

## The contribution of transaction cost theory and other network-oriented techniques to digital markets

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**Abstract** The purpose of this paper is to examine the relationship between information and communication technology (ICT) and the development of organizational forms, showing in particular how ICT is able to promote new forms of cooperation among enterprises. The research question is to understand the role played by ICT in the development of an electronic marketplace (EMP), from an organizational standpoint. A further objective is to highlight the new type of relationships being established between the participants in the EMP. Such phenomenon therefore will be analyzed and its implications and limitations studied using as a reference the transaction cost theory (TCT) and other network-oriented techniques, such as social network analysis (SNA). In the analysis of the limitations of the TCT, we will show how the “Theory of strategic networks” can contribute to expand our understanding of new phenomena that characterize some industrial sectors. This paper, therefore, will illustrate the theory of strategic networks and the various levels of cooperation among enterprises. A good example of a strategic network is the EMP (e-marketplace), whose effect at an interorganizational level will be analyzed in this paper. Finally, a real example of e-marketplace—i.e., TileSquare, the virtual market for ceramic tiles—is being introduced. This is a particularly meaningful case, as it exemplifies all theoretical concepts previously expressed. On the one hand, in fact, it is a valid example of ICT application to the relationships between enterprises and economic actors, and on the other hand, it proves how evolution of technologies plays a massive role in view of the potential openness to strategic forms of network on the part of Italian districts—in this case, the ceramic district of Sassuolo. Tile-Square, a neutral market-maker compared to other actors involved in the market, started out as a tool at the service of manufacturers to ease transactions. In fact, it developed most of all as an aid tool for retailers, for the purpose of sharing

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information and cooperation rather than executing transactions. The new role played by the portal is thus emphasized, which is seen as an electronic intermediary providing services that did not exist before. Moreover, the portal enables a growing number of participants in the value chain to improve mutual collaboration processes.

## 1 Introduction

The purpose of this paper is to examine the relationship between information and communication technology (ICT) and the development of organizational forms, showing in particular how ICT is able to promote new forms of cooperation among enterprises.

The research question is to understand the role played by ICT in the development of an electronic marketplace (EMP), from an organizational standpoint. A further objective is to highlight the new type of relationships being established between the participants in the EMP.

Such phenomenon therefore will be analyzed and its implications and limitations studied using as a reference the transaction cost theory (TCT) and other network-oriented techniques, such as social network analysis (SNA).

In the analysis of the limitations of the TCT, we will show how the “Theory of strategic networks” can contribute to expand our understanding of new phenomena that characterize some industrial sectors.

The theory of strategic networks originates from the subdivision made by Ouchi (1980) regarding the mechanisms regulating hierarchical governance. In fact, he draws a distinction between bureaucracies and clans, based upon consistent objectives. Originally, the concept of clan was only used with reference to intra-company relationships, while the concept of network emerged with its application to inter-company relationships. According to Thorelli (1986), a network is a cluster of “two or more enterprises that, thanks to the strength of their interaction, constitute a subsystem of one or more marketplaces.” According to Jarillo’s (1988) definition, a network is strategic when long-term relationships exist between different organizations belonging to such network so that they can benefit from a competitive advantage compared to external competitors. Strategic networks differ from vertical integration due to the relative independence of participating enterprises.

The theory of strategic networks expands the TCT since it explains the existence of long-term relationships among various enterprises and the elimination of transaction costs due to the cooperations within the network. When objectives are highly compatible, the cooperation of several enterprises in a networked relationship allows optimization of the various activities at a total cost that is lower than that incurred through vertical integration. In essence, the theory of strategic networks privileges the analysis of integration effects and, therefore, of collaboration effects, while the TCT stresses the importance of communication and brokerage effects (Christiaanse and Markus 2002).

New forms of cooperation among enterprises stem from the abandonment of the Ford model. In an environment that is increasingly more dynamic and at the same time less predictable, centralized and hierarchical organizational forms can no

longer be pursued. In fact, it is necessary to determine which criterion can better enhance a company's performance and in order to do so we turn to the principles of the TCT. Companies can either opt for hierarchy or the market, based upon efficiency evaluations. However, such principles no longer stand following the introduction of the ICT.

In this context, in fact, ICT plays a critical role not just because it cuts down contact costs between different economic entities, but also, and above all, because it allows new models and types of relationships and cooperations among enterprises.

This paper, therefore, will illustrate the theory of strategic networks and the various levels of cooperation among enterprises. In fact, bilateral approaches better suit closer and personalized forms of cooperation, while more standardized and, in some respect, less strategic forms of cooperation ease the development of tools that fosters multilateral relationships. A good example of a strategic network is the EMP (e-marketplace), whose effect at an interorganizational level will be analyzed in this paper. E-marketplaces are virtual marketplaces that thrive most of all on business to business (B2B) markets. Main classification criteria and current trends are also illustrated.

Finally, a real example of e-marketplace—i.e., TileSquare, the virtual market for ceramic tiles—is being introduced. This is a particularly meaningful case, as it exemplifies all theoretical concepts previously expressed. On the one hand, in fact, it is a valid example of ICT application to the relationships between enterprises and economic actors, and on the other hand, it proves how evolution of technologies plays a massive role in view of the potential openness to strategic forms of network on the part of Italian districts—in this case, the ceramic district of Sassuolo. It represents a trend that is not yet fully defined but that is inevitable due to the introduction of ceramic products manufactured in other parts of the world, especially in China.

TileSquare, a neutral market-maker compared to other actors involved in the market, started out as a tool at the service of manufacturers to ease transactions. In fact, it developed most of all as an aid tool for retailers, for the purpose of sharing information and cooperation rather than executing transactions.

This paper therefore will examine the above case and its organizational implications, in terms of organizational design (contribution to organizational innovation), in light of the TCT and the theory of strategic networks.

Although it was created to support multilateral cooperations, digital platform has gradually evolved into a strategic network, as clearly illustrated in the study that follows, which is increasingly dedicated to provide competitive advantages to those belonging to the network.

## **2 Among markets and hierarchy: a literature review, from TCT to other network-oriented techniques**

E-marketplaces are inter-organizational information systems where a large number of participants in the value chain can share information and exchange services as well as goods (Bakos 1991, 1997, 1998; Graham et al. 1996). These can be

considered as electronic intermediaries that make it easier to cooperate and exchange information on products. A further objective is to support business transactions between buyers and sellers (Bakos 1998; Sarkar et al. 1995).

In the literature, the e-marketplace phenomenon has been researched and studied in the light of various theories.

For the purpose of this paper, the e-marketplace is a network considered as the third coordination mechanism as an alternative to market and hierarchy.

In literature, networks have been characterized as “intermediate organizational forms” or “hybrid organizational forms” (Thorelli 1986; Powell 1990). According to Borys and Jemison (Borys and Jemison 1989) such hybrid organizational forms constitute networks of both relations and power and trust, through which organizations exchange influences and resources and are able to reach advantages in terms of economic efficiency.

Several authors (Grandori 1997; Jones Hesterly and Borgatti 1997) consider networks as a distinct organizational form, which is different from market and hierarchy and requires unique and separate research approaches and theories.

In brief, the comparison between market/hierarchy and network can be made in literature on the basis of three different perspectives. In the first instance, market and hierarchy are considered as extreme models and the network is located at an intermediate position along a continuum of forms that go from one to another. The second perspective considers the network as an alternative form to market and hierarchy. According to the third perspective, the network represents a tool of strategic and organizational analysis, which finds itself at a higher position compared to market and hierarchy. It is an interfirm coordination form that guarantees the coexistence of different interdependency relations (Martinez 2000).

The network analyzed in this paper is of a digital kind. In this network, the type of interdependency existing between participants and the content of the relations among them becomes particularly meaningful. To this regard, the interdependency characterizing the participants of an e-marketplace depends on the intensity of the relations among the participants in the network. Key attributes of the interdependency characterizing the relations among the participants in the network are: magnitude (the value of the contribution that each party receives), complexity (low for tangible goods and resources, high for knowledge, information and intangible goods) and intensity. Based upon these characteristics, generic interdependencies can occur. These are characterized by a weak tie binding the various entities and are rather simple to manage even without the avail of standardized rules and procedures. Sequential interdependencies characterize relations of a one-directional kind where the output of an entity constitutes the input for downstream units and where activities can only occur once others have been completed. Reciprocal interdependencies are characterized by a bidirectional cross-sequentiality, where the input of an actor becomes the output for another subject and vice versa. Intensive interdependencies present very intense relations between the various subjects that simultaneously participate in the execution of a given operation (Thompson 1967).

A further element characterizing networks, besides interdependencies, is the type of relations established between the actors–participants in it and the mutual influence exerted by them in their relations. The relations between the network

subjects may have as an object the transfer of tangible and intangible resources, affiliation to the same organization and divulgation of information or knowledge (advice network) or be based on the existence of personal relations (primary network). In general, the relations between two actors consists of the exchange of products, information and knowledge, while in other instances the relations may not imply any type of exchange but rather a common action between the parties in view of the achievement of multiple objectives (Grandori and Soda 1995). Various authors have investigated the content and importance of relations. In particular, Mitchell (1969) differentiates four types of relations and consequently four forms of network. Transactional relations are linked to a network aiming at the exchange of products and services. For relations dealing with the exchange of information, the reference network is communication. The relations focusing on norms and affection are represented by the network of social expectations. Lastly, a network of affiliation or common action corresponds to associative relations. It is interesting to analyze the actual properties and attributes that characterize a network of companies, such as trust, reciprocity, loyalty, all essential qualities for a correct operation of networks. These properties differentiate a network from hierarchy and market.

However, only a portion of these attributes are among the objectives of this paper, whose purpose is the analysis of the contribution given by the TCT to the development of digital markets and the subsequent new relations established between the participants in the network, thanks to the employment of ICT.

This paper will make reference, out of all the possible theoretical approaches investigating the network phenomenon, to the TCT. Furthermore, some considerations will be made with reference to the SNA, considered as a real branch of the network analysis, since we believe that such considerations are useful in view of the elaboration of the subject of this paper.

The theoretical approach of the TCT is used in this contribution to analyze the network as an economic coordination form between market and hierarchy. According to TCT's main contention (Coase 1937; Williamson 1975, 1981), the variety of organizational forms in economic activities originates from the need to reduce transaction costs, that is, from the search for efficiency.

The purpose of this paper is not a discussion on TCT, but rather to highlight the organizational form of networks and thus emphasize the role played by them in view of the reduction of transaction costs. Further down in this paper, the limitations of TCT in the analysis of digital networks will also be described.

The main factors of a network that influence transaction costs the most are trust and embeddedness,<sup>1</sup> considered as the level of social status of the participants in the network measured by the intensity, or level of connectivity, of the relations between the participants in the network (Thompson 2003). An increase in the ties between participants, and therefore, in embeddedness, positively affects the level of trust and cooperation within the network and enables a reduction in transaction costs.

<sup>1</sup> The concept of embeddedness was first introduced by Granovetter (1985), who points out how enterprise processes are embedded in the socio-economic context to which enterprises belong and in the relations existing between them.

Moreover, as the trust relation within the network increases, opportunistic behaviors decrease.

Indeed, opportunism along with other factors such as limited rationality and asset specificity, are the elements characterizing transaction costs. Limited rationality consists of a total, or simply partial, lack of the information and knowledge needed to carry out specific company operations. Although human beings intentionally behave in a rational way, in reality they turn out to be far less rational due to a lack of knowledge, far-sightedness, technical abilities and available time to perform. Asset specificity occurs when exchanges require specific investments to enter into valid contracts or when peculiar knowledge is acquired during the fulfillment of contracts. Investment in specific resources implies several advantages, such as costs reduction, but even risks. In fact, the return on the investment in a specific resource is far less substantial than the return of the same resource in the principal transaction. Moreover, specificity requires high costs for the search and selection of the most suitable partner.

Most of these problems can be minimized or contained through participation in a network. Other authors have elaborated on this subject (Jones Hesterly and Borgatti 1997), combining the basic concepts of TCT with those of embeddedness and the SNA<sup>2</sup> theory.

Social network analysis is a method for the analysis of social relations (Wasserman and Faust 1994), which has been applied in the context of several social sciences such as sociology, psychology and most of all economics. Over the last few years, it has been successfully applied to the study of various phenomena, such as international commerce, divulgation of information and study of organizations.

Social network analysis<sup>3</sup> has been adopted by several authors to study knowledge networks (e.g. Anklam 2004; Cross and Parker 2004; Meuller-Protmann and Finke 2004; Liebowitz 2005).

In the theory of social networks, society is considered as a network of relations, more or less wide and structured. The basic assumption is that each individual or actor relates to other people, and that through this interaction the behavior of both parties changes. The main purpose of the network analysis is exactly to define and analyze such ties existing between the various individuals (nodes).

Each individual operating in a company, or each company operating in a network, is part of a relational network which oftentimes is not represented in any official organization chart. SNA therefore consists of mapping and measuring the relations and flows between persons, groups, organizations and institutions. The purpose of this effort is to gather and analyze data and information to identify relation and interaction models between entities. Contrary to an organization chart which only shows the formal relations between various entities, this approach also highlights informal relations, allowing the network to understand and strengthen the

<sup>2</sup> For more information on the contributions of these authors, see Thompson (Thompson 2003).

<sup>3</sup> This approach is being used to study, through tools such as graphic charts and diagrams, the relations existing between individuals, companies, institutions, organizations, etc. Over the years, SNA has been developed through the application of a branch of mathematics, called Graph Theory.

ties that can ease or thwart generation and divulgence of knowledge. These connections are usually invisible. However, thanks to SNA, it is possible to investigate them, uncovering real networks that occur underneath the formal organizational structure and to define improvement routes.

Social network analysis is a general analytical model which oftentimes challenges the ubiquity of TCT and therefore tries to give a general explanation of all socioeconomic organizational forms.

According to the SNA approach, some specific network characteristics (Wasserman and Faust 1994) may help interpret the phenomenon of digital markets, as well as the case study presented in this paper. These are:

- Subjects and their actions are analyzed according to the interdependency view.
- Social network analysis is based on relations (interactions and exchanges) and not on the characteristics/attributes of each individual subject.
- Relational ties between actors are channels that foster the flow of tangible and intangible resources.
- Network models are structured environments that offer specific opportunities and at the same time impose restrictions and limitations on individuals' actions.
- The structures of social network establish long-lasting relation models between agents.

Actually, the purpose of this paper is also to illustrate the limitations of TCT in interpreting phenomena such as digital markets. Therefore, we will adopt instead the strategic networks theory to show how the development of e-marketplaces can be studied in light of this approach, which is still under examination and therefore the literature has not yet been able to describe such phenomenon in a clear manner.

According to Orneita Burton's theory (Burton 2002), markets tend to incorporate organizations and automatically regulate the complexity and uncertainty of transactions, based upon some particularly meaningful hypotheses, which are:

- The cost of transactions executed through e-business channels is lower than that of transactions executed through conventional channels.
- Electronic channels are able to transmit more information than conventional channels.
- As complexity and uncertainty increases, the quantity of information transmitted through electronic channels also increases.
- Market efficiency is positively correlated with ICT concentration.
- Transaction costs decrease as e-commerce volume increases.

In addition to the three effects of communications, electronic integration and electronic mediation described by Malone et al. (1987), Wigand (1996) introduces a new one, i.e., the "effect of strategic electronic networks". ICT in fact allows one to design and strategically plan the connections among enterprises cooperating with one another to reach common strategic goals in order to obtain competitive advantages (Wigand 1997). This aspect is usually disregarded but in this case is essential to explain which strategic implications network relationships have not just on the relationships within the network but also on the relationships outside it. This subject will be further discussed in the analysis of the TileSquare case study.

The latest and most authoritative theoretical contribution has been given by Castells (2000), who, with reference to the studies conducted by Cohendet and Llerena (1989) stresses how the organizational change that led to the creation of networks of enterprises has occurred irrespective of the technological progress, as a necessary reaction to survive and live in an environment that is increasingly more complex.

When the operating feasibility of networks has been proved, the new technologies have enabled or even accentuated the trend towards them (Boyett and Conn 1991).

However, it is difficult today to propose excessively deterministic approaches with reference to the organizational implications of ICT in the evolution and organizational changes of enterprises and also to deny altogether the existence of perspectives of a deterministic nature. In this respect, Petit Pascal privileges a perspective that combines several approaches on this matter and comes to the final conclusion of a new competitive relation in market and industry. This perspective is further developed by Petit Pascal who following an historical and institutionalist perspective refers in his papers to the notion of structural forms as proposed by the Regulation School, based on the Theory of Regulation (Petit 1997; Petit and Soete 1998).

## 2.1 TCT limitations in business to business exchange

Christiaanse and Markus (2002) argue that the TCT when applied to the study of e-marketplaces poses three substantial limitations. First of all, the theory puts too much emphasis on the brokerage and communication effects to the detriment of the integration effect. As a result, possible shifts from hierarchical to networked relationships rather than the market at large are overlooked (market subsystems). Secondly, the TCT seems to disregard the influence of pre-existing relationships and extended supply chains between enterprises bound by commercial ties, which once again are able to promote network instead of market relationships. Finally, the TCT completely overlooks the effects of power relationships among enterprises that might affect the structure of intercompany relationships.

Classical features of a network relationship are “relational” trading and negotiation as opposed to “legal” trading which is typical of market relationships (Van Alstyne 1997). Therefore, in a network the emphasis is on cooperation and integration as opposed to the brokerage function. Many e-marketplaces provide technological capabilities that support integration and cooperation, instead of, or in addition to, communication and brokerage capabilities. Virtual marketplaces oriented towards integration tend more to enable post-sale operations and forms of cooperation in view of the development of new products rather than the real buy and sell stages.

Virtual markets’ cooperation services and tools require high levels of external integration systems. Investments on system integrations can be seen as investments in specific assets, which the TCT links to hierarchical and not to market



relationships. As a result, the important integration functions are not adequately considered.

Furthermore, the case exists whereby some organizations are not able to support e-marketplaces with a communication and brokerage business model. One of the assumptions of market models is a critical mass of buyers and sellers and frequent transactions. As a consequence, virtual marketplaces must be oriented towards a business model based on cooperation services to meet the needs of this type of industry.

Finally, integration capabilities may in part be attributed to another phenomenon overlooked by the TCT, i.e., the power relationships among enterprises. Theoretically, e-marketplaces are associated with the idea of lower prices for traded products. Lower prices, on their own, trigger the reaction of suppliers whose non-participation makes e-marketplaces fail (Bakos 1997). As a consequence, suppliers give up their participation in those markets whose goal is the cutting down of prices, thus causing their failure. It is expected therefore that many e-marketplaces will emphasize the information on prices, especially when the contractual power of sellers is particularly strong, whereas others will give importance to product rather than price information or may well omit brokerage activities to focus on integration (Cordella Rossignoli and Mola 2006).

## 2.2 Strategic networks: a possible new theoretical approach

Going to the quotation of Thorelli (1986) mentioned above, networks are “two or more enterprises that, thanks to the strength of their interaction, constitute a subsystem of one or more marketplaces.”

This is an ample, open concept with a strong empirical overtone. The strategic advantage is a function of the competitive advantage that such networks are able to guarantee, especially in the case of long-lasting relationships.

In this paper, the theory of strategic networks is being applied to the analysis of cooperation-oriented e-marketplaces.

In fact, if on the one hand, transaction-oriented e-marketplaces exist that are characterized by the use of catalogs and auction and exchange methods and focus on the price negotiation phase, on the other hand there are cooperation-oriented e-marketplaces characterized by their ability to organize planning, forecast and management activities of the products' life cycle. It is easy to understand how the TCT in the first case can provide a more or less exhaustive framework, while in the second case it is completely inadequate.

B2B e-marketplaces are generally considered as “spaces” where potential buyers can find out about products and prices through electronic catalogs, auction and exchange methods and more in general through information technology capabilities supporting price negotiation. In this case, the e-marketplace acts as an intermediary between a buyer and a seller. The economic impact that this might determine is very strong, since a greater transparency causes a general decrease in the prices of carried products. However, some B2B e-marketplaces rather than acting as intermediaries in the buying process, act as process facilitators

(Christiaanse and Markus 2003), i.e., they tend to foster integration of interorganizational systems and provide specific capabilities in view of cooperation along the supply chains. The companies that elect to participate in a cooperation-oriented virtual marketplace operate according to a rationale that is completely different from the logic followed by companies that wish to operate in a transaction-oriented e-marketplace.

The initiative objective of first-generation e-marketplaces was the creation of a more competitive market and a friction-free commerce. The drawbacks however are still countless, above all due to the limited number of participants (Holzmuller and Schlichter 2002).

In order to create a more sustainable business model, some e-marketplaces are oriented towards the so-called second generation, whose primary objective is the execution of the entire transaction, from on-line order creation and management to—whenever possible—the organization of logistics through the tools made available by the virtual marketplace (Philipps and Meeker 2000). However, many consumers are not willing to sustain the high cost of all these services and the number of participants is not as high as to be able to guarantee the survival of the platform. The real challenge therefore is to involve a high number of consumers, a fact that constitutes a problem most of all for the suppliers (MacDuffie and Helper 2003). Moreover, intercompany long-lasting, trust relationships are key factors for potential participants. Most enterprises do not wish to forego their traditional procurement lines and for this reason are more willing to choose that type of e-marketplace that is able to improve the already implemented purchasing methods.

For these reasons, e-marketplaces are beginning to offer new cooperation-like functions compatible with the need to maintain long-lasting relationships with strategic partners (Christiaanse and Markus 2003).

Although the offering of cooperation-like services represents the direction to follow, cooperation among e-marketplaces has not yet been understood in a correct manner, to the point that oftentimes it represents a vague term that can assume different meanings in relation to different subjects.

It is necessary to make a classification by types, based upon two research criteria:

- The level of cooperation
- The subjects involved in the cooperation (Wang and Archer 2004).

Generally, it is fair to say that cooperation is the effort made by two or more organizations in order to reach specific results that otherwise, i.e., acting individually, could not be reached (Wang and Archer 2004).

Winer and Ray (1994) draw a distinction between cooperation, coordination and collaboration based upon the various levels of interactions between two or more organizations.

When more parties cooperate, each organization maintains its level of autonomy and resources. Cooperation may stem between subjects with different goals and without a clearly defined and shared mission. In these types of relationships, which do not really share goods, services and knowledge, a few risks and limited gains are involved. The counterparts maintain the highest level of autonomy and the level of trust among them is very low.

Two types of contracts govern the different types of cooperation: definitive and relational contracts (Ring and Ven 1992). The former are characterized by formal agreements and full definition of the mutual obligations of the parties. The latter, which were so defined for the first time by Simon (1951), are characterized by informal agreements and non-written codes of conduct. Cooperation is obviously governed by full negotiation.

When speaking of coordination, each party maintains its own autonomy and independence. However, changes may occur in the procedures and employees' duties, while the counterpart may enact some forms of collaboration (consulting services, experts' opinions, etc.). Coordination requires mutual planning and open communication between the parties, since there is only a partial sharing of mission objectives. The parties enjoy the benefits resulting from sharing resources, however problems may arise in relation to the occurrence of delays. Trust is still limited. The finalized contracts regulate most routine activities. However, relational contracts can be used when unexpected events may jeopardize the achievement of the common objectives.

The concept of collaboration is fully in place when several separate organizations aim at achieving common objectives and bond together to form a new structure. Collaboration requires exhaustive planning since decisions, power, authority and resources are shared. These synergistic efforts oftentimes create new advantages in terms of innovation from which all participants can benefit. When there is real collaboration, the partners give up parallel, individual programs and work towards the creation of a new program that can offer the participants more than what the organizations were able to provide alone. A high level of trust is obviously required.

Moreover, the analysis of the case below provides interesting ideas which will be illustrated in the following paragraph on the new role played by the network as electronic intermediary.

### 3 The case study

The research design includes the analysis of a case which is considered meaningful for the following reasons:

- Although the case at hand originates in Italy, it has international relevance.
- The life of this e-marketplace is more than five years. Over these years, the initiative has not only started, but has constantly evolved and grown in a very turbulent environment.
- The number of participants in this digital market is particularly high.
- ICT plays a critical role in changing the "engagement rules" and balance of power of the participants in the manufacturing chain.

The research has been carried out using tools for data collection of a qualitative nature, mainly based on interviews to strategic and technical managers, systems designers, operating users and administrators of the information system of the analyzed e-marketplace.

### 3.1 The TileSquare case

TileSquare was established in 2001 as a stock holding company.

TileSquare is an EMP, i.e., a marketplace that reproduces the work methods of the ceramic sector, with the purpose of promoting and developing relationships among manufacturers, created both for manufacturers and final users who have free access to a vast area of information and services.

The mission of the company is to build a reference marketplace for the ceramic sector through the aggregation of the business leaders belonging to it, enabled by the creation of more effective and efficient, standardized procedures, able to support all the links of the chain, that is, suppliers of raw materials, manufacturers of machineries and ceramic products, and retailers.

The above represent the parties to the marketplace, which amount to approximately 1,000 subjects and also work abroad, particularly in East European countries.

One of the most relevant aspects of the portal is its neutrality, a necessary condition for the survival of the initiative. Neutrality means respect for the rules of the real market, without interfering in the way people do business, who shall act in full autonomy and with no intrusion in the content of their activities.

### 3.2 Functions and services offered by TileSquare

The marketplace is a meeting point where people gather to discuss and do business. In TileSquare market, it is possible to find the places that allow development of such relationships.

The square branches off into several roads where one can find Displays, Shop Windows and Stores of suppliers, manufacturers and distributors, which can be also reached through a search engine. Inside these places, each client is the master of its space and can organize its presence using the criteria he/she deems most appropriate to conform to the company organizational model in order to enhance their competitive advantages.<sup>4</sup>

TileSquare stems from the idea of some professionals experienced in marketing, sales and communications in the ceramic sector. TileSquare is not an alternative tool to company websites but complementary to them, which proposes a work environment where one can find procedures and applications able to meet the different needs of all actors involved in the ceramic manufacturing industry. Moreover, it can be defined as neutral in that it respects the rules of the real market, without changing the way people do business and without interfering in the commercial or financial relationships between buyers and sellers. Companies can directly manage, with no interference whatsoever, content, portfolio and commercial offers.

No buying or selling commissions are required. According to the price policy, there are only annual costs for the use of the web space and the infrastructures that

<sup>4</sup> [http://www.tilesquare.com/viewnode.do?pagina\\_name=823689819679120067+piazza](http://www.tilesquare.com/viewnode.do?pagina_name=823689819679120067+piazza).

the companies wish to activate: TileSquare provides a technological platform shared by the market and through which companies can develop their activities.<sup>5</sup>

The advantages offered by TileSquare to subscribers can be summarized as follows:

1. Company visibility: All companies subscribing to TileSquare are visible even by users that are not registered, with the purpose of enhancing the value of the ceramic community and recognized specialization.
2. Guided researchability: All subscribers who are united by their belonging for whatever reason to the ceramic sector are easily researchable thanks to a multi-parameter search engine.
3. Containment of contact costs: During the research and selection of new customers-retailers, or other third parties, contacts become easier. In fact, researching methods have been provided which enable the exchange of information, negotiations and relationships in general.
4. Reduction of management costs: Instead of managing the negotiations through traditional methods which oftentimes generate high costs and organizational diseconomies, several negotiations can be easily managed at the same time, while keeping under control the status of each negotiation and reducing errors and investments fragmentation.
5. Sale promotions and bargains: Thanks to interactive tools, it is possible to create one-to-one proposals that generate loyalty between companies and customers. Going into the bargain area, the registered users interested in accepting the bargains are given the opportunity to verify the characteristics of the offer and to directly negotiate the supply.
6. Effectiveness of sales activities: Constantly updated portfolio in real time, measurement of interests and behaviors of potential customers in the companies' space, ability to propose targeted contact and sale-promoting actions.
7. Access to the largest catalog of products and services for the ceramic market.<sup>6</sup>

The target of the virtual market is a variety of subjects, all involved in the ceramic supply chain.

More specifically, the market caters to ceramic suppliers which are businesses located inside industrial districts offering goods and services mainly for manufacturing companies, such as manufacturers of ceramic equipment and machinery, suppliers of raw materials and display tools and companies providing vertical and horizontal services.

Two methods are available for this type of company to be present in the e-marketplace, i.e., Display or Shop Window.

The e-marketplace also caters to manufacturers of flooring and paneling (ceramic, wood, natural materials) for which a specific shop has been created having all the functions necessary to present, promote and manage the catalog of each single manufacturing company.

<sup>5</sup> [http://www.tilesquare.com/viewnode.do?page\\_name=823689819679120067+nocommissioni](http://www.tilesquare.com/viewnode.do?page_name=823689819679120067+nocommissioni).

<sup>6</sup> [http://www.tilesquare.com/viewnode.do?page\\_name=823689819679120067+vantaggi](http://www.tilesquare.com/viewnode.do?page_name=823689819679120067+vantaggi).

As for retailers and distributors, TileSquare was established with the primary objective to solve the typical problems of a multi-brand distribution system, characterized by a lack of a univocal standard in the data and information management. We see therefore the proliferation of e-commerce systems proposed by individual manufacturers, design systems containing materials of each individual manufacturer - each of them organized in a different manner—and products' cataloging systems of each individual manufacturer where retailers should learn how to use as many systems as the number of their suppliers. This imposes an incredible waste of time and resources. TileSquare Store has been designed to solve these problems and it is meant for professionals of the sector, that is, agents, project design firms, individual designers, tile-layers, building companies, all actors that play a key role in the value chain of the ceramic sector. Registration is free for all of them, allowing access to most reserved-access areas available on the marketplace. Once authorized by manufacturers and retailers, professionals can participate in negotiations, place orders for display tools on behalf of themselves or their customer, use 3D software and lastly join correspondence courses organized for the purpose.

Finally, for the associations and the ceramic sectors all over the world, TileSquare offers a complimentary Window presenting their activities and services. Moreover, special deals are included for the participation of associated companies in Display and Shop Windows.

In practical terms, manufacturers may opt to be visible to everyone with a transparent catalog or only to partner retailers. As a consequence, retailers in their catalogs may display the manufacturers' products with a transparent catalog or personalize the catalog according to their exclusive rights regarding some of their partner manufacturers.

TileSquare therefore offers several options that can be adapted and personalized to specific needs. The services offered in an aggregate manner or in pre-assembled packages allow different service levels, according to strategies that are increasingly more evolved and that can be found in last-generation e-marketplaces.

The system was started as a digital platform at the service of tile manufacturers and over time has become increasingly more of a support tool for the new needs of retailers, thanks to the implementation of 3D visualization software (3Dweb) which is being installed at the retailers subscribing to the e-marketplace. This is a sales support software rather than a real design tool. Its main features are simplicity, since the target users are the retailers who oftentimes are not quite familiar with information tools, and the possibility to create in a quick way an approximate interior design.

Once the parameters and the materials have been chosen and entered, 3Dweb allows preparation of real-time price estimates also taking into account any discount policy that each single retailers may be able to obtain from the manufacturers.

A further feature of the software is that it allows retailers to offer to the customers an array of products that are not typically ceramic products.

However, the real asset of this software application is the ability to uniform and standardize the relationship between manufacturers and retailers. We no longer see unique software for each single manufacturer, but single software able to include the

whole professional category under the manufacturers. Before that, we had *ad-hoc* software programs for each single product or line of products, which caused countless management problems to the retailers.

The portal moreover allows one to update in real time the catalogs, to present new products as well as new lines and make special offers for lots of products left unsold (under the section Special Deals).

Therefore, the retailers subscribing to the e-marketplace are given the possibility to offer to their customers a series of exclusive products which are only available in their catalogs. Standard product packages may also be offered in the future with access to both subscriber retailers (through a password) and final users (free access). Exclusive rights are granted under a written contract governed by applicable laws.

From the analysis of this case, we can see how new forms of governance of transactions can be used that promote new interaction methods among the subjects participating in the network along with new methods for the organization of the work.

Suffice it to mention, for example, the work method used by the retailers, who first of all develop their projects and designs with 3D tools, thus saving designers' costs. Second of all, they can create and make project designs in a few minutes instead of several days. From the analysis of the case it is also possible to see how retailers cooperate among themselves and generate the so-called peer-group phenomenon (Martinez 2000). Lastly, the retailers themselves are able to offer alternative simulations and proposals to customers which before were just unthinkable.

In brief, the 3Dweb software allows participants to improve interior design and consequently to improve cooperation between both manufacturers and retailers and retailers and architects. The stricter relations established between participants distributed all over the world due to the use of the software for several years within the portal, constitute today a prerequisite that will also enable transactions in a near future (brokerage effect).

### 3.3 TileSquare: a strategic improper network

From the description of the characteristics of TileSquare it is possible to infer some ideas on the trends of the ceramic sector.

At an international level, we have seen the astounding rise of some countries—especially China—which are able to offer products that from a quality standpoint are very similar to Italian products but are definitely cheaper. Since these are easy-to-make products, especially since the technological gap with these emerging economies has been filled, it is fair to say that Italian products place themselves in the medium-to-high market target. Asiatic products do not really penetrate in the internal market due to the barriers that can be found inside traditional sales channels. For this reason such products might be able to enter into the Italian market through electronic channels or digital markets which therefore might become real alternative sales channels.

Moreover, the portal which was created to meet the needs of manufacturers has instead been very successful most of all among retailers. The manufacturers enjoying a competitive advantage in the traditional market usually do not feel the need to be present in the virtual market. Only those that occupy a marginal position can appreciate the advantage of being able to nick some market shares to their stronger competitors. The very balance of the ceramic market has been tipped by the introduction of TileSquare, especially when there is too much to offer and retailers have the opportunity to select the products that offer the best compromise in terms of quality, quantity and price. The digital market tends to break up the oligopoly of some manufacturers, guaranteeing transparency of information necessary to the retailers to make intelligent choices.

From the case study, other significant aspects emerge: the effect of electronic commerce on the structure of intermediation. In fact, thanks to the network, a new form of electronic intermediary is being created, whose objective is not the reduction of prices but to enable the famous three effects suggested by Malone et al. (1987).

The three effects suggested by Malone—i.e., communication, brokerage and integration—should be taken into consideration when studying the electronic network created by TileSquare.

- *Communication effects* This implies the generation of an efficient flow of information. Such effect is certainly allowed by TileSquare, in that the various actors of the ceramic manufacturing chain are offered the opportunity to be visible to all other subjects—therefore, produce information—and at the same time receive information from other subjects or through special links with specialized magazines, sector studies and others, available in the portal. Today the virtual marketplace has gone from 1,000 to almost 1,500 subscribers, thanks to the participation of a growing number of interior design firms coming from all over the world.
- *Brokerage effect* This implies the match-making between buyers' needs and retailers' offers. In this respect, TileSquare is potentially able to offer to its customers the opportunity to close a deal on-line. This is actually beginning to happen only recently not just for "regular" purchases from the catalogs but also for special offers, where the good price makes it convenient to quickly close a deal on the digital market.
- *Integration effect* This implies the creation of closer ties. TileSquare is certainly a tool that allows the ceramic sector agents to come out of a strictly competitive logic, fostering instead the development of cooperative relationships, both among subjects that occupy a different hierarchical position and among same-level subjects.

Also strictly correlated with the networking concept are the new effects generated by the electronic integration among participants to this digital market. The primary reason why this e-marketplace was created was to ease the relationship between manufacturers and retailers. Today, such relationships exist both between manufacturers and retailers, but also between retailers and architects (interior design firms), retailers and construction companies and



between manufacturers and construction companies, although manufacturers in this case are not allowed to close transactions to avoid breaking-off of business relations with retailers.

Atypical effects emerge therefore in terms of the new roles played by the network as intermediary. This subject is only briefly mentioned in this paper, i.e., the effect of electronic commerce on the structure of Intermediation, or the role played by these new intermediaries in network-like organizations.

A network does not always cause elimination of the intermediary and reduction in the price of goods. On the contrary, new intermediaries emerge that did not exist before and that have different objectives than price reduction.

In the case at hand, the electronic intermediary, i.e., the TileSquare portal, has generated new types of relations among participants in the value chain. It is necessary therefore to draw a distinction between relations of a cooperative kind (cooperative transactions) and transactions that lead to the closing of the transaction itself (transactive transactions).

Thanks to the new role played by the electronic intermediary, cooperative transactions are also extended to other actors, which before were not so connected with one another, such as, the growing number of architects in close relation with retailers, or builders who get in touch with an increasingly larger number of retailers or manufacturers of ceramic tiles. As regards the closing of transactions, business agreements entered into by participants force builders to turn to retailers for the final purchase of goods. The electronic intermediary therefore does not produce an effect on prices but rather expands and expedites the purchase process reducing information asymmetries and directing the focus on the service and not on the price. In other words, it improves the quality of the service connected with the purchase process and offers a larger variety of choices to both end buyers and builders.

Such effect is not consistent with the effects of electronic commerce on the structure of intermediation described in the literature.

In literature, the concept that the electronic commerce leads to disintermediation (Benjamin and Wigand 1995; Picot et al. 1997) is widely accepted. This supposedly occurs because on-line consumers interact with on-line suppliers and prices are reduced due to the elimination of intermediation costs.

In particular, in a specific contribution, Picot et al (1997) accept the approach of New Institutional Economics and Principal-agent theory to explain future disintermediation structures in electronic markets.

Schmitz, analyzing the effects of electronic commerce on the structure of intermediation, suggests that the effect of the diffusion of electronic commerce on each intermediation service should first be analyzed before jumping to any conclusions.

Furthermore, the impact of electronic commerce on structure intermediation is strictly connected with the physical characteristics of the goods managed on the net. For example, a high level of standardization, an easy description and a low level of complexity to be evaluated represent valid requirements to ease the distribution of goods via electronic commerce (Schmitz 2000).

Although tiles are a product that can be standardized in terms of mappable information in a database, the complexity of the relations between participants in this business does not allow today to easily come to generally valid conclusions. The electronic intermediary has eased and strengthened the role of retailers, who are now able to dictate to manufacturers certain behaviors and business rules that prevent the price reduction brought about by the elimination of intermediaries of a traditional kind, a phenomenon that has not occurred in this sector. It should be noted, therefore, that the effect of price reduction described in the literature only occurs when the new electronic intermediary represents a real sale channel—for instance, in BtoC—but when the electronic intermediary is basically a supplier of services aiming at easing and optimizing the operation of the entire value chain, the price reduction effect, at least in the middle term, does not occur.

Moreover, the organizational features of the e-marketplace are being expanded since a new web-based access version to the portal of retailers by final users is being developed. For this reason, the diffusion and fragmentation of the network will be increased.

#### 4 Conclusions and research further directions

The presentation of the TileSquare case offers some interesting reflections. Above all, we wish to point out the networking effect as described by Wigand (1996). TileSquare reconfigures the relationships in the market of ceramic products, generating a competitive advantage for the retailers participating in it. The e-marketplace therefore creates “situation rents” for participating subjects. Reducing the transaction costs, retailers can render their offers on the e-marketplace more competitive, thus favoring those who are inside the network to the detriment of those who are not. All this should cause manufacturers to participate in the e-marketplace, even though such effect causes an increase in the level of competition of the sector, thus reducing the economic rents of the oligopoly. Should manufacturers decide not to participate, they would be cut out of the market since the transaction costs to close business activities with them would be higher compared to the costs that manufacturers themselves would have to bear to close deals with the subscribers to the e-marketplace.

This determines increased interest on the part of retailers and manufacturers in being present on the e-marketplace, therefore creating positive side effects and increasing the richness of the e-marketplace offering, which becomes even more advantageous for retailers, and contemporarily increasing the disadvantages for those not participating in it. Such virtuous/vicious cycle—depending on the perspective from which it wishes to consider it—creates a new strategic configuration of the ceramic products market as a consequence of the effects of ICT on the coordination costs internal to the network and transaction costs between agents belonging to it and those who interact in terms of economic transactions with them. In a nutshell, TileSquare allows the creation of a strategic and improper electronic network. It is fair to hypothesize an improper electronic network insofar as each actor is present both on the portal and in the traditional market. In fact, if on

the one hand there are some advantages in being present on TileSquare as a channel to access information, on the other hand we have seen how the real transaction actually occurs outside it, even though with some exceptions.

From an organizational standpoint, retailers have the opportunity to manage contacts and create for instance buyers' groups through the communication tools made available by TileSquare, such as direct contact or videoconference. Within the network, there is no real brokerage effect but for now there are only cooperation-like ties. A further interesting aspect that can be found in TileSquare is the role played by the network in overcoming the traditional limitations experienced by retailers and suppliers in accessing the market. TileSquare proposes a new electronic market overlapping the preexisting one mainly confined to the district, thus allowing the development of new business activities for the actors involved in the network. In this case the EMP can be defined not only as a new organizational form supporting the relationships among the institutional actors that can be directly found on the digital market, but also as a mediation tool that allows new economic relationships to emerge between actors that in a non-ICT-mediated market would not be able to meet, directly due to the high transaction costs. The case of the Chinese manufacturers is a clear example of such dynamic. TileSquare therefore not only supports the "preexisting" relationships in a more efficient manner but also allows the emergence of new relationships that otherwise would not have been possible due to the high transaction costs. It also plays therefore a market-making role.

TileSquare is a large virtual warehouse that allows real-time monitoring of availability, delivery time and other conditions of traded products.

Moreover, manufacturers can update in real time the catalogs at retailers and present new products and product lines.

It is possible to market exclusive catalogs of product series thanks to the opportunity given to retailers to customize the catalogs on-line.

A further interesting consideration, closely related to the above, regards the level of cooperation reached inside the e-marketplace. There are different configurations in terms of cooperation, according to the level of trust, sharing of goals and integration among the various rings of a given supply chain. If machineries' manufacturers allow everybody to seize the most advanced technologies, this will knock down the technological barriers defending a given production. In this specific case, if the manufacturers of machineries for ceramic production—an instance that actually occurred—provide Chinese ceramic manufacturers with the same equipment used by Italian enterprises, they are actually knocking down the technological barriers. It is apparent that it would not be correct to speak of cooperation within a supply chain. There is no sharing of mutual purposes and no common mission. At the most we can see, in place of cooperation, a coordination in relation to a given investment project but without experiencing full awareness in a strategic sense.

In the analysis of the evolution and diffusion of the e-marketplace phenomenon, we have seen how the initial stage of utmost trust towards these tools mainly created for on-line negotiation gave way to a stage of restructuring, concentration and pooling of various experiences, oftentimes coupled with a re-configuration of the business plan of many of these virtual markets. In a nutshell, it would be fair to

describe such evolution as the passage from a transaction tool to a service-provider tool.

Therefore, if on the one hand negotiation in TileSquare is a function that is not being fully, or just in part, exploited, on the other hand the 3Dweb software becomes the value added feature for the users, shifting from an ancillary to a core business service.

We have also seen how e-marketplaces are many-to-many brokerage models. The rationale behind them is free access to any user that of course might be able to meet some basic requirements. However, we have seen how in their evolution e-marketplaces offer increasingly more functions that are typical of one-to-many applications, allowing for instance to encrypt particularly sensitive information, conduct bilateral negotiations and create privileged relationships with a restricted number of actors of a given supply chain. The e-marketplace pools the typical functions of an extranet, giving up at least in part some its original features. For example, TileSquare allows retailers to keep in their catalogs exclusive products of a given manufacturer.

In the light of the above considerations, it is fairly apparent how the application of the TCT alone is not enough to interpret the complexity of current markets and how it is necessary instead to search for new venues that better help comprehend the trends currently in progress. The strategic networks approach, as well as other network-oriented techniques, turn out to be better suited to explain a phenomenon that originated to meet specific needs of a transactional kind which then changed and evolved into needs of an informative and cooperative kind.

It is however apparent how e-marketplaces are proper forms of transactions' governance having peculiar characteristics that need further analysis.

This research is evolving towards the analysis of how ICTs are able to provide additional tools to improve the relation of cooperation between participants.

A natural evolution of the relation of cooperation leads, as stated before, to on-line management of the whole negotiation, thus determining the brokerage effect. Current research however is also proceeding in another direction. It seems in fact especially interesting the adoption of fully-developed techniques of data analysis, and more in particular of Business Intelligence<sup>7</sup> systems to allow the relation between participants in the digital market. As mentioned before in this paper, it emerges how the portal has over time favored retailers more than manufacturers, altering therefore the traditional balance of power within the value chain. Manufacturers in fact almost feel obliged to provide catalogs and information through the portal if they want to keep the good relations with their retailers.

We wish therefore to continue the study analyzing how through BI systems it is possible to analyze the data on the use of the portal by retailers and in this way provide to manufacturers information that they can use for marketing purposes.

In fact, it had been noted that the organizational complications or difficulties caused by the obligation to update and manage the catalogs on-line represented one

<sup>7</sup> BI are tools that enable the transformation of data into information in support of decisions, according to the objectives that a company wishes to pursue in order to sustain its competitiveness (Gray and Negash 2003; Negash 2004).

of the impediments to the development of cooperation in the use of the portal on the part of manufacturers. Such problem delayed, compared to the actual development potential, the use of the portal as a new method for cooperation. The moment TileSquare will be able to provide to manufacturers information that can be exploited for marketing purposes the advantages will become apparent. Cooperating in the on-time provision of updates and any other information that retailers need, manufacturers receive in exchange by those who manage the portal the information on the use of their own products, which should promote the creation of a new balance of roles and powers that was initially altered by ICT.

It becomes therefore increasingly more apparent how ICT are not neutral in defining new organizational orders, new roles and power balances between the very participants in the digital networks.

TileSquare is visibly a value-chain portal. Therefore, the analyzed effects are affected by the type of participants in the network. A further development of this research aims at an in-depth analysis of the differences between the new forms of strategic cooperation between enterprises operating in the same value chain and other kinds of e-marketplace where instead participating enterprises belong to different manufacturing sectors.

TCT as well as SNA and strategic network offer useful contributions to the study of this case and to further research in the directions outlined above. Besides the reduction of transaction costs represented in this case by the costs for the search for counterparts, costs for execution of contracts and costs for the search and retrieval of information and divulgation of knowledge, the containment of opportunistic behaviors, which can be better kept under control through the portal, also represents a particularly important aspect. TileSquare, considered as a strategic network, certainly helps dealing with these problems. Moreover, thanks to SNA, the importance of the relational aspect is highlighted, which is essential to the pre-contractual phase carried out through the portal. Participants in the network in fact relate to one another in order to formalize and execute their relationships. Some participants play a preeminent role in the orientation of these relations and, exerting their control, influence the behavior of other participants who find themselves in a position of interdependency. Such relations enable the flow of resources that are most of all intangible but at times also tangible. The purpose of these relations is to encourage diffusion of information and sharing of knowledge, which becomes a crucial factor to start again new relations.

Over the last few years, we have seen in the literature a growing interest in these organizational forms, although certainly it is only the start of a more general phenomenon consisting in an increasingly stronger correlation between organizational design and leveraging of ICT potential.

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