

# **“Make a Desert and Call it Peace”: The March of Online Reverse Auctions in Business Markets**

**Luis Araujo and João Mota\***

Department of Marketing  
Lancaster University Management School  
Lancaster LA1 4YX, UK  
Phone: + 44 1524 59 39 15  
Fax: + 44 1524 59 39 28  
e-mail: [L.Araujo@Lancaster.ac.uk](mailto:L.Araujo@Lancaster.ac.uk)

\*Departamento de Gestão  
Instituto Superior de Economia e Gestão  
Universidade Técnica de Lisboa  
Rua Miguel Lupi 20, 1200-725 Lisboa, Portugal  
Phone: + 351-21 3925800  
Fax: + 351-21 3966407  
e-mail: joaomota@iseg.utl.pt

Paper prepared for the 23d IMP Conference, Manchester

## **Abstract**

This paper explores the effects of online reverse auctions (ORAs) in business markets using an illustrative case study of the introduction of this tool in relationships involving a car assembler and three of its suppliers. In an online reverse auction, a buyer defines the terms of the exchange and sellers bid to push the prices down either through open or sealed bid formats. The feasibility of these auctions depends on the precise qualification of what sellers have to bid for so as to enable perfect comparability of prices.

In practice, it is difficult to codify all the necessary information required to generate specifications as it is to separate the process of formulating solutions from their implementation. Whereas relational contexts tolerate these ambiguities and grey zones, tools such as ORAs require precise specifications and clear distinctions between the objects to be transacted and phases of the transaction. Our empirical data shows how actors work around these difficulties and cope with the constraints imposed by ORAs. The paper concludes that online reverse auctions have a number of intended and unintended consequences for buyer-supplier relationships as well as for the relationship between the purchasing and technical functions within the buying organisation.

## **Introduction**

The popularity of online reverse auctions (ORAs) in business markets has grown apace in recent years (see e.g. Emiliani, 2004; Jap 2002, 2003, 2007; Smeltzer and Carr, 2003; Wagner and Schwab, 2004). The promise of large cost savings enabled by Internet-based technologies will ensure that online reverse auctions will continue to play a role in B2B markets for years to come. An auction is an attempt to create the neoclassical version of markets, with a perfect and transparent information structure and with price being the only discriminator amongst competing bidders. In a reverse as opposed to a forward auction, buyers offer sellers the opportunity to bid down their offers to supply a pre-specified item or lot of items.

Much of the literature that addressed this topic has focused on the design of auctions and on the conditions for the successful implementation of ORAs. For example, Smeltzer and Carr (2003) and Wagner and Schwab (2004) discuss the conditions that should underpin a successful auction in terms of numbers of supplier and type of goods auctioned as well as risks for the parties involved, whilst others focus on the characteristics of the process (e.g. lot sizes, bid transparency) that can influence perceptions of success by the parties involved (Jap 2002, 2007; Carter et al, 2004).

The introduction of ORAs has often been conceptualised as a move from a relational towards a transactional orientation in business markets (Pillai and Sharma, 2003; Sharma and Pillai, 2003). For example, Hertz and Hultman (2004) examine how network position influences the adoption of electronic auctions whilst Ivens and Pardo (2005) look at the “transactionalisation” of a key account relationship. Whereas some regard this move as the inevitable march of Internet technologies (Sharma, 2002), there have been plenty of cautionary tales about the introduction of this tool into business markets. Emiliani and Stec (2002, 2004), for example, termed online auctions a “destructive cost reduction practice” and claimed that they are “more hype and substance”. Jap (2007) spoke of the “dark side” of auctions and concerns over suspicions of opportunism in established relationships.

This paper examines ORAs from a different conceptual perspective, using an illustrative case study of the introduction of this tool in the relationship between a car assembler and some of its component suppliers. Our starting point is that business relationships comprise transactions as well as transfers (Baldwin and Clarke, 2006). The original interaction model (Håkansson, 1982) regarded relationships as consisting of short-term

exchange episodes embedded into a longer-term pattern of cumulative adaptations. Conventionally, transactional and relational orientations have been conceptualised as opposites end of a continuum, with transactional orientation equated to arms-length exchanges and relational exchanges encompassing anything from flexibility to assistance, information provision and mutuality (Pillai and Sharma, 2003).

ORAs provide a useful test case to re-examine these views. On one hand, the attempt to configure transactions to mirror the neoclassical, ideal market introduces a template that runs against the notion that transactions punctuate more complex patterns of exchange which are dismissed as frictions in the neoclassical world. In such a world, exchange is effected through atomised sets of dyads, abstracted from any social or historical context. An exchange takes place only when actors perceive their holdings to have increased in value through an exchange episode. Exchange partners are typically interchangeable given that only their ability to enhance the other party's potency assortment is of interest. In this idealised world, there are no set-up costs involved in establishing an identity in the marketplace since the history of past relations is immaterial and all elements of exchange are contained in sharply defined time frames (Araujo, 1999).

On the other hand, the introduction of ORAs throws into sharp relief the investments required to set up transactional interfaces that mirror the neoclassical market ideal. Furthermore, ORAs are not just about transforming relational into transactional interfaces. The introduction of transactional interfaces induces a new form of calculativeness in business relationships and may have a number of unintended consequences. For example, services that were treated as an integral part of transactions, unmetered and uncompensated transfer, are now converted into a series of discrete transactions. Once adopted, the calculativeness underpinning ORAs may quickly spill over into other areas of existing relationships and induce the proliferation of transactions in every facet of a business relationship.

The paper is structured as follows: in the first section we will review the literature on ORAs and introduce our framework to examine the introduction of ORAs into existing business relationships. In the second section, we will cover the methodology that underpinned our empirical study. In the third section, we present a case study of an introduction of an ORA system by a car assembler and look at its impact in the relationship between the buyer and three of its suppliers. Finally, we offer some conclusions and implications of our study for the understanding of ORA's role in business markets.

## Literature review

In a recent review, Jackson (2007, pp. 236-7) reminds us of the components of the neoclassical view of markets. Markets are settings where:

1. Transactions take on a monetary form;
2. Exchanges are two-way transfers;
3. Transactions are voluntary;
4. Transactions are repeatable – not single acts of exchange;
5. Homogeneous goods and published prices to facilitate comparisons;
6. Trade is open to new entrants;
7. Exchange is subject to competition among buyers and sellers who trade anonymously and transact only by price.

In much of economics and indeed marketing, markets appear as a natural given as exemplified by Williamson's (1975, p. 20) dictum: "In the beginning there were markets". Indeed, the tendency of economics is to explain the absence of markets as in the case of public goods or externalities, or their failure as in Williamson's (1975) explanation for the existence of firms as cases of market failure. Loasby (1999, p. 112) makes a cogent argument against this view: "It seems clear that is called "market theory" tells us rather little about markets... Markets are much too important and much too amenable to economic analysis, to be treated as primitives".

The new economic sociology has also moved into this territory by elaborating on the notions of calculativeness and the framing of exchanges. Callon et al. (2002) make a useful distinction between products and goods. A good implies a stabilisation of characteristics at the moment an entity, product or service, is made tradeable. A product is an economic good that can be seen from a variety of perspectives: production, circulation and use. Thus a product corresponds to a process, a trajectory in time, whereas a good corresponds to a state at a point in time. Services can be turned into goods too by defining and objectifying their properties making them tradeable – e.g. a leased machine for a limited period and for pre-specified uses.

Products may have long and complex biographies that are temporarily interrupted by the attachment and detachment of property rights (Araujo and Spring, 2006). The same product can have a multifaceted biography and constitute a different good at different

stages of its life-cycle (e.g. a new and second-hand car). At each point in this trajectory, when it is traded, it is necessary to stabilize and singularize its properties as a good (e.g. placing a newspaper advertisement specifying the age, mileage condition and so forth, of the car).

Through a process of qualification, a product is progressively transformed into a good that slots into the world of the buyer, becoming entangled into the networks of socio-technical relations that constitute this world (Callon and Muniesa, 2005, p. 1234). Callon and Muniesa's (2005, p. 1245) are primarily concerned with explaining how goods can be calculated as the outcome of distributed agencies "...whose encounters are organized and stabilized to a greater or lesser degree". The organisation of these encounters is provided by what Callon and Muniesa call algorithmic configurations. Algorithmic configurations perform a variety of functions: a) they determine the particular configuration of calculative agencies that participate in a particular encounter; b) they organize the way these agencies are linked in a concrete instance; and c) establish ground rules for the ordering these connections (Callon and Muniesa 2005, p. 1242). Thus a physical space like a supermarket, or a virtual space such as an electronic market, are examples of algorithmic configurations, where calculative agencies can be assembled and markets emerge as collective calculative devices. As Barry and Slater (2002, p. 181) put it: "In the case of markets, 'calculativeness' depends upon the separation or individualisation of objects into discrete transactable entities with (temporarily) stabilised properties that can be placed within a frame of calculation".

Whereas these approaches touch on what markets do, they don't shed much light on where market transactions emerge and why. In some approaches such as transaction cost economics, transactions emerge across given technologically separable interfaces:

"A transaction may thus be said to occur when goods or a service cross a technologically separable interface. One stage of processing or assembly activity terminates and another one begins [...] A well working interface like a well working machine can be thought of as one where these transfers occur smoothly" (Williamson 1981, p. 1544).

Baldwin and Clark (2006) ask the question: "where do transactions come from?". They adopt an engineering systems approach to defining where transactions should be located in a complex production system, conceived as a network of tasks that agents perform and transfers of material, energy and information between and amongst agents.

The driver for defining transaction loci is the notion of mundane transaction costs, or the costs of defining what is to be transferred, counting, valuing and paying for the transfers. At some points in the system, transfers are simple, and therefore *easy* to standardise, *easy* to count and *easy* to value. At other places, transfers are complex and in some cases *impossible* to standardise, *impossible* to count, and *impossible* to value.

The basic unit of analysis in a network is the task. Tasks are interlinked due to the underlying logic of their technologies and are carried by agents including people and machines. No agent is capable of carrying out all tasks due to physical and cognitive limitations. Thus transfers are ubiquitous and must take place in a logical order – i.e. transfers need to be designed as much as the tasks themselves.

Baldwin and Clark (2006, p. 16) argue that transactions are desirable, since they provide standard interfaces between actors and facilitate coordination in decentralised systems, but expensive because they require investments to set up institutions to support them. But what transfers could most easily qualify as transactions? Baldwin and Clark suggest that the cost of turning transfers into transactions varies widely across different types of transfer. The lowest mundane transaction costs apply to the transfers of simple, discrete, material objects which can be aggregated in sizeable lots. Conversely, the highest mundane transaction costs are incurred in the contingent transfer of services, involving complex bundles of information, know-how and activities.

As Baldwin and Clarke's (2006) remark, transactions should be expected to occur at the thinnest crossing points in buyer-supplier interfaces. However, these transfers are the exception and not the rule. In well-designed network of productive tasks, complex transfers should take place within transaction free zones, while transfers with low mundane costs should be turned into transactions. Transactions thus constitute thin crossing points between encapsulated local systems and a form of coordination between these systems.

In their analysis of a more complex transaction between two enterprises, where specifications could not easily be translated into product characteristics, Baldwin and Clarke (2006) contend that the two parties had to become locally and temporally de-encapsulated with respect to the specification issue. In their terms, buyer and supplier had to allow a whole set of material, energy and information transfer to occur across their boundaries, which were uncounted, unstandardised and uncompensated. The implication drawn from this example is that product-based transactions involve a whole series of service-based exchanges that resemble intra-firm transfers.

Market-based transactions conform neatly to the thinnest of interfaces between buyer and seller. Transfers that score low on standardisation, low on ease of counting and valuing belong to the realm of hierarchies and relational contracting. This framework leaves a number of questions open. Transactions are regarded as pinchpoints along sequential processes of production and use with little room for interaction between market participants. For example, when products are modified in anticipation of a buyer's idiosyncratic preferences or customised following interaction between a buyer and a supplier, when does a product become a good – and when does a good revert to becoming a product?

Transactions do not emerge spontaneously where products cross thin buyer-supplier interfaces. Many transactions are embedded in complex buyer-supplier relationships with multiple product and service exchanges. The interaction model (Håkansson, 1982) embeds short-term exchange episodes or transactions into longer-term, routinised patterns of interaction. Transactions comprising products and/ or service exchanges matched by financial flows between the interacting parties do not exhaust the patterns of short-term exchange episodes. Information and social exchange episodes, often closely aligned with transactions, are influenced by and influence transactions. In Baldwin and Clarke's (2006) terms, information and social exchange episodes can be classified as transfers since they are unstandardised, uncounted and uncompensated.

The second major issue concerning transactions, relates to the time dimension. In a pure transaction, the goal of both parties is to bring everything from the past and everything in the future to the immediate present - thereby creating a compressed and well bounded time-frame, sharp-in, sharp-out scenario (Macneil, 1980). In complex exchanges, it is neither possible to compress everything into a single time frame nor to identify the transaction as a single discrete event. As Ford et al (2003, p. 65) remark, offerings are combinations of a variety of elements (products, services, advice, logistics, adaptations) that are often the subject of protracted discussions, specifications, developments, deliveries and so on. Similarly, payment schedules may vary depending on particular episodes (e.g. deliveries), fixed milestones in terms of time or pre-specified performance levels.

Lastly, the move towards transactional interfaces implied by the introduction of ORAs assumes that precise specifications can be drawn up prior to the set-up of auctions so that all offerings can effectively be compared only on price. Araujo et al (1999) distinguish between different types of interfaces based on which customer and supplier

are aware of each other's context. Standardised interfaces represent the classical arm's length market relationship. There are no relevant technical or organizational interdependencies between the two parties, specifications are well-understood by both parties and price act as the main coordinating device between buyer and seller. The offering must be identical from all sellers and in the eyes of all buyers (Easton and Araujo, 2003). If it were not, then buyers would be able to discriminate among competing offers and would be willing to pay higher prices for closer-matched offerings. In practice, this type of standardisation is difficult to achieve. While the physical specifications of the product may be equivalent, other elements of the offering will be less easy to standardise. Service-based offerings such as pre or post-sales advice may be impossible to codify and standardise.

In summary, the set-up of transactions in business markets is neither easy nor costless. As Baldwin and Clark (2006) suggest, the set-up of transactional interfaces is easiest and incurs the lowest mundane transaction costs in the case transfers of simple, easily-specifiable, discrete, material objects which can be aggregated in sizeable lots. Conversely, the most difficult and expensive transactional interfaces occur in the contingent transfer of services, involving complex bundles of information, know-how and activities.

In this context, where would we expect ORAs to surface in business markets? Jap (2002) provides a list of conditions starting with product characteristics. ORAs suit products for which the purchase price accounts for the majority of the total cost of ownership. Smeltzer and Carr (2003) express a similar condition in terms of the need for a clear commodity specification – including quality requirements, delivery lead times, order quantities, service issues and so on. When products become commoditised, Internet technologies free transactions from the constraints of time and space to an unprecedented level. On the other hand, online mechanisms do not facilitate the expression of non-price attributes of offerings nor do they allow for changing specifications to be traded-off against price changes (Easton and Araujo, 2003).

As far as sourcing strategies are concerned, Jap (2002) looks at the introduction of ORAs in the context of ongoing purchasing strategies. This strategy could involve efforts to rationalise the supply base, aggregate dispersed lots or introduce further competition for specific items. Jap (2002, p. 514) wonders how established suppliers might fare in relation to new suppliers in the introduction of ORAs. On one hand, established suppliers might bid less aggressively because they rely on numerous

intangible aspects of their relationship they trust will be taken into account by buyers. On the other hand, established suppliers may turn out to be aggressive bidders because they have the most to lose.

Lastly, Jap (2002) looks at the supply base characteristics as a determinant for the introduction of ORAs. The existence of spare capacity in the supply base is a sign that prices can be driven down and suppliers may be motivated to pursue additional business through lowering their costs or pursuing economies of scale. The existence of a sufficiently large number of rival suppliers for any one commodity is another bedrock condition for the introduction of ORAs (Smeltzer and Carr, 2003).

The above discussion raises a number of interesting avenues for further research. If buyers attempt to introduce ORAs in situations that do not fulfil the ideal criteria, how do the auctions unfold and what are their consequences? For example, if buyers are unable to specify precisely the conditions of offering prior to the auction, how are these gaps papered over during and after the auction process? Jap (2002, p. 515) raises the spectre that suppliers shirking on some parameters (e.g. quality), reducing service levels or converting key intangibles (e.g. post-sales services) into separate transactions as a way to formally meet the conditions of their bid, whilst making the whole process more burdensome for buyers.

A second question relates to the value placed on existing relationships by different functional areas of the buyer. Whereas ORAs are predicated on significant reductions of purchasing bills, the costs of codifying specifications and the impact of developing new routines to dealing with new suppliers or adjusting routines to deal with incumbent suppliers in new ways, falls to other areas of the firm (e.g. engineering, operations). Thus the costs and benefits of introduction and operation of ORAs may be seen differently from different perspectives within the buying organisation. In the empirical section, we will examine a case study which examines some of these issues in greater depth. Before we present our empirical data, we will explain the method employed in our study.

## **Case Study: C\_AUTO and its suppliers**

Our empirical study took place between the middle of 2005 and the beginning of 2006 and involved four companies, three suppliers of equipment and services and their main customer, a car assembler plant, initially part of a joint venture between two prominent global auto groups. The suppliers (labelled SUP\_1, 2 and 3) are located within a 30 km radius of the assembler's plant. Since our interest was to understand the impact of the introduction of ORAs in a hitherto relational context, we selected three suppliers who had had a long-standing relationship with C\_AUTO. These suppliers had first-hand experience in the shift from a relational to a transactional context and were experienced participants in ORAs – please see table 1 for further details on nature of goods supplied and figures on supplier participation in auctions.

To allow the suppliers to relate some of the more subtle and idiosyncratic aspects of their experience with C\_AUTO, we adopted a semi-structured format for our face-to-face interviews, combining both standardised and non-standardised items (Ackroyd and Hughes 1992, p. 104). Each interview lasted two hours on average some of our informants were contacted again by phone to obtain clarifications and/ or to seek new information.

At C\_AUTO our key informant was a senior purchasing manager who was involved in the set-up of ORAs and looked after some 50 auctions since the tool was introduced in his organisation. In the suppliers, we interviewed chief executives, all with experience in relating to the customer prior to the introduction of ORAs and since then, directly involved in the analysis of tendering specifications and the submission of bids as well as the actual implementation of solutions at the customer's plant.

As far as data analysis is concerned, and in keeping with the extant literature on the subject, the initial stages focused on the impact of the introduction of the ORAs, their perceived costs and benefits for both the customer and the suppliers. At a latter stage of the analysis as the links between different issues become clearer, the problems of generating specifications and defining the object of transactions became more prominent. The progressive clarification of this issue shed further light on the differences between transactional and relational approaches and highlighted how the a relational context helped the parties deal with considerable zones of ambiguity in the generation of specifications and in the implementation of solutions. Conversely, a focus on this issue also allowed us to analyse in further depth how the parties adopted work-

around strategies to deal with ambiguity in a context that purportedly relies on the exhaustive codification of all aspects related to the transaction.

The following table clarifies the position of each supplier and its experience with ORAs conducted by the buyer:

	<b>SUP_1</b>	<b>SUP_2</b>	<b>SUP_3</b>
Systems for C-AUTO's assembly line	<b>X</b>	<b>X</b>	<b>X</b>
Mechanical & Metallurgical equipment & services	<b>X</b>		
Maintenance services	<b>X</b>		
Automation systems			<b>X</b>
Welding equipment & consumables		<b>X</b>	
Participation in ORAs for C_AUTO	19	9	26

Table 1: Goods supplied and suppliers to C\_AUTO

### ***The Purchasing Practices of C\_AUTO***

Since the mid 1990s, when C\_AUTO initiated its activity, the assembler has been involved in a variety of joint projects with the three suppliers involved in this study, aimed at making improvements in their assembly lines. These projects involved the purchase of a variety of products and services including standard and customised equipment, installation services, training of staff, and the monitoring of the start-up of new assembly lines. The company launched an Internet portal in 2002 with the purpose of facilitating transactions with suppliers of non-essential components and opening up access to new suppliers. From 2002 to 2006, C\_AUTO organised a total of 187 ORAs. These changes in purchasing practices as well as the cost savings achieved by C\_AUTO were substantial. Before the introduction of ORAs, the company used a small number of suppliers for the products and services listed in the table above. Often, new requests

emerged during regular meetings between technical staff from both sides and in situations where problems were discussed or opportunities for improvements surfaced. On other occasions, a number of suppliers were formally consulted, but according to one of our informants, "...the orders seemed to be shared amongst the various suppliers the buyer had a privileged relationship with, in a way that allowed all of them to keep their interest in the customers' business".

Nowadays, when faced with new orders, the purchasing department of the customer seeks out a minimum of three suppliers to undertake an ORA. Technical personnel from the area of the plant where the project is to be implemented put together a list of specifications and pass them on to the selected suppliers. A few days later, purchasing sends out request for quotations (RFQs) and seeks technical proposals from the bidding suppliers. Supplier proposals are then sent to the assembler's technical personnel who check the conformity of the proposals with the issued specifications. The proposals are then returned to the purchasing department for a detailed analysis of the financial conditions put forward by the suppliers, such as payment schedules and penalty clauses in case of contract breaches.

The assembler then sets a reserve target price for the ORA. The auction operates according to an open format and a "soft-close-rule" (Jap, 2002) – i.e. bids are visible to all participants and suppliers can place bids with a minimum 2% lower than the last registered bid. The auction is automatically extended for a further 5 minutes anytime a bid is placed. After this interval, the auction closes if no further bids have been placed. If the reserve target price is not attained, the auction does not have a winner and is followed by direct negotiations with the lowest bidder. C\_AUTO judges the reaction of the suppliers is always negative when the auction has no winner and for suppliers, the perception is that auctions are often used as a tool to select the most competitive supplier and subsequently obtain further price concessions.

The purchasing department of C\_AUTO estimates that ORAs have allowed price reductions in the region of 40%. These reductions have been achieved partly by placing orders with new and often geographically distant suppliers, as well as the squeezing of margins from established suppliers. For one informant within C\_AUTO, these reductions: "...demonstrate that some suppliers were too comfortable, reaping benefits from their existing relationship with us which provided them with sizeable and profitable orders at predictable intervals".

In addition to price reductions, the same C\_AUTO informant highlighted the reduction in the cycle time of negotiations with suppliers. Multiple face-to-face negotiations involving the coordination of busy diaries and costly travel can now be condensed into shorter time frames and without the need for costly meetings (see Carter et al, 2004). This simple cost-benefit logic becomes far more complex when we investigate the cascade of often unintended effects caused by the introduction of ORAs, seen from both a customer and supplier perspective.

### *The Hidden Costs of Codification*

The preparation of ORAs turned out to be very time-consuming especially in relation to the elaboration of technical specifications by C\_AUTO's personnel. Technical specifications must be sufficiently detailed and exhaustive so as to prevent the need for meetings with potential bidders as well as avoid post-purchase problems in the implementation of solutions. On occasions, some suppliers are invited or even mildly coerced into meetings at the customer's plant to clarify technical issues related to equipment or its uses within the assembly lines. These meetings are designed to avoid problems in the implementation phase due to technical misunderstandings or omissions in the bidding phase.

These problems are well recognised, and in cases where there is no time to prepare detailed specifications, C\_AUTO refrains from using ORAs. In this event, the company resorts to the traditional practice of negotiating with a few selected suppliers who are more experienced at working with the plant and have a better understanding of the customer's standards. However, it is not uncommon in situations where comprehensive specifications have been drawn up, for problems to develop in the implementation phase.

An informant from the purchasing department at C\_AUTO recognises that, after prompting by the interviewers that despite the best efforts of technical personnel, it is not always possible to draw up sufficiently detailed specifications to ensure the absence of problems in the implementation of a winning solution. For both the buyer and the suppliers, changes in the assembly lines as a result of the introduction of new equipment can generate problems that are not predictable but are understandable in light of the complexity of interactions between different types of equipment. But, for suppliers, the

frequency of and the time taken to resolve these problems are a direct consequences of the introduction of ORAs.

The difficulty of separating the generation of technical solutions from their implementation, including changes to agreed solutions, accounts for most of these problems. These difficulties are all the more salient when contrasted with the experience of suppliers with the customer prior to the introduction of ORAs. As an informant from C\_AUTO recognises:

“Many of the suppliers have been with us since the start-up of this plant. Beyond the business relationship, there are strong interpersonal links between people from both sides. For these suppliers, the introduction of ORAs has contributed to change in these relationships which became more impersonal and colder, which obviously doesn’t please the suppliers.”

It is clear that these changes are not necessarily appreciated by the customer’s technical staff, bearing in mind possible conflicts and attributions of blame in case of failure or the fact that suppliers can be allowed to pursue alternative solutions to avoid further problems in the execution of projects. According to C\_AUTO’s purchasing department, the availability of suppliers to support the generation of technical suppliers is much reduced under the ORA regime. If suppliers are requested to help this process their motivation to accede rests on their fear of compromising their chances of participating in future auctions. In what concerns the implementation phase, suppliers appear to be less willing to cooperate in training the customer’s staff to operate their equipment and even less wiling to participate in what our respondents called “baby-sitting” – i.e. the phase of the project when the supplier follows the initial phase of operation of the equipment they supplied in situ. In these cases, detailed changes requested by the plant operators are negotiated on a case by case basis and charged for as discrete transactions. This change in outlook is explained by both the dimming of the “shadow of the future” (Axelrod, 1984) and the suppliers’ new found tendency to dissect technical specifications with a fine toothcomb. This last aspect is particularly evident for one the purchasing staff at C\_AUTO:

“In the implementation phase, suppliers look closely at what has been agreed in terms of specifications and have no intention to add the smallest thing to what has been agreed”.

According to the same informant, in the implementation phase, the supplier has the chance of taking advantage of the temporary dependence of the customer on the

supplier for the timely completion of the project, since non-completion can bring about temporary shut-downs or other problems such as line stoppages.

For the suppliers, these practices make sense in the context of the type of relationship that the customer wishes to promote. Price is seen as the only order-winning criterion and as working independently from the history of a relationship. As one of our supplier informants put it:

“This tool (ORA) has served the purpose of playing suppliers against each other. With auctions, the era of squeezing suppliers has truly arrived. Auctions have been responsible for the demise of some suppliers”.

### *The Impact of ORAs on Suppliers*

One of the obvious impacts of the introduction of ORAs on the suppliers studied was the need to reduce or eliminate the possibility of taking on unprofitable orders. Due to the need for detailed analysis of the customer’s technical specifications, suppliers’ ability to find a lower-level limit to price their offerings has substantially increased. As one of our informants put it:

“At first, we won some orders and made some mistakes but afterwards we became more rigorous and lost the majority of the bids. It came to a point when we simply entered our lower-level limit, switched off the computer terminal and let the auction runs its course. The customer was phoning us, saying that we had to remain active bidders but we replied that our bid was set and wouldn’t be lowered.”

Although ORAs suggest a clear and stable framework of technical specifications, this vision is more apparent than real. SUP\_1 claims that even if the proposals from all the different suppliers have already been checked by the customer’s technical personnel, they are hardly ever identical in terms of technical solutions. The equipment to be supplied may differ in terms of reliability and it is impossible to verify that for similar equipment, the quality of the parts, assembly, after-sales service and so on, will not be compromised in order for suppliers to be able to honour their bids. It is because the way to fulfil technical specifications and prices set are at stake in ORAs that it is possible to achieve significant price reductions.

At the same time, the codification of technical specifications has also increased in detail in the last few years, as an informant from SUP\_1 puts it:

“As an example, in earlier years, the customer may have specified that the welding gauge would have to fix a metal sheet in 4 places through pneumatic pincers. Now they specify the exact coordinates of these 4 points, the type of pneumatic pincers, the gripping force, etc.”

However, systems for the customers’ assembly line are often complex and idiosyncratic. This means that there are many details in these systems that are left uncoded and are part of the tacit knowledge built up through mutual understandings in a business relationship developed over a number of years. To keep suppliers distant from the customer does not mean that the importance of these tacit components disappear. On the contrary, as one respondent noted, the danger is that the customer may be unable to:

“... appreciate that a proposed solution may distinguish itself through a technical detail that reveals both the tacit knowledge the supplier has of the customer’s context as well as the capabilities the supplier possesses in that particular technical domain”.

This more creative component of offerings is also highlighted by SUP\_2. In their perspective, it is almost impossible for the customer to ensure that all detailed specifications are fulfilled. This has allowed SUP\_2 to find alternative but functionally equivalent solutions in many cases, despite having to drop quality standards:

“Instead of using zinc-coated screws we use cheaper alternatives since the specifications don’t go this far. Instead of using specialised subcontractors, we try to find cheaper and less qualified subcontractors. The finishing details in terms of painting and protection are gone. In terms of “babysitting” the start-up phase of projects, we try to get around the number of teams we deploy in the customer’s plant.”

The detailed and tacit knowledge lying behind technical specifications and proposed solutions can only be acquired through joint learning, developed over a long period, and cannot be codified in project manuals for assembly lines and welding in general. These are technically complex domains and experiential knowledge is paramount. For example, the choice of welding equipment, the types of welding electrodes and the welding parameters (e.g. time, intensity) are a function of a particular welder’s knowledge and experience. There are many possible combinations of these parameters and, in recent years, the introduction of new aluminium-based alloys in car assembly lines has made this picture even more complex. In this event, there is much to be gained by confronting the technical knowledge of the customer and the supplier.

Opportunities to develop joint knowledge have largely disappeared since the number of visits to the customer's plant, either motivated by technical and commercial purposes, has been curtailed to an absolute minimum. Before the introduction of ORAs, ideas for introducing improvements into the assembly lines through the replacement of equipment or consumables, or the introduction of new equipment took place through the normal pattern of contacts between technicians from both sides, on the customer's shop floor. As one of our respondents put it:

“In earlier times, we had the time and a type of relationship which allowed close interaction between our respective teams when we were setting up welding equipment on the assembly line. There was a fair amount of knowledge sharing in the sense that they informed us how our equipment had performed and we taught them new ways of using our equipment, welding electrodes and so on, so that can improve their operations and reduce waste”.

The difficulty of providing exhaustive specifications become more apparent in the implementation of solutions especially when it comes to making changes to the proposed solution and the need to allocate responsibilities between buyer and supplier. In the past, any changes were carried out by the supplier and without additional charges for the customer. In a sense, the supplier's margins incorporate the probability of those occurrences. In the new scenario, and in case of unforeseen problems, each party tries to take advantage of each other's difficulties – e.g. a problem with the technical solution of the supplier, a mistake or omission in the customer's specification including changes in the plant that were not communicated to the supplier. The costs of these problems may be significant to the customer. A failure may stop a whole assembly line, alter its rhythm of the line or compromise the quality of the assembled vehicles leading to the need for repairs when finished vehicles exit the line.

In case of SUP\_2, the loss of profitability and the increased risks of undertaking projects for C\_AUTO have led the company to focus on the sale of welding equipment and consumables whilst cutting in half the workforce employed in the engineering and project section. This reduction in headcount did not go further because the supplier harbours the faint hope that the customer may change its purchasing policies and the supplier may yet be able to re-use the capabilities it developed to serve this customer. In the words of one of our informants: “... we hope to be able to capitalise on the fact that we moulded ourselves to this customer, after years of working according to their technical norms and standards.

For SUP\_3 in the automation area, the reduction of margins in the C\_AUTO business has led to disinvestment, reductions in headcount and even the closure of some departments and companies. SUP\_3 is now the only supplier in the country who can bid for sizeable projects in this area. In the case of this supplier, there has been a reduction in expenditure in tools, internal training programmes, in the development of new solutions and the quality of service.

For this supplier, the problems that have emerged with projects for the assembly of new models at C\_AUTO could have been resolved if the suppliers had been geographically closer to the plant. The increasing complexity of the assembly lines with an ever increasing number of robots and automatisms leads these equipments to suffer ever more complex breakdowns. The reliability of these equipments can only be improved through a detailed and local knowledge of the operational conditions at the assembly line and cannot easily be codified into technical specifications.

As in other cases, the reduction in the quality of the equipment supplied and / or the levels of service provided have been the means to deal with downward pressures on prices. Thus the supplier is now using lower-cost but less specialised subcontractors as well as cheaper parts which may nevertheless breakdown more often and require costlier repairs, especially when cheaper automation parts make it more difficult to access information on breakdowns (e.g. absence of self-diagnostics kit).

In general, it is possible even after the award of an order, for a supplier to replace some parts for others which did not feature in the original specification. In a more limited fashion, it is also possible to include parts that do not feature in the standard lists issued by the plant since it is not always easy for the customer to perform exhaustive checks. In some cases, these changes are the outcome of informal agreements between technical specialists on both sides. This is only made possible because there is a degree of trust on the technical capabilities of the supplier, as a result of the success of past projects, a degree of flexibility on the interpretation of technical standards on the part of the customer's personnel and some empathy with the supplier's predicament. Our informant in SUP\_3 went as far as saying that:

“The customer's technical personnel are well aware of the squeezing on our margins and have closed their eyes on a number of occasions, to allow for unforeseen situations and reach some compromises so as to not create any further obstacles to the completion of the project.”

It is also common in automation projects to find unanticipated problems and to witness last-minute changes in response to specification gaps or failures. As a result, the

customer often requests that the supplier prolongs the follow-up period after the solution is implemented on the shop floor. In these cases, the supplier is now charging the customer for additional services: As our informant remarked:

“In the past, we never charged for extras and now we charge for everything and anything. It was possible to spend two or three months at the customers’ site without charging extras; now it is ten days and anything above that is charged for separately”.

For this supplier, these problems stem from the changes in the supplier’s purchasing policies. In earlier times, the customer seemed interested in keeping a number of suppliers happy by allocating regular orders to them. The geographical proximity of the suppliers allowed them to develop an intimate knowledge of the customer’s plant, the technical standards used by the customer, production problems and a number of operational issues. When unforeseen difficulties emerged, the supplier showed a willingness to help solve these problems quickly, including the case of breakdowns with equipment supplied by others.

In our informant’s perspective, the change in the customer’s purchasing policies had a mixed impact within the customer’s organisation:

“The purchasing hierarchy in C\_AUTO was able to shine thanks to the introduction of ORAs but with a total lack of respect for the technical area who have inherited a set of problems and the suppliers with whom they had developed a good relationship”

Faced with this predicament, SUP\_3 has decided to search for new customers in the same sector who can ensure a regular stream of orders and allow the company to reduce its dependence on C\_AUTO. This change has not proved easy to implement. Whilst the relationship with C\_AUTO has allowed the supplier to initiate contacts with other customers, the development of new relationships is costly due to the investments necessary to develop new routines and capabilities to deal with these customers, including the detailed knowledge of their internal technical norms and local practices.

## **Analysis**

The introduction of ORAs into relational contexts provides an excellent opportunity to examine the differences between the ideal of neoclassical markets and relationships.

The organisation of ORAs relies on a number of key principles (Smeltzer and Carr, 2003; Wagner and Schwab, 2004):

- 1) the existence of a perfectly specified good helps build a space of calculability where all offers can be compared only on one variable, price;
- 2) large lot sizes to be auctioned so as to encourage suppliers to bid;
- 3) a sufficiently large number of suppliers bidding so as to foster competition amongst rival bidders.

As Callon (1998, p. 20) has highlighted, all these elements contribute to frame transactions in a way that disregards any previous relationships between the customer and the bidding suppliers and construct an arena where supplier offers are compared on price alone. ORAs provide one way through which markets can be made in the image of the neoclassical, textbook ideal depicted by Jackson (2007).

The following discussion revisits the two questions raised earlier:

- 1) If ORAs do not match the ideal criteria outlined above, how do buyers and suppliers cope with this mismatch?
- 2) Does knowledge stemming from past interactions survive in the context of a process that is purposefully designed to disconnect the two sides of the transaction?

It could be argued that none of our cases fulfils the ideal conditions for ORAs. This fact did not stand in the way of C\_AUTO's push towards substantial cost reductions through the use of ORAs and its attempt to shake up what was perceived to be a somewhat complacent supply base. In addition to significant cost savings, C\_AUTO's purchasing team also cited the huge simplification of hitherto had been complex and costly negotiation processes. Processes that may have taken weeks to organise can now be condensed into much tighter time frames. In summary, from C\_AUTO's purchasing perspective, ORAs introduced greater responsiveness, efficiency and transparency in their supplier relationships.

The perspective of suppliers and other departments within C\_AUTO turned out to be at odds with this view. The difficulty of C\_AUTO to generate exhaustive and precise specifications led to a series of coping strategies on the part of suppliers. On one hand, during the bidding phase, suppliers consistently try to explore loopholes in the customer's technical specification by using cheaper options whenever possible. Thus every component down to the coating of screws is analysed and downgraded if specifications allow. In extreme cases, as exemplified by SUP\_3, suppliers try to

smuggle in non-standard parts in their offering with or without the complicity of the customer's technical personnel. When resorting to subcontracting, suppliers seek lower-qualified and cheaper labour.

On the other hand, suppliers are quick to exploit opportunities to cut costs and / or charge the customer for extra work, during the implementation phase of a project when unforeseen problems often emerge. Thus they try to minimise their involvement during the implementation phase in the customer's plant and seek to adhere strictly to what was agreed when the deal was clinched. Anything over and above what was initially agreed is charged as extras to the customer.

The introduction of transactional interfaces resembling the neo-classical market ideal helps configure market agents in the image of *homo economicus*, as Callon (1998) remarked. Rather than being hard-wired, the calculativeness of economic agents in this example has been largely shaped by the frame imposed by ORAs. If this calculativeness has had some benefits in terms of making supplier cost structures more transparent, it has also induced the proliferation of transaction opportunities where squeezed suppliers feel they can try to take advantage of buyers unable to issue complete specifications and with less than perfect foresight.

This consideration leads us to a similar argument concerning the nature of opportunism in bilateral relationships. For Williamson (1993) opportunism is a familiar and pervasive feature of economic life. Economic theories of organisation should encompass the possibilities that agents lie, cheat, steal, conform to the letter but violate the spirit of agreements as well as engage in forms of strategic behaviour, including the deliberate breach of contracts (*ibid*, p. 101). Although our empirical examples do not reveal blatant forms of opportunism, they show how a degree of opportunism has invaded the relationships between C\_AUTO and its suppliers. Thus suppliers will try to work around specifications and collude with their opposite numbers in bypassing technical norms and standards for the purpose of getting a job done. The use of less well-qualified subcontractors during the implementation phase may compromise the good functioning of the installed equipment as demonstrated in the case of SUP\_3. Cheaper parts may suffer from lower-reliability and fault diagnosis may prove harder in case of breakdowns with consequences for the duration and cost of repairs.

In summary, the introduction of ORAs contributes to fostering opportunism at all levels. As Jap (2002, p. 251) had earlier noted, if suppliers believe that buyers are increasingly short-term and transaction oriented, looking at nothing but cost-savings, suppliers will

respond in kind and mirror the buyer's behaviour. Opportunism and obsessive calculativeness, rather than being hard-wired characteristics of economic agents, are features developed in interactions framed by a particular logic. ORAs made in the image of the neoclassical market ideal help shape agents who behave according to the model's assumptions.

The other major issue thrown up by the disjunction between the logic of relationships and neoclassical markets concerns the nature of knowledge and learning. ORAs thrive on exhaustive codification of the goods to be auctioned, as we highlighted above. The view of knowledge that prevails in much of economics is that much of what constitutes knowledge can be equated with information and economic tools are well-equipped to deal with the problems of creating, storing and retrieving information (Amin and Cohendet, 2004). Duguid (2005, p. 111) argues that it is impossible to codify all knowledge involved even in the most elementary of practices and even if that was possible, it would prove unhelpful. There is much to be said for the economy of leaving as much as possible unsaid or implicit. Furthermore as Johnson et al (2002, p. 256) note, the conversion of tacit into codified knowledge is not a simple transfer of knowledge from one form into another: "...the [codification] process includes not only transformation from tacit to codified knowledge, but also direct losses of knowledge. Parts of local tacit knowledge never get codified at all but rather are inactivated, and after a time forgotten and lost".

Much of what goes on in close relationships between small teams within or across organisational boundaries, develops as joint but tacit and distributed knowledge (Håkansson, 1993). The products of joint learning are part and the parcel of what constitutes a business relationship. In the language of Baldwin and Clark (2006), the development of this joint knowledge occurs in a zone characterised by uncounted, unstandardised and uncompensated transfers. Indeed, the introduction of a transactional logic would conceivably destroy the very possibility of generating joint learning in a relationship.

Our case provides evidence of the shift in attitudes concerning the development of joint knowledge that marked the transition from a relational to a transactional context. The experience of SUP\_2 provides a good example of this shift. The experience of working side by side with C\_AUTO's personnel on the assembly line allowed both parties to learn about the use of welding equipment and to jointly develop minor improvements in the operation of the assembly line. Welding lines provide a particular good example

since the choice of parameters depends crucially on the characteristics of the task and on the experience and skills embodied in particular individuals. The reduction of opportunities for closer interaction with customers as well as the increase of perceived risk in obtaining new orders, has led SUP\_2 to focus on standardised solutions and to downsize its technical department. As SUP\_3 recognised, over a period of time, the joint learning developed in these relationships has a tendency to decay due to the distance imposed by ORAs and the constraints to interaction imposed by the prevailing transactional logic.

## **Conclusions**

This paper has examined the introduction of ORAs in previous relational contexts using a case study in the automobile sector. Our objective was neither to investigate the conditions for the successful implementation of ORAs nor to decry their destructive effects on buyer-supplier relationships. Our aim was to understand how ORAs embody a particular economic logic and how that logic progressively shaped the characteristics and behaviour of market agents. In this sense, we can claim that ORAs perform markets and configure market agents in ways that resemble the neoclassical market ideal (Callon, 1998). Thus contexts that were largely characterised, in Baldwin and Clarks' (2006) terms, as de-encapsulated transfers were transformed into transactional environments characterised by obsessive calculativeness and rise of opportunistic behaviour on both sides of the dyad.

Some of the most virulent critics of ORAs cite the lack of benefits for suppliers, their feelings of alienation and the absence of opportunities to improve productivity in order cope with squeezed margins as arguments against this tool (see e.g. Emiliani and Stec, 2004). Our empirical data sheds further light on two related aspects: first, the use of ORAs may in the long run destroy the very competitiveness of the supply base that auctions were supposed to promote. Secondly, the shift from relational to transactional can have the unintended effect of degrading jointly developed, specialised capabilities and severely constrain opportunities for learning.

As far as the first issue is concerned, the increase in short-term cost competitiveness of the supply base in our case has had the effect of eliminating some suppliers and promote disinvestment in others. Lacking any assurance regarding future orders and having to look after the profitability of every single order, suppliers are either seeking to reduce

their dependence on the focal customer or reconfiguring their offerings whilst downsizing their operations. The absence of opportunities to interact outside the confines of ORAs and a purely transactional logic has also led to the degradation of capabilities and constrain learning in these relationships. As the experience of SUP\_3 demonstrates, a relational context allowed for the two parties to teach and learn from each other about the performance of the supplier's equipment on the customer's assembly line. The imposition of a transactional logic on the relationship eliminated the possibilities of de-encapsulated transfer zones which tolerated ambiguity and promoted joint problem solving (Baldwin and Clark, 2006).

Our final conclusion takes us back to the interaction model (Håkansson, 1982). This model conceptualised relationships as a mix of transactions and transfers in the language of Baldwin and Clark (2006). Transactions are seen as serially interdependent and embedded in patterns of complex exchanges and transfers, bridging inter-transaction periods. Rather than seeing transactions and transfers as opposite sides of a continuum, the interaction model looks at relationships as a mix of transactions and transfers where transfers are crucial in lubricating transactions. ORAs, by embodying the neo-classical ideal of serially independent transactions and by configuring obsessively calculative agents, eliminate the possibility of transfer zones. In doing so, they also thwart the possibility of developing knowledge and mutual understandings that cannot be codified and transacted through this mechanism.

## References

- Amin, A. and P. Cohendet (2004). Architectures of Knowledge. Firms, Capabilities and Communities. Oxford, Oxford University Press.
- Araujo, L. (1999). Exchange, Institutions and Time. In Rethinking Marketing. Towards Critical Marketing Accountings. edited by D. Brownlie, M. Saren, M. Wensley and R. Whittington. London, Sage: 84-105.
- Araujo, L. and M. Spring (2006). "Services, products, and the institutional structure of production." Industrial Marketing Management **35**(7): 797-805.
- Araujo, L., A. Dubois, and Gadde, L. E. (1999). "Managing interfaces with suppliers." Industrial Marketing Management **28**(5): 497-506.
- Axelrod, R. (1984). The Evolution of Cooperation, Basic Books.
- Baldwin, C. and Clark, K. (2006), Where do Transactions Come From? Harvard University, Working Paper No. 901790
- Barry, A. and D. Slater (2002). "Introduction: the technological economy." Economy and Society **31**(2): 175-193.

- Callon, M. (1998). Introduction: The Embeddedness of Economic Markets in Economics. In The Laws of the Market, edited by M. Callon. Oxford, Basil Blackwell: 1-57.
- Callon, M. and F. Muniesa (2005). "Peripheral Vision: Economic Markets as Calculative Collective Devices." Organization Studies **26**(8): 1229-1250.
- Callon, M., C. Meadel, and Rabeharisoa, V. (2002). "The economy of qualities." Economy and Society **31**(2): 194-217.
- Carter, C. R., L. Kaufmann, Beall, S., Carter, P L., Hendrick, T. E., Petersen, K. J. (2004). "Reverse auctions--grounded theory from the buyer and supplier perspective." Transportation Research Part E: Logistics and Transportation Review **40**(3): 229-254.
- Duguid, P. (2005). "The Art of Knowing': Social and Tacit Dimensions of Knowledge and the Limits of the Community of Practice." The Information Society **21**(2): 109-118.
- Easton, G. and L. Araujo (2003). "Evaluating the impact of B2B e-commerce: a contingent approach." Industrial Marketing Management **32**(5): 431-439.
- Emiliani, M. L. (2004). "Sourcing in the global aerospace supply chain using online reverse auctions." Industrial Marketing Management **33**(1): 65-72.
- Emiliani, M. L. and D. J. Stec (2002). "Realising Savings from Online Reverse Auctions." Supply Chain Management **7**(1): 12-23.
- Emiliani, M. L. and D. J. Stec (2004). "Aerospace Parts Suppliers' Reaction to Online Reverse Auctions." Supply Chain Management **9**(2): 139-153.
- Ford, D., Gadde, L. E., Håkansson, H. and Snehota, I. (2003). Managing Business Relationships. Chichester, John Wiley.
- Håkansson, H., Ed. (1982). International Marketing and Purchasing of Industrial Goods: an Interaction Approach. Chichester, John Wiley.
- Håkansson, H. (1993). Networks as a Mechanism to Develop Resources. In Networking in Dutch Industries, edited by P. Beije, J. Groenewegen and O. Nuys. Leuven-Apeldoorn, Garant: 207-223.
- Hertz, S. and Hultman, J (2004), Network Positions and e-Auctions: Transactional or Relational Orientation, Paper presented at the 20th IMP Conference, Copenhagen Business School, Copenhagen.
- Ivens, B. S. and Pardo, C. (2005), When a Relationship is "Transactionalised": The Introduction of Reverse Auctions in a Key Account Relationship, Paper presented at the 21<sup>st</sup> IMP Conference, Rotterdam School of Management, Rotterdam.
- Jackson, W. A. (2007). "On the social structure of markets." Cambridge Journal of Economics **31**(2): 235-253.
- Jap, S. J. (2002). "Online Reverse Auctions: Issues, Themes and Prospects for the Future." Journal of the Academy of Marketing Science **30**(4): 506-525.
- Jap, S. J. (2003). "An Exploratory Study of the Introduction of Online Reverse Auction." Journal of Marketing **67**(3): 96-107.
- Jap, S. J. (2007). "The Impact of Online Reverse Auction Design on Buyer-Supplier Relationships." Journal of Marketing **71**(1): 146-159.
- Johnson, B., E. Lorenz, and B.-A. Lundvall (2002). "Why all this fuss about codified and tacit knowledge?" Industrial and Corporate Change **11**(2): 245-262.
- Loasby, B. J. (1999). Knowledge, Institutions and Evolution in Economics. London, Routledge.
- Macneil, I. R. (1980). The New Social Contract: An Inquiry into Modern Contractual Relations. New Haven, CT., Yale University Press.

- Pillai, K. G. and A. Sharma (2003). "Mature relationships: Why does relational orientation turn into transaction orientation?" Industrial Marketing Management **32**(8): 643-651.
- Sharma, A. (2002). "Trends in Internet-based business-to-business marketing." Industrial Marketing Management **31**(2): 77-84.
- Sharma, A. and K. G. Pillai (2003). "The impact of transactional and relational strategies in business markets: An agenda for inquiry." Industrial Marketing Management **32**(8): 623-626.
- Smeltzer, L. R. and A. S. Carr (2003). "Electronic reverse auctions: Promises, risks and conditions for success." Industrial Marketing Management **32**(6): 481-488.
- Wagner, S. M. and A. P. Schwab (2004). "Setting the stage for successful electronic reverse auctions." Journal of Purchasing and Supply Management **10**(1): 11-26.
- Williamson, O. E. (1975). Markets and Hierarchies: Analysis and Antitrust Implications. New York, Free Press.
- Williamson, O. E. (1981). "The Modern Corporation: Origins, Evolutions, Attributes." Journal of Economic Literature **19**(4): 1537-1581.
- Williamson, O. E. (1993). "Opportunism and its Critics." Managerial and Decision Economics **14**(2): 97-107.