

## **Collaborative Value Network: Real cases of industry collaboration.**

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### **Abstract**

*Real cases of industry collaboration encountered by the authors during various research projects. This paper focuses on how e-tools are used across the value chain to add value to the parties involved, using an illustration from the automotive industry. It presents the results of a survey conducted in several european companies and introduces a categorization of the types of collaboration encountered. The results show that the overall benefits of collaboration are clear and measurable to the parties involved, essentially because transactions are easily measurable too.*

### **1. Value Chain Management**

The main focus of current Value Chain Management can be found in the innovative models of collaboration between the different links that configure the chain, between the different Value Chains of the market and their procedures, as well as technical and organizational requirements. Models of collaboration based on the Web, called “eCollaboration”, are of special importance for members of different Value Networks (Laudon&Laudon, 2004). These are Suppliers and Purchases, Engineering and Projects Management, Quality Management, Distribution, Spare Parts and Service Management, etc.

In order to explain how the concepts of value chain evolved drastically with the emergence of information technologies to serve new market requirements, at the end of the nineties, the new Web-based technologies lead to Value Network Management (VNM) and e-VNM models in the form of complete, integrated networks that link the different participants.

As a result, ICTs also strongly affected the Value Chain within firms. The communication with the suppliers is now managed by a central platform where the partners have direct access to the network’s data “inter managerial. In this context the following challenges appeared:

- Performance timing of the tasks must be drastically reduced.
- Vehicles built to order are already a reality in Western Europe.
- Suppliers must optimise their cost structure to sustain competitiveness in the market.

This evolution is reinforced by the new demands of clients and markets. Competitiveness is driven by efficiency on deadlines and costs in production and distribution. Changes appear in client needs. This leads to custom designed products and services for the most demanding clients, problems’ solutions thus a large variety of products and models, and demand for fast delivery and high quality.

In the face of the development of new technologies and procedures, it is a must to point out

realities as:

- The concentration in the essential abilities that maintain the competitive advantages.
- Increase of the own efficiency and competitiveness and the reaction speed, flexibility and efficiency of costs.
- Innovative models of cooperation.

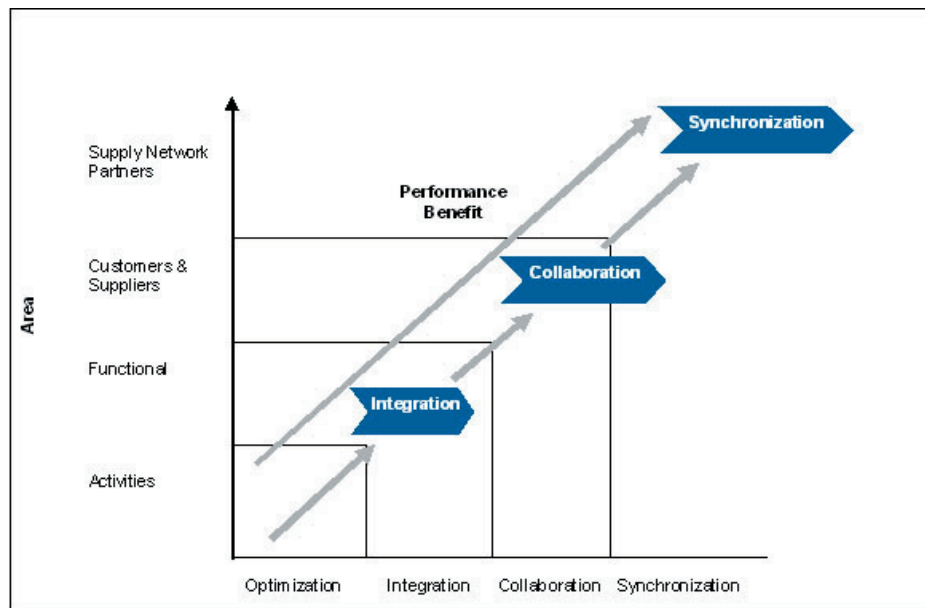
These lead to the need to act by the markets:

- The increasing necessity of tight collaboration with clients and suppliers.
- The rise in the clients' demand and a very dynamic business activity.
- Demands of high reliability and flexibility as well as deadlines and quantities.
- High competitiveness in production and supply chains and an increasing internationalisation.

However, the market benefits from:

- The appearance of Electronic Markets (eMarkets) with integrated business procedures services as well as logistic gates.
- The powerful IT solutions for planning and simulation of the Value Chain.
- The collaboration of planning and precaution solutions.
- The digital technologies based on innovative networks and Internet applications (i.e. eProcurement)
- The integration of solutions ERP, SCM and business, throughout the Value Chain.

The main point of the different Value Chain Management visions is called "eCollaboration". Based on the Web, it includes all participants throughout the Value Chain. The Value Chain's evolution is based on the successive models as shown in figure 1.



**Figure 1.** Value Chain Evolution

The “different visions” of the Value Networks Management embrace all the Value Chain procedures where the Management Systems support the foundation of internal procedures and all the business procedures via the different possible solutions.

This way it is possible, that the business procedures that start from the suppliers and finish with the clients (including development, purchases, production, sales and distribution as well as after sales services) have the support of different Management Systems today. Thus, it is confirmed that engineering is based as much on CAD/CAM Design Systems as on Design Systems of the Product (PDM) and on Portals.

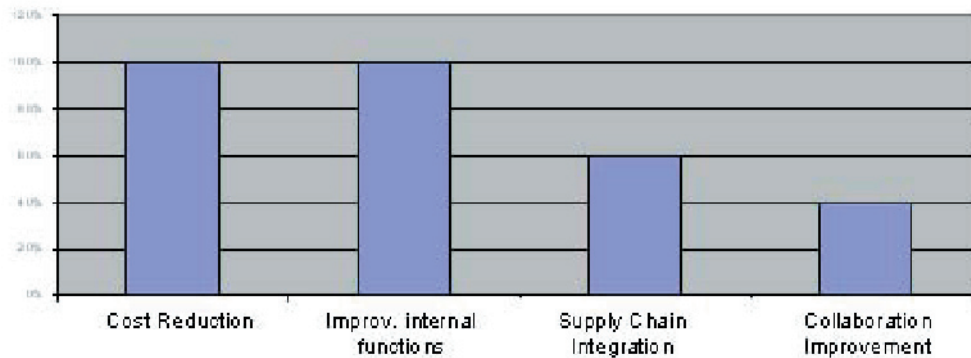
As previously mentioned, via Supply Chain Management, there are expected constant possibilities of improvement. For instance, for the European vehicle industry it is possible to obtain improvements by implementing digit supply networks called “eSupply-Networks” so that, at the logistic level, the delivery deadlines’ reliability to a client increases from the current 30 to 60 percent to more than 90 percent. Delivery deadlines of individualised vehicles to clients are reduced from the current 8 or 12 weeks to 2 weeks. On an economic level, the cost reduction by improvement of production and organisation procedures can reach 13.5 thousand million euros. Although by increasing the Supply Networks efficiency between the partners and suppliers, it is possible to obtain an additional savings of 7.8 thousand million euros. This gives a conservative total cost reduction close to 6.2 %.

Even though, it is true (this expression is strong: where does the info come from ?) that 80% of the companies during the year counted with basics collaborative solutions (EDI, fax, etc), just 13% could present technology news orientated to SCM, CRM, etc solutions, and only 2% showed a real integration in collaborative networks.

Clients’ demands of eCollaboration solutions, where the critical point is the managerial success in the short run, is shown in a survey made to several european companies during 2003 as it can be seen below (figure 2):

- Cost reduction (100%).

- Improvement of the companies' internal functions and their procedures, tools and available information (for example, forecast accuracy, optimum transportation) (100%).
- Improvement of internal Integration of the Supply Chain, for example complete planning of supply chain and execution (60%).
- Improvement of collaboration between the participant companies of the Value Chain, for example CPFR, VMI (40%).



**Figure 2.** Clients' demands for eCollaboration solutions

As main barriers for the introduction of eCollaboration, solutions were sought in moderate steps. The following barriers to the introduction are shown in the presented survey (figure 3):

- Weakness of the current organisation and Information Technology Management (50%).
- Economic situation (40%).
- Estimated complexity of Projects (30%).

The aim of Collaboration Management is to improve competition and achievement of economic potentials via eCollaboration solutions. The stated improvement is materialised through the following tasks. Improvement of the competitive position, that allows one to understand and transmit the client's expectations by managing clients' success factors (time-to market, order lead time, etc), own competition as supplier (total quality, JIT/JIS, response time, etc), clients models for eCollaboration, new solutions for eCollaboration or profit sharing models. Economic potentials through three main ways:

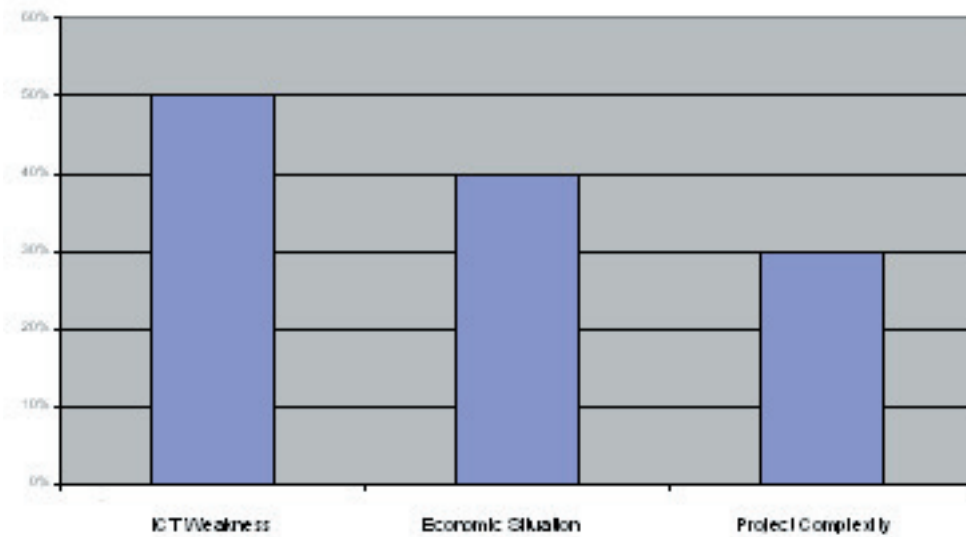


Figure 3. Barriers to eCollaboration

- Entries and margins improvement through offer management improvement.
- Cost reduction in purchases, for example purchases online related with suppliers.
- Cost reduction by improvement, using assets, reduction of circulating assets (stock, order-to-cash, lead time), reduction of procedures that do not create value (transport, warehousing, inspection, trials, etc), rationalization of procedures in direct or indirect areas, as in cost reduction for mistakes.

Collaboration Design is where the eCollaboration Programme develops procedures, necessary technologies, organization, evaluation and choice of ICT solutions as well as the Business Plan. Finally, a detailed planning is developed in the Introduction Planning. This refers to projects' parts, resources, budgets, deadlines and key indicators of success. As a result the General Plan, Financing and Control Model must be obtained and applied to the Value Chain.

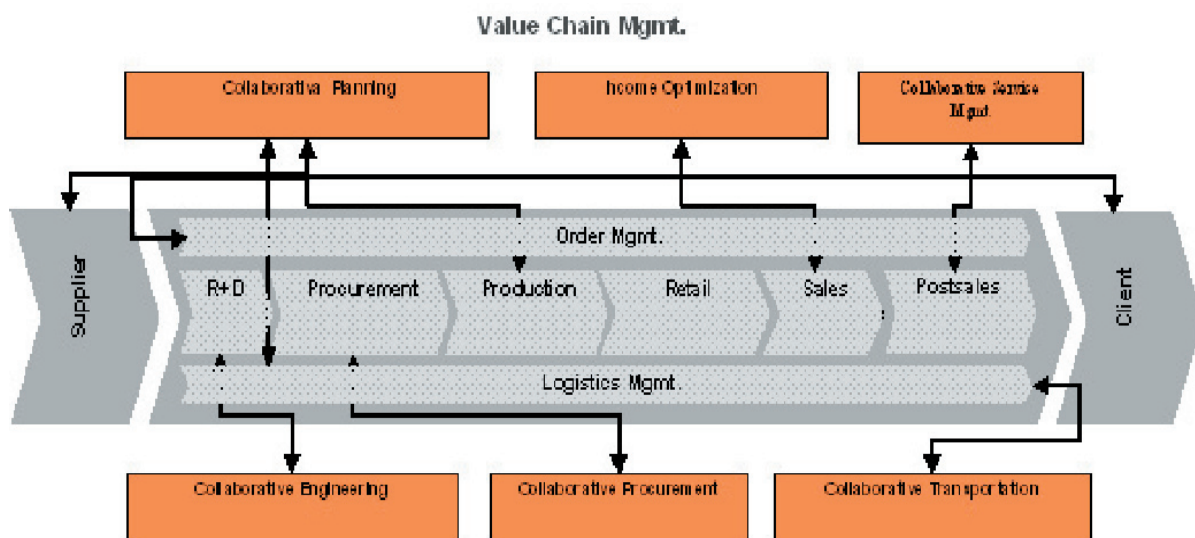


Figure 4. Value chain management

## 2. Real Cases of industry collaboration out of the same value change.

When taking about several partners involved in the collaboration in an organized way we can cite for example trade associations, groups of suppliers or industry peer networks (Sgourev and Zuckermann, 2006), all widely studied by academics. In this part of the chapter we present three examples different from the aforementioned, one related to quality management across industries in the US, another in the electric utility market in Spain and a final one in the ceramic tile industry also in Spain. All of them have been investigated by the authors. In some cases, we have had the opportunity to work within the organizations mentioned.

Before presenting these 3 case studies briefly, we wish to emphasize immediately that these three situations were characterized by a high level of personal interaction. We also identified the following commonalities:

- There was an important need being fulfilled or opportunity realised with the collaboration. There was a sense of urgency for collaborating, as the task was perceived to be better undertaken as a group.
- The CEOs and senior management of the companies involved knew each other beforehand and there was a certain level of trust. This trust implied certain openness in the communications process among them and in the will to share detailed problems and solutions.
- Most of the times there was an external mediator or broker with high reputation and credibility involved in the process. This broker very frequently came from an “engineering” or “practical” oriented university.
- All the companies involved have a minority control of the collaboration. Its management is done externally to all of them, normally by the external broker mentioned above.
- The collaboration was incremental. It started with sharing for example training and in some relationships it ended up having even a temporary exchange of managers or people.

### 2.1. Collaboration in Quality Processes: The Centre for Quality Management<sup>4</sup>

In the 50s several American experts reached Japan to talk about quality and quality improvements. Firstly W. Edwards Deming in 1950 and later Joseph Juran in 1954 initiated the quality movement. The quality movements reached all of Japan with the support of the Japanese Union of Scientists and Engineers (JUSE) and the Japanese Standards Association (JSA). Professors of reputed universities, such as Tokyo University, Tokyo Institute of Technology and Kyoto University, among others, acted as catalysers for change supported by their social prestige. This made Japan a country with one of the most competitive and internationally reputed industries in several sectors. By the 80s they were exporting all over the world and specifically to the US (Gram, Shiba and Walden, 1993).

Since the late 80s several companies of the Boston area in the US were suffering economic slowdown and increasing competitive pressure from competition, some of it coming from abroad. The CEOs of most of these companies had visited Japan and observed the business practices. At the same time they met each other regularly on professional organizations and business associations (Shiba and Walden, 2001).

In November 1989 Professor Shoji Shiba gave a seminar at the Massachusetts Institute of

Technology (M.I.T.) and introduced Total Quality Management to CEOs. Several decided to cooperate and disseminate business practices. The following companies founded the Center for Quality Management, which was later called the Center for Quality of Management: Analog Devices, Bolt Beranek and Newman, Bose Corporation, Digital Equipment Corporation, GE Aircraft Engine Division, Polaroid Corporation and Teradyne.

The centre initiated activities with an executive director and support staff and it was structured in 6 operating committees mainly formed by company participants: seminars; education and training; networking; promotion; research, document and library and finance. The idea of this structure is that CQM staff should be for support of CQM members, and the intellectual leadership and work would reside in the member companies. The other important issue is that, although senior managers and CEOs had an extremely high involvement in the initiative, organizations are the real members of CQM.

In the early stages in-company seminars were organised. One day courses were taught by Professor Shiba and manuals and documentation was prepared. As the relationship moved along, the number of activities increased along three lines: research, education and networking, reaching dozens in a given year.

Collaboration has integrated online and offline tools. For example, currently there is an online database with the most relevant cases, books, methodologies and articles. Members introduce several types of quality data online for benchmarking the best practices and they get aggregate results for improvement purposes within their company. Offline methodologies have traditionally been very important too. They have reached the level of temporarily exchanging managers within the partner companies on a one to one basis.

As of February 2006, the CQM has grown to 70 member companies and several chapters in the US and Europe. Still, high in their web page they define mutual learning as key to their activities:

“Mutual learning is not benchmarking, nor is it industrial tourism. In a nutshell, Mutual Learning provides opportunities for executives to learn from each other. It involves openly sharing training materials, data and anecdotes with other companies and learning to work differently, based on experience.”

## **2.2. Collaboration among Spanish Electric Utilities: Tecnatom**

The electric utility market is normally a geographically limited market with very few participants. This is so because governments have always been interested in supervising and controlling the availability of electricity to industries and citizens. Also because of the heavy capital investments needed to run a traditional electricity production facility, especially when taking about nuclear, hydroelectric or combustion plants. In such a market, it is common that CEOs of different players know and meet each other frequently in professional organizations and other types of social events. If the distribution of electricity is also regulated, there is also the possibility that the competition among them may be limited, as it was the case by the end of the 50s in Spain. So, a certain level of familiarity and trust was likely to have developed in the market among the main participants.

In the late 50s Spain was entering in the atomic era. Several electricity utility companies were buying and setting up nuclear power plants in the country. These were first generation nuclear power plants and there was very limited knowledge on the country on how to build and run

these large installations. Additionally, should errors happen in the process, the risk and damage to the surrounding environment could be enormous.

Instead of creating their own training organizations or hiring a consultancy firm to do so, the companies involved decided to cooperate on a continuous manner and create Tecnatom, an external firm that provided training and benchmarking activities among the three firms involved. In such a way they guaranteed a certain level of neutrality in the relationship, being the organization external to all of them. The new company billed individually the services and knowledge, avoiding appropriation by a single partner.

Tecnatom procedures for training, maintenance and inspection have always been under a close scrutiny of the regulatory body for nuclear energy production, because of the potential implications that nuclear incidents in a country or region may have, as we know nowadays from Chernobyl.

The level of collaboration between the companies, as in the previous case in CQM, has been incremental. Initially it was the support, commissioning and operating the first generation power plants. Of course, this involved sharing best practices across all the lines of activity, even though the technologies may have not been the same, and using these to develop manuals, courses, procedures and documentation. When the second generation power plants arrived in the 70s the sector included nuclear power plants with Pressurized Water Reactor (PWR) and Boiling Water Reactors (BWR) from different suppliers. The owners decided to increase cooperation and do the heavy capital investments of buying two full scope simulators, one with PWR technology and the other with BWR technology.

In the early 80s, activities increased to the development of data acquisition and signal processing systems with ultrasonic for test and supervisory purposes. In the 90s, they decided to internationalise within the same sector and to apply the expertise acquired to other sectors.

Nowadays Tecnatom has more than 600 employees, most of them highly qualified, and is present in more than 30 countries. It operates in the nuclear market, the aeronautical and space markets, railways, thermal and combined cycle plants and the petrochemical market, doing mostly testing and inspection, maintenance, training, simulation and development of the specific support equipment. The organization is still mostly owned by the original electric utility companies, having Endesa 45 % of the company, Iberdrola 30 % and Union Fenosa 15% of Tecnatom.

The level of trust and collaboration is such that middle managers from the founding companies attend two fully fledged masters programs in electric utility management, run by Universidad Politecnica de Madrid along with other participants. Conferences are taught by senior managers of the owners of Tecnatom and several site visits are scheduled.

### **2.3. Ceramic tile industry cooperation: the Ceramic Tile Research Institute (ITC) in Spain**

The ceramic tile cluster in Spain has currently (2004) an annual turnover of 3.392 M€ (ASCER, 2005), being the second producer in the world with 9.5 % of the global production and exporting over 60 % of the production (21.2 % of the world commerce). But this has not been traditionally this way. Only in the last 2 years Spain has become a world leader and producer, having about 90 % of the production in a radius of 40 km (Albors, 2002).



The area of Castellon, where all these factories are established, lived the commissioning of a new natural gas network in the eighties at the same time as the new technology of single cycle firing arrived, which meant that the tile saw the cooking time reduced from almost two days to less than an hour. This affected specifically the tiles that had a vitreous coating or glazing, which in fact was most of the production.

In parallel we can follow the history of an active research group in the area. It started in 1969 at University of Valencia with a focus in Chemistry that concentrated exclusively in ceramics in 1975. This group was formally named Ceramic Tile Research Institute (ITC) and was led by Dr. Agustin Escardino, already a very prestigious scientist at the time.

So what we see is an extremely competitive industry under a strong pressure for change or disappearance, due to a new technology coming from Italy. And in addition to that, the potential for a neutral broker for leading that change in the industry. Several of the industrial firms decided to foster the creation of a common location for research and development, from which they could all profit. They would contract these facilities on an individual basis, but it would serve them all. In 1984 they created the Research Association for the Ceramics Industry (AICE), with common facilities, equipment and personnel to ITC under a specific contract. The location of the site was in the city of Valencia.

What started as a different legal entity became the ITC in 1992. The research and development facilities moved nearby the industry, to Castellon and activities increased significantly for the satisfaction of the industry, which gave the annual prize of the Spanish Ceramic Trade Association (ASCE) prize in 1994 to Mr. Escardino.

Nowadays, the institute has 76 full time employees and 11 researchers. 18 professors of the neighbour university collaborate on a permanent basis with it. 280 companies participate in its management structure<sup>11</sup>, 206 of which were clients of the institute in 2005. This means that the industry as a whole manages the institute and that the same industry is the client of it. It is a collaborative initiative in a very competitive environment pressured always for new designs and shorter product development cycles.

The activities involved in this collaboration are:

- Research, development and technological support: these are the original activities and purpose of the collaboration, where clients command research or support in new product, machinery or process development.
- Technology Prospective: use of leading technologies from other industries in the ceramic industry.
- Training: courses and seminars for technical personnel.
- Technological services: testing, laboratory subcontracting, quality assessment, and documentation.

What is important too is that the centre has also a high rotation of people towards the industry, resulting in knowledge sharing and technology spill-overs.

In fact this is not the only form in which the firms collaborate. There are very few clay providers and also very few leading technology glazing firms. The entire industry collaborates with

them. The level of collaboration has reached a point where the main producers have currently announced that they are joining forces to enter the natural gas distribution industry. After the gas crisis in Europe during the winter of 2005/06 and the level of concentration existing in the Spanish market on the supply side for gas, the producers have seen their business at risk. Ceramic tile production is high intensive in energy consumption and they want to guarantee the supply of that energy. Again, given a common fear and a history of collaboration and trust, several industry participants are joining forces to guarantee they remain competitive.

### **3. Final remarks**

The two parts of the paper have presented actual situations of collaboration among companies. Across the value chain, interactions and benefits are easily identifiable and measurable, so direct work between the partners is possible using technology solutions. Several software vendors have identified this opportunity and as we see from the results of the survey presented, they have succeeded in providing value to their clients.

On the other hand, when the value is not exclusively transaction based, other forms of deep collaboration are also possible. These forms involve the development and maintenance of relationships, often personal, and succeed in the long with the support and arbitrage of external entities, such as research and consulting organizations close to universities. These mediators manage the equilibrium between appropriation and contribution of the firms involved from an external perspective to them. These structures are more unusual, complex and less systematized, due to the specifics of the collaboration. Three cases have been presented.

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