not because we address economic issues that we have to concentrate a priori on the so-called “Williamsonian economic institutions of capitalism”. For

her the only effective research strategy is to target the more relevant institutions for the chosen question. It means: the key institutions which really frame the area and the issues to be studied. As already suggested by Doug North, it is not necessarily the so-called “economic institutions” which are key in every economic process. The most relevant institutions might well be political, social or religious (as well formulated in the early 20th Century by Max Weber’s “protestant capitalism”; see 1905).

If you think Elinor, think about a community of practice, of repeated interactions, of local information gathering and sharing, of day-to-day sequential and interactive decision making, and of coherent or compatible beliefs. This might well recoup innovative and heterodox modern microeconomics: a la Akerlof –see 1984- (gift and counter-gift in a community of practice or endogenous selection of the individual standards of learning effort in a world of heterogeneous ethnic communities; etc.) or Avner Greif –see 1989 & 1993- (repeated long distance trade games in a narrow social milieu of a few endogamic families sharing a closed and demanding religion).

3. Do network industries exist for NIE?

While NIE certainly exists as a field of research questioning and reasoning, we may certainly frankly ask: Do «network industries» have anything to do or any place to find in that NIE field? I personally think so. While I also confess that it can be strongly debated or contested. The simplest starting point is that industries with very particular features should depart more from the classical economic reasoning for a world with no transaction costs. However, such a starting point is too poor to get to the point –which is not why to start, but where to go. And I feel better coming back to the four founding institutionalists to try to speak about it with their own voices. Again, I am already very sorry for any inconvenience or inappropriate statements that may follow.

3.1 a la Ronald Coase

It might be true than Ronald Coase would have been very bored with any research on “network industries”. But maybe not. He so frequently did work himself like an entomologist: he did spend a lot of time to see how bees are really used to fertilize orchards; how coast lighthouses were actually funded and managed in communities; how cattle and corn fields might coexist –or not- in the US West; how to restructure the radio and TV industry as a non-governmental and open business. He also spent his very last years on earth studying China’s long march out of extreme poverty and Maoism. Why not waste a couple of months with network industries?

At least Stephen Littlechild, one of the Coase’s closest admirers, did something similar by proposing a quite Coasian “network industries re-arrangement” (see 2014). First, get the network industry property rights’ order in line by unbundling the monopoly activities from the potentially competitive activities. Second, get the market participants’ network property rights in order by giving “network access rights” to all third parties. Third, get the incentives right on both sides of the split network industries by a) keeping an open entry on the competitive side and letting players find their profit how and where they can, b) mimicking a market process on the regulated side with an incentive regulation and RPI-X formula (later on also add “performance based regulation” with profit and risk sharing). It is as simple as that to open a Coasian boulevard across the many bunkers and trenches of network industries. True, Coase presumably did not like “systems” and handbooks; he did not write any. “*Just do it right*” seems a very Coasian approach indeed. Why not use Littlechild’s approach to network industries then?

3.2 a la Oliver Williamson

Oliver Williamson would tell us that he of course -and since very long- opened the black box of network industries in the light of his “economic institutions of capitalism”. Looking at his 1976 TV cable article and his corresponding 1985 book chapter, Oliver is even very proud of having resisted the Harold Demsetz 1968 claim of easily suppressing all existing network monopolies by opening vibrant markets for franchise. For Oliver the “competition *for* the market” can only exist if the corresponding activity has no strong network effects. Why? Because to neutralize the long term and enduring network assets effects at the ex-ante competitive stage, one needs to be able to define an effective long term contract foreseeing all the future significant contingencies and predicting the corresponding appropriate behavior of the network operator. In Coasian words: one then assumes no transaction costs, hence a perfect ex ante bargaining ending in a perfect ex ante contracting. Better to say that you assume that these network industries will never have significant network effects that might end up derailing the right implementation of the ex-ante “competitive” contracting process. The feeble point of Demsetz reasoning –from the Oliver’s point of view- is this imaginary capability to define ex ante a credible set of contractible terms and conditions keeping the transactions “aligned” all along the long life of the network assets. For Oliver they are the asset specificities of networks which finally annihilate the economic guidance provided by the ex-ante competition crystallized in the ex-ante franchise contract. In the network industries there is an «*irreversible transformation*» which cannot be avoided: the ex-ante competitive guidance does not last because they are the network effects which last. Hence, networks always need either a bilateral or a multilateral governance linking their “B2B” users and their network operators (see Glachant, Dubois & Perez 2008). Or, with millions of households or small and medium businesses at stake, a trilateral governance is even needed where a Third Party specializes in the general ruling of network operation and its following up (either adaptation to circumstances or settlement of conflicts). We actually call these third parties “*regulators*” and the ex-ante “*regulated contract*” they refer to is a typically “incomplete contract” which evolves through time through bargaining and regulatory decisions. Even if one can use a competitive process of monopoly franchise allocation, network industries guaranteeing an open access to their networks need a regulator and a regulated contract. (Joskow 1983 and Williamson 1976; Glachant-Perez 2011; Glachant – Hallack – Vazquez 2013 & 2014)

3.3 a la Doug North

Doug North would probably not like the way we have approached our issue till now. For Doug we should look first at the big picture, at the trunk, and not to focus immediately on the leaves and a few branches (as Oliver typically does, according to Doug). The big question with regulation is not to look for a good or a better contract, for a first best or a second best contract. It is mainly a question of institutional frame, not to speak immediately of institutional endowment.

What does the polity of your country typically do with this type of network industry issues? What do the lobbies at Parliament and around the government do? Do they even prefer to lobby or to sue? What then might the courts and the judges do? Or the Competition Authority? Do you even have a multilevel set of institutions with local regulators, courts and governments, etc. along a federal level of similar authorities? And how do they combine then (de Hauteclocque 2013; Glachant, Finon & de Hauteclocque 2011)? These are the only key questions that you cannot avoid asking (see Spiller 200_ & 2011; Holburn & Spiller 2008).

If you are not ready to build the corresponding reasoning and to apply it to your network industry issues it is better for you to not start studying such a topic. It is because you will not grasp what is really at stake as long as you ignore the big mountains like the nature of decision-making in a multi-level (local and federal) and multi-channel (sector regulation; competition policy; courts and executive power) institutional landscape (see Levy & Spiller, Spiller for an overview). Do you even notice that

the US and the EU are at odds regarding their multi-level and multi-channel institutional endowments? How then could the US and EU ever reproduce each other's network industry policies?

3.4 a la Elinor Ostrom

I assume that Elinor might have said that the relevant picture depends on the precise research question that you address. Sometimes it is true that it is the trunk only. But other times it might only be the branches or even some of the leaves. However, it is not too controversial to assume that regulation of network industries is not a case for better contracts or better contracting frames most of the time. It is more frequently a case of better institutional frame.

Even to address strong network externalities you might find a professional milieu compact and meshed enough to share most of the relevant information, evolving knowledge, related ex ante expectations and ex post measurement. All this might quite easily be conducive to an innovative multilateral network arrangement openly managed within the business community, or even managed by an "Agent" of this business community (as an interested intermediary, a neutral Third Party, a private association or a business platform as a hub). Remember that the market platforms called "exchanges" (the ordinary prototypes of a capitalist market institution) have been organized for decades in the US as cooperatives managed by the communities of trade intermediaries (see Craig Pirong 2014). In the same vein, what the Europeans call «*Transmission System Operators*» are transmission companies owning and operating the networks for gas or for electricity under open access and can be replaced in the USA by «*Independent System Operators*» which do not own the assets, but only operate them under the supervision of a nexus of professional stakeholders owning formal and informal decision rights used in the ISOs internal rule making (cf. working groups, task forces, general assembly, executive committee, etc.). Vice versa, the EU law has created, alongside an agency for cooperation of European energy regulators (ACER), two other entities working as official bodies of network operators (ENTSO-E for electricity; ENTSO-G for gas). These ENTSOs notably do the common EU grid indicative planning called "*Ten Year Network Development Plan*" as well as the drafting of all the new official EU grid codes. To conclude: do not forget the business communities when thinking about networks operation and open access implementation.

4. And so what?

Research is a journey only worth its final fruits. And so what? What would you miss by forgetting these four institutional approaches when addressing governance issues for network industries? According to me you would miss a lot. Make your own mind by reading this last part.

4.1 *The first core of network industry applied institutionalism: markets & firms*

As previously suggested, the first visible core of applied institutionalism for network industries is "the economics of governance within economic institutions". Yes, it is a Williamsonian approach. It is about "Markets versus Hierarchies". How can you deny that it started that way? We had vertically integrated monopolies. But why, and what for? Do they have feasible and effective enough market-based substitutes or not? Why? How do we make this work? What's a feasible transition path? There are many other questions we can ask. Three decades after Paul Joskow's pioneering book, "*Markets for Power. An Analysis of Electrical Utilities Deregulation*" (1983), we can only acknowledge where we are coming from. Fairness would be to add the engineering roots of the same utility deregulation process, the mathematical theory of nodal pricing coming from Schwepee & Co (see 1988), to Paul's early institutional economics at MIT.

4.1.1 Markets

But we have to immediately remember that they are markets at stake in the network industries' shaking up. Markets with a bold long «**s**». There does not exist any ideal single model of market (without «**s**») to build on the foundations of the network industries (see Wilson 2002). Keep in mind the extended market zoology we are in: centralized markets (as «PXs») versus decentralized (with only OTC and a few brokers). See «spot only» markets versus «a sequence of articulated spot and future», or even a long sequence splitting the spot into an organized succession of «day-ahead/intraday/gate closure/balancing and real time». Keep an eye on «nodal» (each network node will have a price formation mechanism) versus «zonal» (the managerial zone of each existing network operator is called a due reference market zone). If you are already suffocating under the avalanche of market alternatives, I will not elaborate more on the various ways of combining market places across their various zones («explicit» vs «implicit» coordination, market «coupling» vs market «splitting», and the like, such as whether to merge the ultimate «real time» step of balancing markets cross-border) (see Glachant & Ruester 2014; Glachant – Hallack – Vazquez 2014).

Nevertheless, just a word on an «explicit» coordination of neighboring commodity markets: in an explicit cross-border market regime, a commodity market player has to explicitly bid in the independent transmission market to get access to the grid interconnection through cross-border network capacity. It is therefore his own and full responsibility to rightly foresee what his position would be in the merit order of the two neighboring commodity markets to actually benefit from his connection capacity bid. On the other hand, what is an «implicit» combination of neighboring commodity markets then? In this implicit regime of market coordination, the market player's position in the merit order of neighboring commodity markets automatically drives the allocation of cross-border network capacity. As soon as any commodity bid is good enough in the connected commodity markets, the related network operators give it the corresponding connection grid capacity. Now remember what a grid vis-à-vis the commodity in a network industry chain is: the downstream of the industry upstream. This shows you that an «implicit» combination of markets actually merge two successive industry steps: the upstream and the downstream. In other words, an «implicit» combination of markets is a de facto vertical merger within the industry chain. But the operation of this «within industry merger» is driven by the commodity markets' merit order. Isn't it a speaking example of an effective and innovative «market design»?

4.1.2 Firms

Like «Market» being contradicted by markets, «The Firm» has not anymore existed for about 40 to 50 years (see A. Chandler's 1962 seminal book which literally pushed Williamson into «*Markets and Hierarchies*»). It is of course because we have so many different firms. As centralized firms with a «U» (*Unitary*) form vs decentralized firms with a «M» (*Multidivisional*) form. Does the firm roughly have only one central coherent output (rather to choose a U form) or many heterogeneous outputs (rather to go for a M form)? Maybe the firm single typical output is only delivered within various autonomous teams or zones (opt then rather for a «U.Territories and M.Headquarter» form –like MacDonald or Starbuck or an air transportation company such as Lufthansa or Easy Jet). It might also come a contest between «thin» firms (being organized only behind the walls of their facilities) versus «large» firms (expanding their organizational boundaries to other players acting outside their premises, in either the case of the Japanese firm Aoki or the many «Hybrid Forms» of Claude Ménard). This differentiation easily expands to governance operated only firm by firm or, on the other end of the spectrum, touching upon a whole industry (see «industry institutional chains» in Ménard & Shirley 2005). In the late institutionalist «strategic management research» all this thinking ends up operating in a reverse order: If you know what a given company is really good at governing better than its competitors, why not revisit and redefine all the rules and targets of its operation, investment and expansion to strengthen its market positioning even more? (see Oxley & Silverman 2008; and Nickerson 2008).

4.2 The second core of network industry applied institutionalism: alignment of governance with transactions

Identifying various markets and various firms is good -to underline that we intend to play legos in academia parallel to the real world of practice. But we still miss a minimum understanding of the basic rules of that extended game: how do we intend (or expect) to match these many components? We need to operationalize a bit more our reasoning here (Claude Menard: operationalizing is key with institutional economics which are too complex to work in a vacuum with no established “stylized facts”). It is also expressed as a key principle of the Williamsonian institutionalism: the “alignment” between the governance structures and the characteristics of transactions. If you do not define the governance structures you are referring to and do not detail the transactions that you are addressing, you cannot infer anything significant.

4.2.1 Firms and markets as governance structures

We may start the reasoning about our “alignment” research principle from its governance structures’ side. We have to align a governance structure, say a firm, with transactions knowing in advance that all the firms are not a homogeneous and single species. We know that, like elephants, mice, pigs and dogs being all mammals, all our firms are related animals but cannot cross-reproduce. Firms have heterogeneous institutional and transactional characteristics. They are simply unable to all do the same things; to all undertake the same range of activities. It is because of its very particular institutional nature that a certain firm (let say «A») will rely on a market for transaction (let say «x» or «y») while another firm (let say «J») will never ever do that because it has the very nature needed to self-undertake that type of transaction.

In fact, exactly the same applies to markets. We have so many different types of markets in their internal information and decision making (centralized vs decentralized), in their time horizons (spot vs future), in their space cohesion (nodal vs zonal), in their lateral coordination (as coupling or splitting), and in their vertical coordination (as explicit vs implicit). Hence, you can only foresee that markets too, like firms, have very heterogeneous institutional and transactional characteristics. The various markets are simply unable to all do the same things. They cannot all undertake the same range of activities. Because of its very institutional nature, a certain market (let say of type W) would let a firm (let say of type FF) handle a transaction of type (TT) while –actually- a market of type WW would have done the job much better than this FF firm.

Because of the heterogeneous nature of both firms and markets, the “true” institutional properties of a given firm vis-a-vis a given market cannot be blindly defined before opening our eyes wide in a careful investigation of the precise properties of both this firm and that market. It is typical of New Institutional Economics to think that firms and markets can compete to substitute each other in the governance of the myriad of old or new transaction types popping up in the flows of economic change and innovation. However, the level at which the institutional research reasoning works is very low. It is not macro, or even micro, but “nano” (as Kenneth Arrow rightly said about Williamson 1985). Institutions live there. *Nanoeconomics*: the research level at which many details are not anecdotes, but key. A research strategy cannot be to try to open (or close) any door with any key. It is not even the end of the institutional «alignment» journey because it takes two to tango: Governance structures compete only to match with transactions.

4.2.2 Transactions as targets of governance structures

I understand this “*transactions as targets*” sub-topic in that characteristics of transactions are not given by the primary laws of physics. There are no Kirchhoff laws applying to integrated monopolies from North Korea to Nord Pool and OTC trading. Physics are only an underground. Technology is a floor BUT not the foundation. Why should technology not be the foundation? In my mind it is because a

“transaction” requires an “arrangement” through which one actually transfers a service, a component, a good etc. from one agent to another between two technologically separable units. Hence, where it is technology which strictly dictates how agents are combined in an economic operation, there is no transaction. It is where technology lets people separate and combine in many ways that there is room for transaction(s).

But let’s also be frank. The way technology combines and cuts among agents is also a choice (or a “super-choice”: up to you to choose what level of choice). We know it well today because we think under the paradigm of “modularity”. The concept of modularity comes from the industry manufacturing re-organization in the past 30 years and has been well identified by (Baldwin & Clark 2006). The concept of “Modularity” simply says that one designs technology «borders» and technology «sets» in a vein similar to «Post-Coasian market design» and «Aoki’s company design». In this early 21st Century we human beings design all the components of our economic institutions “by intended design”: markets, firms, and transactions across technologically separable units. Of course our rationality is always limited and “bounded”. But it is exactly why we design a lot: knowing our limits, we also want to limit the areas of consequential uncertainty consequences.

“Modularity” means that one voluntarily glues a bunch of tasks with a “particular or proprietary technology or arrangement” to reinforce the local interdependence of each task with each other related tasks in the very same module. It is why we find there, inside each module, many tasks having local similarities of characteristics and of interdependence.

At the borders of each module, one voluntarily packs her bunch of tasks by designing them a common “interface” with the rest of the world. That interface is a technologically or institutionally defined gate by which each bunch of tasks might cooperate with the other bunches of tasks. That interface has well defined properties intended to be “interoperable” with the many other well defined interfaces. At a limit, anyone in the future might be able to design new interfaces to be interoperable with the existing old ones if any economic value is still at stake in an interplay of various vintages of interfaces.

Of course tasks interact more locally (inside their designed module) through locally particular rules of interaction. BUT the same tasks also can interact with other tasks from other modules through well-defined interfaces. We might end up with a typical “plug & play” open chain which mimics a technological and institutional continuum. One can really freely do “anything” he wants locally (inside his proprietary module of tasks) while keeping open all the opportunity benefits of further interactions (with other modules) as long as he well defines the interface through which his local module of tasks plays with other modules (See again Brousseau & Glachant 2011; Glachant & Perez 2008 & 2011).

In a nutshell, the “modularity” principle brings a bomb into the economics of governance. It is particularly a bomb for us, researchers in the governance of network industries, because most of our industries have been massively designed or redesigned in many directions. 1- One designs/redesigns new technological or institutional modules, hence the new workable technological or institutional interplay between these modules. And this literally designs the space of feasible transactions among modules, hence the demand for governance structures. 2- One also designs new markets and the corresponding allowed firms which delineate the space of feasible governance structures. This gives us an offer of possible governance structures. 3- One then has to match the feasible transactions with the allowed governance structures. It is what the practitioner does in his field of play, and what the researcher tries to understand in his field of New Institutional reasoning. Of course one practitioner might only look for a quiet workable arrangement among already existing tasks and waterproofed arrangements. Such a practitioner hence roughly plays a quiet game a la Oliver Williamson 1985. But another practitioner might want to act more “strategically”. He can voluntarily look at a brand new and more exclusive match between his self-designed characteristics of transactions and some specially designed properties of sophisticated new governance structures. Such a practitioner literally plays

strategic a la Nickerson – Silverman because he creates the world of institutional alignment in which to make his play.

4.3 The chemistry around the core of network industry applied institutionalism: both transactions and governance structures are “context dependent”

We do like the “institutional alignment” principle (Transactions/Governance Structures) inherited from Oliver Williamson 1985. But we know that Doug North is not wrong when saying that the institutional trunk (the “society institutional endowment”) might weigh more than the leaves or the branches (let say the Oliver “private ordering”). As we have already seen, Oliver himself enunciated a «revised» alignment principle in 1996 in his «Mechanisms of Governance». Of course in network industries everybody has known for a long time that both transactions and governance structures are «context dependent», given the incredible amount of laws, regulations, by-laws, rules, codes, standards, plus court decisions, etc. issued for these industries for 20 to 30 years. One already acknowledges at the end of the 20th Century that “deregulation” is the only inappropriate term to characterize the liberalization process in network industries (see Majone 1990).

Look only at the unbundling principle -so strong in the EU liberalization process. One prohibits key parts of the industry chain (basically this or that network) to merge its operation and investment processes with the other parts of the industry which use these networks. One makes this intra-industry tasks and business independence mandatory. One also prohibits particular and privileged bilateral contracting between the network and some of its users. One makes an “open access regime” mandatory for all potential users of the network. This access is therefore inevitably regulated because it has to be user neutral, user transparent and proportionate to a cost base and a service quality level.

This European process also creates new entities named «network operators: TSOs, DSOs» with chartered rights and duties, notably in the management of interconnections and the investment process (See Glachant – Hallack & Vazquez 2014). It might even end up, still in the EU, with a de facto operational merger between network operators and wholesale market operators, as we have seen earlier with the European «market coupling» and «market splitting» mechanisms. We therefore see how the industry structure, the boundaries of the firms, the governance properties of the markets, as well as the set of feasible transactions and possible transactional arrangements are so strongly “context dependent”.

Of course the EU as institutional environment is only what it is. In practice in the EU the implementation of European network industry and sector market common rules is made only at the national level with about thirty national sets of “parliaments/governments/courts/sector regulators/competition authorities”. This other fundamental characteristic of the European institutional context for network industries implies - of course - significant differences between making a transaction here or there and between relying on this or that alternative governance structure for this or that transaction (see Pagano 2003).

Furthermore, in the US the federal sector regulator is assumed a priori to be right vis-à-vis the federal competition policy (it is the “Trinko doctrine” of the Supreme Court). This is not the case in the EU (de Hauteclocque 2013; Glachant, Finon & de Hauteclocque 2011). First of all, DG Competition can strongly disagree with a sector regulator decision at any time, then act against and nullify it (see DG COMP versus German regulator for telecom in the Deutsche Telekom case, or the action against the Swedish TSO Svenska Krafnet). Second, the EU Supreme Court can rearrange the formal priority between sector regulation and competition itself: Think “State Aid” for support to renewable energy. More than a decade ago the EU Court froze the free market & competition policy priority to let the renewables (RES) support flows. Today the same court seems to go the other way around and might be on the verge of breaking all the existing European apparatus of RES support in the name of free market and competition policy priority...

We inevitably end up with a scheme of institutional co-design of transactions and of governance structures, as both are strongly constrained by their larger institutional environment where the larger society endowment plays a key role. In the real world, the EU network industries are visibly put in a *multi-zone* frame (because of EU remaining internal borders between legal and administrative national zones) as well as in a *multi-level* frame (with at least a national level and a European level), and also in a *multi-channel* frame (with at least a sector regulation and a general competition policy). This is why it is not enough for a researcher to say that “institutions matter”. Researchers really need to a) say what the issue at stake is and b) define a precise set of institutions involved before c) making a tractable enough research agenda.

We end up this at institutional reasoning with an analytical matrix frame made at least of two columns (*Characteristics of Transactions* and *Properties of Governance Structures*) and of two lines (*Multi Level*: national vs EU; *Multi Channel*: sector regulation vs competition policy).

	<i>Characteristics of Transactions</i>	<i>Properties of Governance Structures</i>
<i>Multi Level</i> (Countries vs EU)		
<i>Multi Channel</i> (Sector Regulation vs Competition Policy)		

4.4 The mind around the core of network industry applied institutionalism: the informal play in professional communities

However, an important part of the context dependence of network industries upon the institutional environment is not as formal as «Law and Regulation», «Unbundling and Third Party Access» or «Market Design Principles». Network industries also live in professional milieus where many key agents are actually «professional third parties» vis-a-vis the market players. In the EU most of the time these third parties play such a pivotal role (in the industry as in the market) that they are called “operators”, such as network operators, system operators, or market operators. They are not law makers, lawyers or even regulators. They only have to produce the common services that all the other players need to play their own market and business play. They are the market facilitators or the industry platforms. Because of their role and of their status, they are induced to create and animate “professional communities” a la Ostrom where they quasi voluntarily submit themselves to informal constraints and influences, to information and knowledge sharing, and to revelation of preferences and negotiation of judgment criteria. As Ostrom reigns here (see 2010), we encounter repeated interactions, reciprocity, reputation, informal coding of individual behavior through shared belief and common memory, etc. This informal setting overplays many formal codes and rules. Typically in the USA the «*Independent System Operators*» are strongly independent from the administration and the polity but very responsive to their professional communities -their constituencies.

Conclusion

Any reasonable reasoning about governance structures in the network industries ends up with an institutional matrix which is very demanding for any researcher. The world we are in is at least multi-level and multi-channel (not to mention multi-zone). And it is where we have to start building a workable alignment frame between the real characteristics of the transactions and the actual properties of the governance structures. Such a workable alignment is therefore not a strong piece of hard science, but a flexible case for sensible reasoning. We immediately remember why Ronald Coase was not a big fan of systematic treaties of the Coasian universe of transaction economics. Maybe he nevertheless should have tried to do a bit more as he finally did in his enormous investigation on

China's self-discovery of all the basic properties of a so-called "market based" economy. Anyway, Oliver Williamson, Douglass North and Elinor Ostrom did deliver outstanding supplements to Coase in the understanding of the real world of an industry play and its institutional structures.

1. We have actually seen that institutional economics provide a useful frame to navigate the fuzzy world of governance structures. Of course markets, firms and relational contracting (or Hybrid Forms) are alternative tools which can complement or substitute each other to frame transactions made among economic agents. However, firms are not a single piece of governance structure as they might handle different transactions very differently. Either inside the firm, such as the day-to-day operational workflow, the hazards of R&D discovery and trials, the long term production of skills and knowledge through organized definition and allocation of tasks, the coordination between today's and tomorrow's operations e.g. between the various levels of management and the interactions with the stockholders, or outside the firm in the interactions with suppliers, customers bankers and the social or professional communities. Truly, those firms are all conglomerates of several governance sub-structures. So are the markets conglomerates of several governance mechanisms. It is why we are able to think about designing/redesigning the markets we have and to move to get the markets that we would like to have. The already decade old impressive book of Aoki shows how this institutional interplay expands between all the firm components to all the industry structures and across many alternative market arrangements.

Furthermore, present state and coming evolution of the economic properties of both the firms and the markets (as well as the Hybrid Forms) are interdependent, as firms and markets (or Hybrids) are both substitutes and complements. They also are all sensitive to the constraints and opportunities offered by the society general institutional endowment. As for the set of possible governance structures, the set of feasible transactions emerges from an interplay with governance structures and the general endowment. The Akerlof "market for lemons" is a paradigmatic view of how transactions rise or die according to the actual set of possible governance structures.

2. But we also saw that network industries are a particularly flexible case of institutional flexibility regarding the alignment between transactions and governance structures. "Liberalised" network industries needed and still need an "intense" design and re-design to be able to host any kind of markets and to interact with. Network industries are particularly sensitive to «modularity» and «tasks packaging» all along the industry value chain. What we call network and market areas are themselves pre-defined by decisions taken into the modular designing of network industries. Hence, the whole set of alternative feasible variants of market, industry and firm arrangements is particularly large and variable in the network industries (See again the latest 2014 Glachant – Ruester or Glachant – Hallack – Vazquez).

In practice, several key institutional characteristics may be rigid and inflexible –even if badly illogical or discretionary. This creates sub-worlds of "institutional complementarity" a la Ugo Pagano with intractable institutional inflexibility and restricted variants for governance and transactions. It also creates «anti-worlds». Given that, let's say, institutional features (a), (d) and (p) are truly inflexible and invariant into this or that particular sub-world, certain governance structures and certain transactions might have –only in this sub-world- very particular matching properties that cannot be reached anywhere else and that cannot be suppressed by importing "alien first best matching" from foreign sub-worlds. Real institutional life is such that there is no guaranteed institutional transitivity from one institutional sub-world to the other. Yes, "institutions matter" and that is why.

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