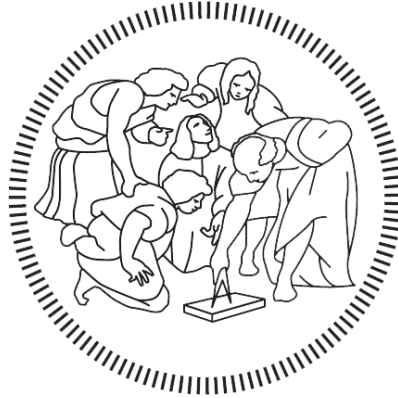


**POLITECNICO DI MILANO**

*School of Industrial and Information Engineering*

**Master of Science in Management Engineering**



**Extranet and Web Portal for  
the management of the Supply Chain  
processes: an empirical analysis**

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## **Executive summary**

The following thesis work has been developed in collaboration with the “Osservatorio Fatturazione Elettronica e Dematerializzazione” of the Politecnico di Milano School of Management. The structure is divided into two different parts: the literature review and the empirical analysis, moreover including a census mapping and cases studies. Finally, the work ends with the finding and results emerged out from a critical and in-depth analysis of the gathered information, with the purpose of identifying the needed elements to respond to the work objectives.

## **Reference framework**

In an environment such as the Italian one, characterized by an economic downturn, one of the topics on which companies are focusing more attention in the recent years is the digitization of the Supply Chain, in particular the electronic integration with Supply Chain partners. The latter represents the ability of Supply Chain actors to automatically support, executional or collaborative processes, which involve a company and its main partners, in order to reach the benefits of planning and process management from the perspective of "extended enterprise" (Cagliano et al., 2009).

An adequate level of integration and collaboration enables companies to achieve significant benefits in terms of cost reduction and performance improvement, as well as transparency across Supply Chain and new business opportunities. All these aspects must be supported by the adoption of appropriate technologies. The Information and Communication Technology (ICT) could play a key role: its conscious and strategic adoption not only would generate benefits of efficiency and effectiveness, but would allow to obtain and sustain fundamental competitive advantages for the survival of the system in the long run.

However, in this context, Italy must relate with its unique industrial structure: there are almost 5 million companies, of which over 95% are classified as Micro and Individual enterprises. This situation implies a substantial inability to invest in structural projects. Hence the desire to study Extranets: versatile technology solutions, scalable, and characterized by low usage barriers.

## **Literature review**

In order to obtain the necessary theoretical basis on which write this thesis as well as a proper contextualization of the phenomena, it has been extremely important the literature review. More in depth the literature review has been based on several sources related to the topics of Supply Chain Management, with a specific focus on eSupply Chain (i.e. eExecution and eCollaboration). Furthermore, it has been deepened the eProcurement phase and the Extranet technology.

## **Supply Chain Management**

Starting from the Supply Chain topic, the main Supply Chain Management definitions have been identified; moreover, the main reasons behind the birth of Supply Chain Management have been described as well as its most important characteristics and managerial approach.

The birth dates back to the 80s and the Council of Supply Chain Management Professionals (CSCMP) define the Supply Chain Management as a practice which encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third party service providers, and customers.

## **eSupply Chain Management**

The eSupply Chain solutions, or rather ICT-based tools to automatically support, executional or collaborative processes, which involve a company and its main partners, in order to reach the benefits of planning and process management from the perspective of "extended enterprise" (Cagliano et al., 2009).

According to Bertelé et al., (2004), eSupply Chain Management could be classified into two processes: (i) *eSupply Chain Execution*: the integration and digitalization of the Order - Payment cycle, including logistics and administrative activities (Perego et al., 2010) and more generally of the trade process. It supports pre-sales, Order issuing, logistics, accounting and after sales; (ii) *eSupply Chain Collaboration*: it involves sharing of electronic information to support operational planning processes and the development and design of new products, aiming at improving process efficiency through collaboration in decision-making and execution phases (Bertelé et al., 2004).

Furthermore, another important macro process, that usually take place before eSupply Chain Management, is the eProcurement, which refers to the use of electronic communications to deal with business process between sellers and buyers. It can be considered as the linking and integration of inter-organization business process and systems with the automation of the requisitioning, the approval purchase Order management and accounting processes through Internet-based protocols (A.K. Pani et. al., 2007; Jose Maria Alvarez-Rodriguez et. al., 2014).

IT technologies could be applied to a portfolio of relationships and give the opportunity to drive more efficiently processes, improve information flow and closer supplier relationships (Roberts and Mackay, 1998). These solutions could be classified into: (i) *User to Application (U2A)* solutions, which are largely related to Extranet that allow the communication between buyer and seller using mainly Web pages and Web forms through a Web browser and implying the human

interaction with the system; (ii) *Application to Application* (A2A) solutions (i.e. proprietary solutions, traditional EDI, EDI on Internet, XML-based solutions), which allow to establish authorized interactions between the companies' information systems involved in the B2b relationship.

## **Extranet**

Coherently with the thesis goal, the Extranet topic has been deepened, focusing on its definitions, processes supported, differences between EDI technologies as well as drivers, barriers and the main benefits and criticalities.

The Extranets are networks with a restricted access (according to predefined profiles) based on the Internet technology and aimed at supporting the integrated and collaborative management of the intercompany processes. An extranet allows the exchange of resources (applications, database, information, etc.), provides services and process integration (Balocco and Rangone, 2002).

## **Methodology**

The main objectives that drive the development of this graduate work are:

- To collect and analyze data about key Extranet projects in our country, mapping them according to different parameters, and filling out a census, with particular reference to those which support eSupply Chain Execution functionalities (Transactional Extranet) however, at the same time, analyzing eProcurement solutions as well;
- To estimate the level of adoption and the current status of Extranet solutions on the Italian territory;
- To identify and in-depth analyze some key Italian Extranet considered representative for the market, in order to estimate their maturity degree as well as penetration level and process coverage;
- To identify the main drivers, benefits and criticalities behind Web-based Portal solutions.

Once defined in detail the main objectives of the research, from a methodological point of view the work has been articulated in three macro phases: (i) *literature analysis*; (ii) *empirical analysis*; (iii) *finding and results*. More in depth, the empirical analysis has been carried out through two different methodological approaches: (a) *census* aimed at map key Extranet projects in Italy and fill the census; (b) *direct interviews* deeply understanding the role, status and maturity of Extranet solutions and afterwards creating case histories.

## Empirical analysis

The empirical analysis is divided into two complementary approaches that feed each other: the census filling and the direct interviews. In particular, from the census it was possible to identify and select the more interesting cases as well as the ones to be deepened; thereafter, direct interviews were fundamental to gather detailed information, allowing to continuously update the census.

### Census filling

During the census mapping and filling, more than 750 Extranets has been identified, and out of them, so as to implement further analysis, we have selected (according to work goals) almost 400 solutions were selected, classified as “Transactional Extranet”. In particular, they enable the exchange of at least one document related to the Order - Delivery - Invoicing - Payment cycle.

### Interviews

The second part of the empirical analysis has been carried out by conducting direct interviews with company managers (mainly ICT ones); thereafter, it has been possible to create 32 case histories related to Italian companies, belonging to different sectors.

Company	Business sector	Company	Business sector
1 Aeroporti di Roma	Passengers transport	17 Hera	Utility
2 Artsana	Sanitary	18 Hilti	Building utensil
3 Autogrill	Food distributor	19 Intersport-Cisalfa	Sport & Clothing
4 Bayer	Pharmaceutical	20 Italtel	Telecommunication
5 BCUBE	Logistics	21 Leitner	Transport (ropeway technology)
6 Bionike	Pharmaceutical	22 Liu Jo	Fashion & Clothing
7 Bolton Group	Consumer goods	23 Maire Tecnimont	Engineering
8 BTicino	Electrical equipment	24 Matalsistem Sardegna	Services-commercial spaces' equipment
9 Chiesi Farmaceutici	Pharmaceutical	25 Moncler	Fashion & Clothing
10 Costa Crociere	Tourism	26 OTB	Fashion & Clothing
11 Dolce & Gabbana	Fashion & Clothing	27 Patrizia Pepe	Fashion & Clothing
12 ENI	Utility	28 Rhiag	Automotive
13 Ermenegildo Zegna	Fashion & Clothing	29 S.A.C.B.O.	Passengers transport
14 Esprinet	Information Technology	30 Sky	Television-Services
15 GoodYear Dunlop	Automotive	31 Tod's	Fashion & Clothing
16 Gruppo PAM	Retailing	32 Unico	Pharmaceutical

Table A: Companies panel

Furthermore, each case study was structured according to a predefined standard, consistently with the questionnaire of interviews. This allowed to achieve a more efficient and effective comparison between the several cases analyzed.

## Findings and results

### Census

Throughout the activities related to the census, more than 750 Extranets has been identified; in order to implement further detailed analysis (according to the work goals), almost 400 solutions were selected, classified as “Transactional Extranet”.

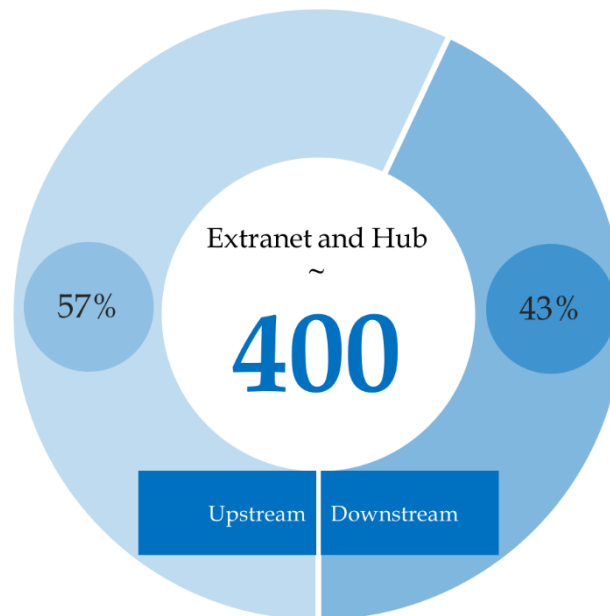


Figure A: Extranet selection

Considering the 400 Transactional Extranet, they are implemented mainly by Supply Chain leaders, involving almost 100,000 companies – including Small-Medium Enterprises (SME) and Micro Enterprises. More in depth, in the Italian country, the 43% of 4,500 big Enterprises, the 24% of 250 thousand Small-Medium Enterprises and the 0,6% of 4.7 million Micro Enterprises exploit an Extranet connection to improve their business and better relate with partners. Furthermore, Extranets are very flexible and versatile and thanks to their week entry barriers (especially in term of costs), can involve also companies with limited resources and digital skills.

Finally, two are the scenarios about existing Extranet development:

- The 18% of eSourcing and eProcurement Extranet already implemented, had recently improved their functionalities, going beyond the pre-transactional phase and including the exchange of the Order cycle documents.
- The number of collaborative projects which have improved their functionalities and added new ones - extending their width - has increased by the 12%.

### Companies panel analysis

The interviewed panel is composed by 32 companies, belongings to 20 different sectors.

It is possible to classify the set of companies identifying a clear axis which could represent the dimension. In particular, the latter, has been built according to the number of employees and the turnover (€).

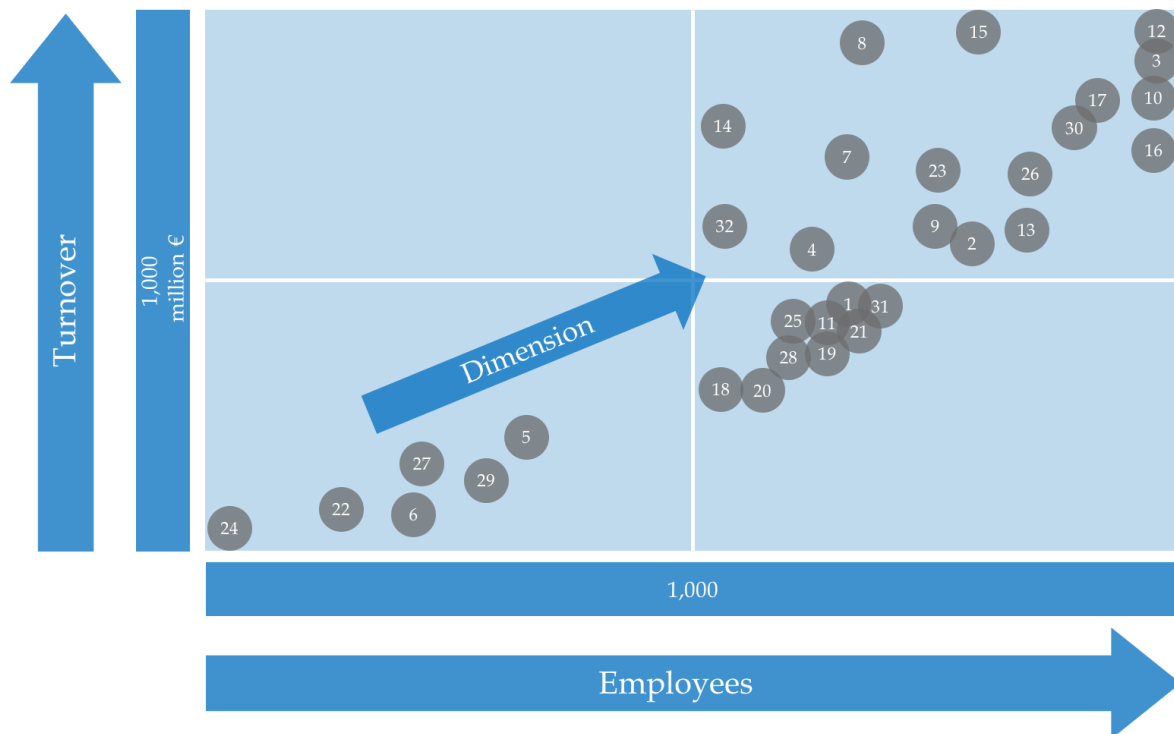


Figure B: Dimension of companies

Furthermore, it has been possible to classify companies according to the implemented solution: upstream and downstream oriented Extranet. More in depth, it is possible to observe that interviewed company are not equally distributed and are more oriented toward upstream solution. In particular:

- 15 companies (47%) have implemented only an upstream oriented Extranet;
- 9 companies (28%) have implemented an Extranet both for customers and suppliers;
- 8 companies (25%) have implemented only a downstream oriented Extranet.

Since some companies have implemented more than one Web-based solution, the analysis has pointed out 45 Extranets, 28 (62%) upstream oriented and 17 (38%) downstream.

A further classification has been used to understand if there are some relationships between market sectors and tendency to implement upstream or downstream solutions. Hence, a matrix has been created using on one axis the solution orientation (upstream or downstream) and on the other the “macro-sectors”. Since 20 sectors are graphically inconvenient to be represented, an aggregation in three macro areas (Manufacturing, Services and Distribution) has been done.



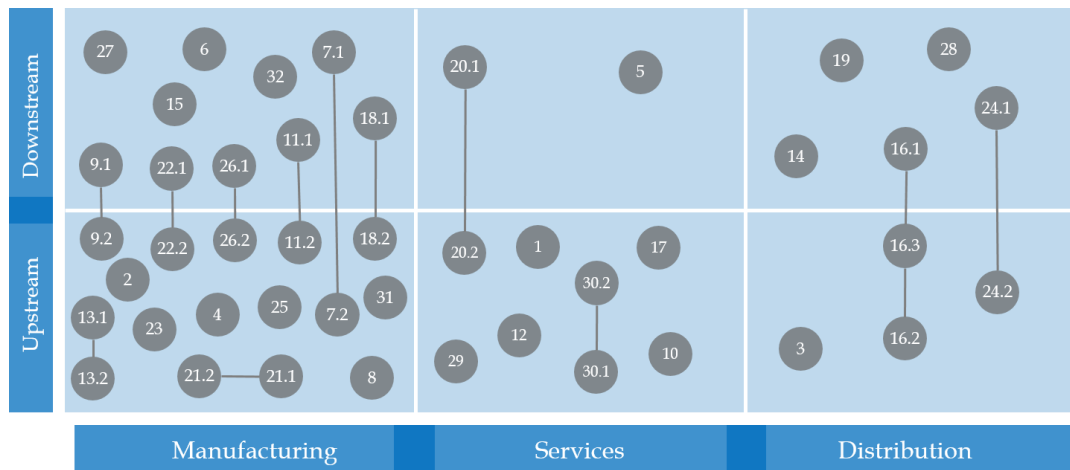


Figure C: Extranet solutions per macro area

From the above figure it is possible to see that the majority of solutions have been implemented by manufacturers (58%) (manufacturer are the companies more interviewed, the previous data has not a statistical meaning). Moreover, spots are quite equally spread (in term of orientation) for both manufacturers and distributors, while for services providers there is a strong emphasis on upstream Extranet.

### Extranet penetration

The Extranet penetration has been assumed as the ability for a solution (and the relative company) to be extended toward the majority of partners' categories and, at the same time, to involve the targeted actors as much as possible. In order to understand the penetration of the implemented solution, the matrix adopted (both upstream and downstream), is composed by the "x" axis which represent the number of partner's categories (suppliers or customers) impacted by the solution; they could be "all" (if the solution is used to relate with all type of partners) or "some" (if the Web-Portal is used to deal with only a part of the total actors with which the company work).

The other dimension is represented by the percentage of involved partners out of the targeted category/ies and not out of all the partners dealing with the company.

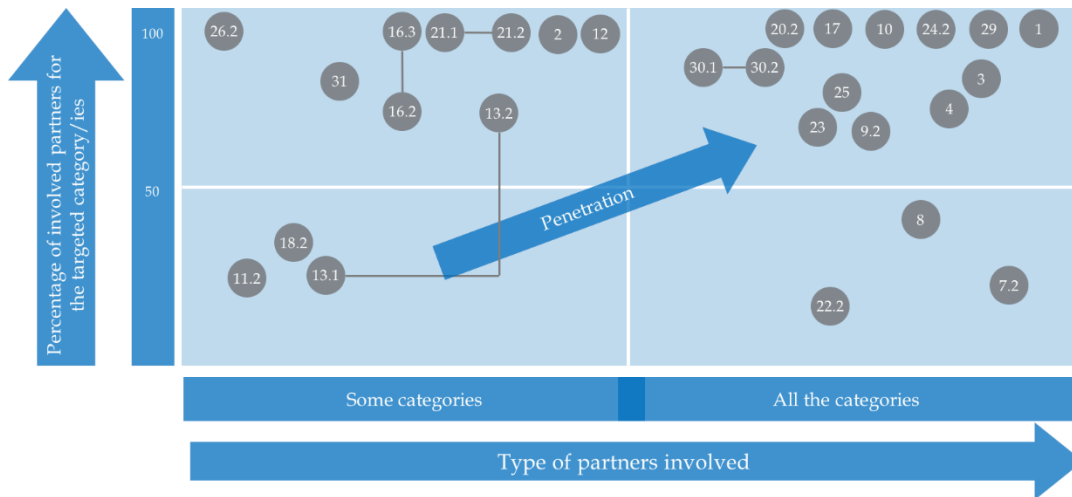


Figure D: Upstream Extranet penetration

Analyzing this matrix, it emerges out that points are not uniformly distributed and the majority of spots (77%) lay on the upper side of the matrix. This means that companies are able to well integrate their suppliers target.

Another important aspect to be pointed out is that the 40% of companies extend their solution only to a part of their suppliers. During interviews it comes out that the involvement of only some partners' types, in majority of cases, is the result of a strategic choice and not a lack of the solution. It could depend either from the aspect that the solution it is not suitable and convenient for some kind of relationships, or because the other suppliers are integrated in different ways (i.e. EDI).

Moreover, in the down side of the matrix it seems that some solutions are unsuccessful since the relative companies have not been able to integrate a significate amount of targeted suppliers. Actually, the real reasons are: (i) strategical choices (Pareto optimal partners), (ii) few partners, belonging to a unique category, but accounting for a significant amount of business volume, (iii) recently implemented solution (iv) the company faced difficulties related to the small and craft nature of suppliers. Coherently, the following figure shows the downstream mapping.

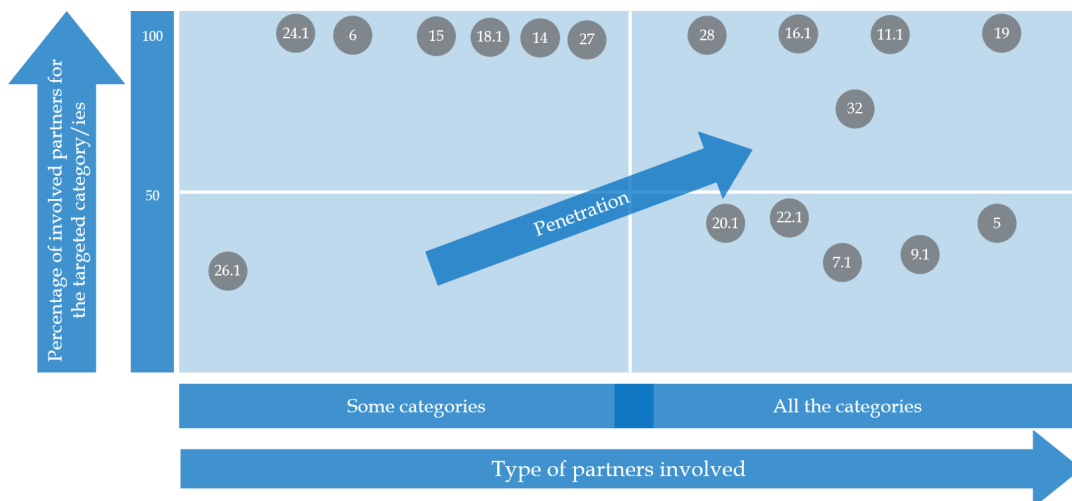


Figure E: Downstream Extranet penetration

Coherently to the previous figure, the upper side of the matrix is the most populated (65% of spots) and almost 40% of solutions involve only some categories. Concerning the down side of the matrix, there are several reason that justify the low involvement of partners (i.e. strategical choices, parallel channels such as EDI, partners' competences and resistances).

**Focus on processes**

In order to have a comprehensive view on process coverage a dedicated map has been adopted. Considering the processes covered by upstream Extranets it comes out that 50% of the analyzed companies support at least two processes; moreover, out of the other 50% which support only one process, the majority have implemented pre-transactional solutions (50%) or collaborative ones (33%). Moreover, the most supported process is the pre-transactional one, 58% of the companies, followed by the transactional, 50% and the collaborative one, 46%.

Considering the downstream situation, it emerges that the 76% of companies support through Extranets at least one sub-phase of the transactional process, differently from the upstream situation where it was supported only in the 50% of cases. Similarly, it results that the 65% of companies supports collaboration with customers while only the 33% supports it with suppliers. Therefore, based on these data it can be asserted that downstream solutions are more executional and collaborative-oriented than upstream ones.

**Extranet maturity**

In order to estimate the maturity of the solutions, Web Portals are mapped on the basis of the involved partner (on the "y" axis) and the age of the solution (on the "x" axis). The following figure shows the upstream map.

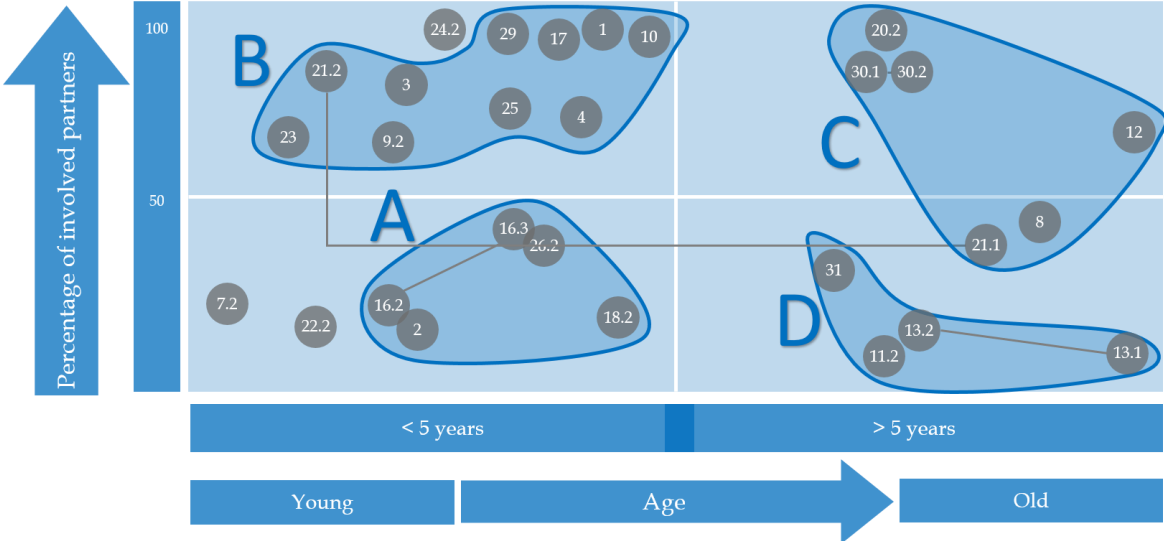


Figure F: Upstream Extranet maturity depending on the age

Analyzing the matrix, it is possible to group the spots into 4 clusters:

- The A cluster called “in progress integrators” is populated by solutions which are quite young, and whose relative companies have decided to integrate only a determined part of actors;
- The B cluster called “focused integration”, contains Extranets which are young and mainly focused on pre-transactional features;
- The C cluster called “stable integration”, is composed by Extranet which, operating by more than 5 years, have reached a stable level of integration and represent historical point of reference for the relative Supply Chain;
- The D cluster called “collaborative solutions” is populated by solutions which shows collaborative features.

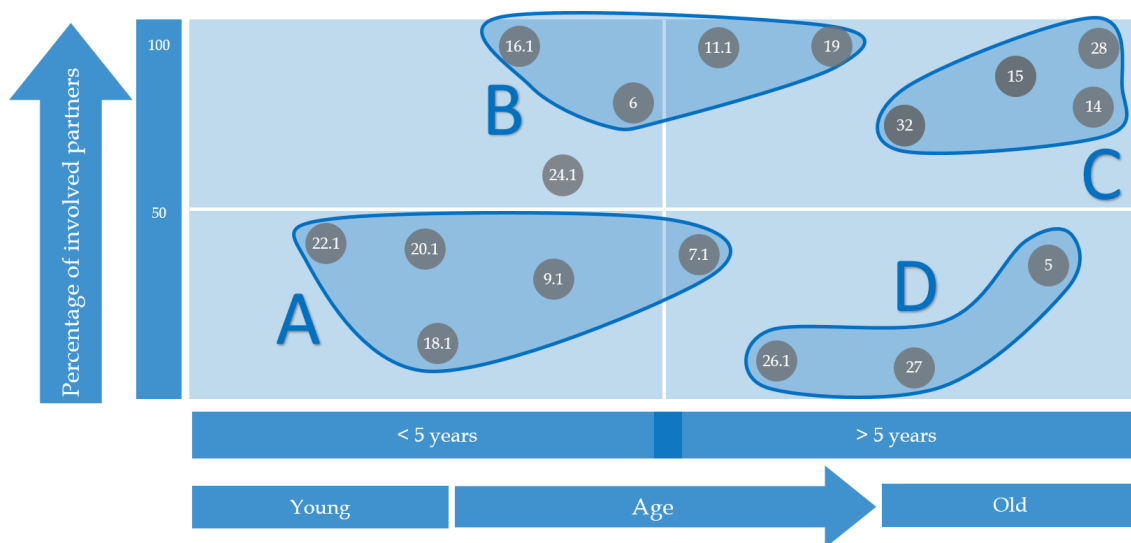


Figure G: Downstream Extranet maturity depending on the age

As in the previous case, the same four clusters could be identified:

- The A cluster called “in progress integrators” is composed by quite recent solution that by now have involved only some selected customers such as medium-small companies;
- The B cluster called “focused integration” is composed by Extranets which have reached a good level of integration even though some of them are quite young and which are mainly focused toward a capillary integration of a lot of small-medium customers, aiming at serving them throughout the national territory;
- The C cluster called “stable integration” is populated by historical Extranets, which represent a reference point for downstream solutions thanks to their high level of involvement as well as completeness in term of process coverage;
- The D cluster called “collaborative integration” contains Extranets which main goal is a collaborative one.

## **Benefits and criticalities**

Thereafter, the focus has moved toward the benefits and criticalities that companies have faced through the implementation of Extranets both from an internal and an external point of view. Regardless of upstream or downstream solution, almost all the companies which as implemented an Extranet, achieved a considerable level of efficiency and effectiveness, as well as a saving of the time previously dedicated to non-value added activities. For this reason, it is possible to classify them as the main “standard” benefits guaranteed when adopting an Extranet to accomplish task and daily activities compared to the traditional way.

Moreover, companies perceived further benefits such as enhanced an easier availability of documents, improved traceability and control and finally an increased loyalty of partner.

Concerning criticalities, the main element brought by interviewed companies, is related to the change management both from an internal and external point of view. Furthermore, digital projects of companies resulted to be slowed down by partners’ competences (not enough structured to welcome B2b digital solutions. Finally, two less diffused criticalities are related to the continuous and rapid development of the technology and security problems (intrinsic criticality related to the Internet).

## **Conclusion**

From the census analysis emerges that there are no industries with a particular peak of concentration of Extranets, since they seem to be quite homogeneously divided across different businesses. Furthermore, some business sectors strongly affect the goal and functionalities as well as the supported processes of the implemented solution. The fashion & clothing alongside the automotive are more collaborative oriented while there are some sectors constrained to adopt Extranets only in the pre-transactional phase (e.g. companies working on commission).

Another interesting point that emerges from this work is that Extranets can be used to support the long tail integration. It means than thanks to their flexibility and low adoption barriers, Web Portals are used to integrate small-medium actors which are not integrated with other technologies such as EDI, since the latter require high technological and structural skills which are owned only by few actors.

Moreover, it is possible to point out that the main benefits provided by Extranets are an increase of efficiency and effectiveness, both concerning internal activities and the external relationships with partners, as well as a saving of the time previously dedicated to non-value added activities. Finally, the most important criticality companies perceived in implementing a Web-based solution is the resistance toward change, both from an internal and external point of view, which is mainly due to difficulties in letting employees and supply chain partners understand the real benefits of digital solutions.

# Introduzione

Il seguente lavoro di laurea è stato svolto in collaborazione con l'“Osservatorio Fatturazione Elettronica e Dematerializzazione” della School of Management del Politecnico di Milano. La struttura si compone di una parte di analisi della letteratura e di una parte di analisi empirica successivamente divisa in studi di casi e mappatura di un censimento. Infine, si conclude con le note di sintesi emerse in seguito all'analisi critica degli studi di caso effettuati e del censimento. Tutti i risultati finali sono stati stesi cercando di rispondere agli obiettivi del lavoro.

## Quadro di riferimento

In un contesto economico come quello Italiano, caratterizzato dalla crisi economica, una delle tematiche su cui le aziende focalizzano maggiormente la loro attenzione è la digitalizzazione della filiera, in particolare l'integrazione elettronica con i partner della propria Supply Chain: eSupply Chain Management. In particolare quest'ultima rappresenta l'abilità degli attori della filiera di gestire automaticamente, i processi integrativi o collaborativi che coinvolgono un'azienda e i suoi principali partner, in modo da cogliere i vantaggi legati alla pianificazione e gestione dei processi in ottica di “azienda estesa” (Cagliano et al., 2009).

Un adeguato livello di integrazione e collaborazione consentirebbe alle aziende di ottenere significativi vantaggi in termini di riduzione dei costi e di miglioramento delle prestazioni, così come di trasparenza dei processi della Supply Chain e di nuove opportunità di business. Tutto ciò deve essere supportato dall'adozione di appropriate tecnologie. L'Information and Communication Technology (ICT) potrebbe giocare un ruolo molto importante, in quanto un suo utilizzo consapevole e strategico, non solo genererebbe benefici in termini di efficacia ed efficienza ma permetterebbe anche di ottenere un vantaggio competitivo fondamentale per la sopravvivenza del sistema nel lungo periodo.

Tuttavia, in questo contesto, l'Italia deve relazionarsi con la sua struttura industriale, unica al mondo: si contano quasi 5 milioni di imprese, di cui oltre il 95% sono classificate come micro imprese o individuali. Tale situazione comporta una sostanziale incapacità di investire in progetti strutturali. Da qui il desiderio di studiare Extranet: soluzioni tecnologiche versatili, scalabili e caratterizzati da basse barriere d'adozione.

## Analisi della letteratura

Per ottenere la base teorica necessaria e una corretta contestualizzazione dei fenomeni, è stata estremamente importante l'analisi della letteratura. In particolare l'analisi si è basata su diverse fonti legate ai temi di Supply Chain Management, con focus specifico sulla eSupply Chain

Management (ovvero eExecution e eCollaboration). Inoltre, sono state approfondite la fase di eProcurement e le Extranet.

### **Supply Chain Management**

Partendo dalla tematica della Supply Chain, sono state individuate le principali definizioni di Supply Chain Management, le ragioni che hanno dato vita a questo fenomeno e sono state anche descritte le sue caratteristiche più importanti.

La nascita del Supply Chain Management risale agli anni 80 e il “Council of Supply Chain Management Professionals” (CSCMP) la definisce come una pratica, che comprende la pianificazione e la gestione di tutte le attività coinvolte nel sourcing e procurement come anche tutte quelle relative alla logistica. Essa inoltre comprende anche il coordinamento e la collaborazione con i partner di filiera, che possono essere fornitori, intermediari o clienti.

### **eSupply Chain Management**

Le soluzioni di eSupply Chain (eSC), sono strumenti ICT-based a supporto della gestione automatizzata, integrata o collaborativa dei processi che coinvolgono un'azienda e i suoi principali partner, in modo da cogliere i vantaggi legati alla pianificazione e gestione dei processi in ottica di “azienda estesa” (Cagliano et al., 2009).

Secondo Bertelè et al., (2004), il eSupply Chain Management può essere diviso in due processi: (i) *eSupply Chain Execution*: integrazione e digitalizzazione del ciclo dell'Ordine, comprese le attività di logistica e amministrative (Perego et al., 2010); (ii) *eSupply Chain Collaboration*: condivisione elettronica di informazioni a supporto dei processi di pianificazione operativa e di sviluppo nuovi prodotti, al fine di migliorare l'efficienza dei processi attraverso la collaborazione nelle fasi di decision-making e di execution (Bertelè et al., 2004).

Un ulteriore macro processo, di notevole importanza è l'eProcurement, che solitamente ha luogo prima della fase transazionale. Questo concetto si riferisce all'uso di tecnologie digitali a supporto della relazione tra cliente e fornitore. Può essere considerato come un processo basato su protocolli Internet, in grado di supportare elettronicamente le fasi di richiesta, emissione dell'Ordine, approvazione di quest'ultimo e dei successivi processi contabili. (A.K. Pani et. al., 2007; Jose Maria Alvarez-Rodriguez et. al., 2014).

Le tecnologie IT possono essere applicate a diverse relazioni dando la possibilità di gestire in modo più efficiente i processi e migliorare il flusso di informazioni (Roberts and Mackay, 1998). Queste soluzioni possono essere classificati in: (i) *User to Application* (U2A), in gran parte legate alla Extranet che permettono la comunicazione tra acquirente e venditore utilizzando principalmente pagine e moduli Web; (ii) *Application to Application* (A2A) (ovvero sistemi proprietari, EDI tradizionale, EDI su Internet e soluzioni basate su XML), che consentono di

stabilire interazioni automatizzate tra i sistemi informativi delle aziende coinvolte nel rapporto B2B.

## **Extranet**

Coerentemente con gli obiettivi della tesi, è stato approfondito il tema delle Extranet, concentrandosi sulle sue definizioni, i processi supportati, le differenze con le tecnologie EDI così come i driver, le barriere e i principali benefici e criticità.

Le Extranet sono reti con accesso limitato (in base ai profili predefiniti) basate sulla tecnologia Internet il cui principale obiettivo è quello di supportare la gestione integrata e collaborativa dei processi interaziendali. Una Extranet consente lo scambio di risorse (applicazioni, database, informazioni, etc.), fornisce servizi e integra differenti processi (Balocco e Rangone, 2002).

## **Nota metodologica**

I principali obiettivi di questo lavoro sono:

- Raccogliere e analizzare dati sui principali progetti Extranet del nostro paese, mapparli in base a diversi parametri e compilare un censimento, con particolare attenzione alle soluzioni che supportano funzionalità di eSupply Chain Execution (Extranet transazionali), senza tuttavia tralasciare soluzioni improntate più su processi pre-transazionali;
- Stimare il livello di adozione e lo stato attuale delle soluzioni Extranet sul territorio italiano;
- Identificare e analizzare in modo approfondito alcune Extranet considerate rappresentative del panorama Italiano, al fine di stimare il grado di maturità così come il livello di penetrazione e di copertura dei processi;
- Identificare i driver principali, i benefici e le criticità che sono alla base dell'implementazioni di soluzioni Web-based.

Una volta definiti i principali obiettivi della ricerca, da un punto di vista metodologico, il lavoro è stato articolato in tre macro fasi: (i) *l'analisi della letteratura*; (ii) *analisi empirica*; (iii) *le note di sintesi*. In particolare, l'analisi empirica è stata condotta attraverso due differenti approcci: (a) *un censimento finalizzato alla mappatura dei principali progetti Extranet Italiani*; (b) *le interviste dirette*, effettuate in modo tale da approfondire il ruolo, lo stato e la maturità delle Extranet e creare poi dei casi di studio.

## **Analisi empirica**

L'analisi empirica è stata effettuata seguendo due approcci complementari: il completamento del censimento e le interviste dirette. In particolare, dal censimento è stato possibile identificare e



selezionare i casi più interessanti nonché quelli da approfondire; inoltre, le interviste dirette sono state fondamentali per raccogliere informazioni dettagliate, permettendo di aggiornare continuamente il censimento.

## Censimento

Durante la mappatura del censimento sono state individuate più di 750 Extranet e - in modo da effettuare ulteriori analisi - ne sono state selezionate 400 (secondo gli obiettivi del lavoro), classificandole come "Extranet transazionali" in quanto permettono lo scambio di almeno un documento relativo al ciclo dell'Ordine.

## Interviste

La seconda parte dell'analisi empirica è stata effettuata conducendo interviste dirette con manager di diverse aziende (principalmente i ICT manager); e da quest'ultime è stato possibile creare 32 studi di caso.

Company	Business sector	Company	Business sector
1 Aeroporti di Roma	Passengers transport	17 Hera	Utility
2 Artsana	Sanitary	18 Hilti	Building utensil
3 Autogrill	Food distributor	19 Intersport-Cisalfa	Sport & Clothing
4 Bayer	Pharmaceutical	20 Italtel	Telecommunication
5 BCUBE	Logistics	21 Leitner	Transport (ropeway technology)
6 Bionike	Pharmaceutical	22 Liu Jo	Fashion & Clothing
7 Bolton Group	Consumer goods	23 Maire Tecnimont	Engineering
8 BTicino	Electrical equipment	24 Matalsistem Sardegna	Services-commercial spaces' equipment
9 Chiesi Farmaceutici	Pharmaceutical	25 Moncler	Fashion & Clothing
10 Costa Crociere	Tourism	26 OTB	Fashion & Clothing
11 Dolce & Gabbana	Fashion & Clothing	27 Patrizia Pepe	Fashion & Clothing
12 ENI	Utility	28 Rhiag	Automotive
13 Ermenegildo Zegna	Fashion & Clothing	29 S.A.C.B.O.	Passengers transport
14 Esprinet	Information Technology	30 Sky	Television-Services
15 GoodYear Dunlop	Automotive	31 Tod's	Fashion & Clothing
16 Gruppo PAM	Retailing	32 Unico	Pharmaceutical

Tabella A: Il panel delle imprese

Infine, ogni caso di studio è stato strutturato secondo uno standard predefinito, in modo coerente con il questionario seguito durante le interviste. Questo ha permesso di ottenere un confronto più efficiente ed efficace tra i diversi casi analizzati.

## Note di sintesi

### Censimento

Durante la mappatura del censimento sono state individuate più di 750 Extranet e - in modo da attuare ulteriori analisi - ne sono state selezionate 400 (secondo gli obiettivi del lavoro), classificandole come "Extranet transazionali".

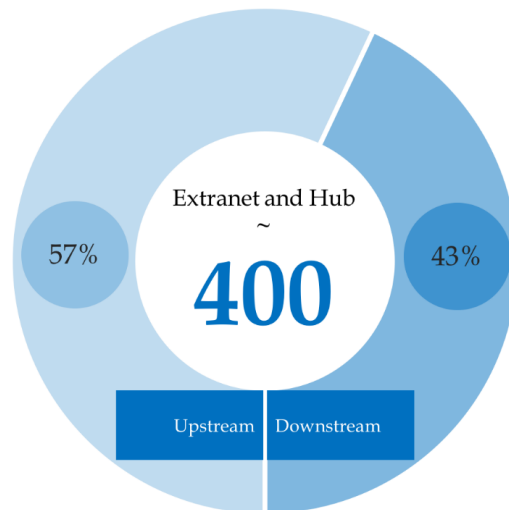


Figura A: Selezione delle Extranet

Le 400 Extranet transazionali, sono state implementate principalmente dai leader della Supply Chain, e coinvolgono circa 100.000 aziende, comprese piccole-medie (PMI) e micro imprese. In particolare queste soluzioni coinvolgono, il 43% delle 4.500 grandi imprese, il 24% delle 250.000 piccole-medie imprese e il 0,6% delle 4,7 milioni di micro imprese. Quindi, le Extranet, essendo soluzioni molto flessibili e versatili, con moderate barriere all'entrata (soprattutto in termini di costi), sono in grado di coinvolgere anche aziende con risorse e competenze digitali limitate.

Infine sono stati individuati due principali scenari:

- Il 18% delle soluzioni di eSourcing e eProcurement hanno aumentato le proprie funzionalità, estendendosi oltre la fase pre-transazionale e includendo lo scambio di documenti legati al ciclo dell'Ordine;
- Le Extranet collaborative che hanno migliorato le proprie funzionalità o ne hanno aggiunte di nuove sono aumentate del 12%.

### Panel delle imprese

Il panel è composto da 32 imprese, appartenenti a 20 diversi settori di business.

È possibile classificare il set di imprese tramite un asse che rappresenta la loro dimensione. In particolare, tale asse è stato costruito attraverso una matrice che tiene in considerazione da una parte il numero di dipendenti, mentre dall'altra il fatturato delle imprese stesse (€).

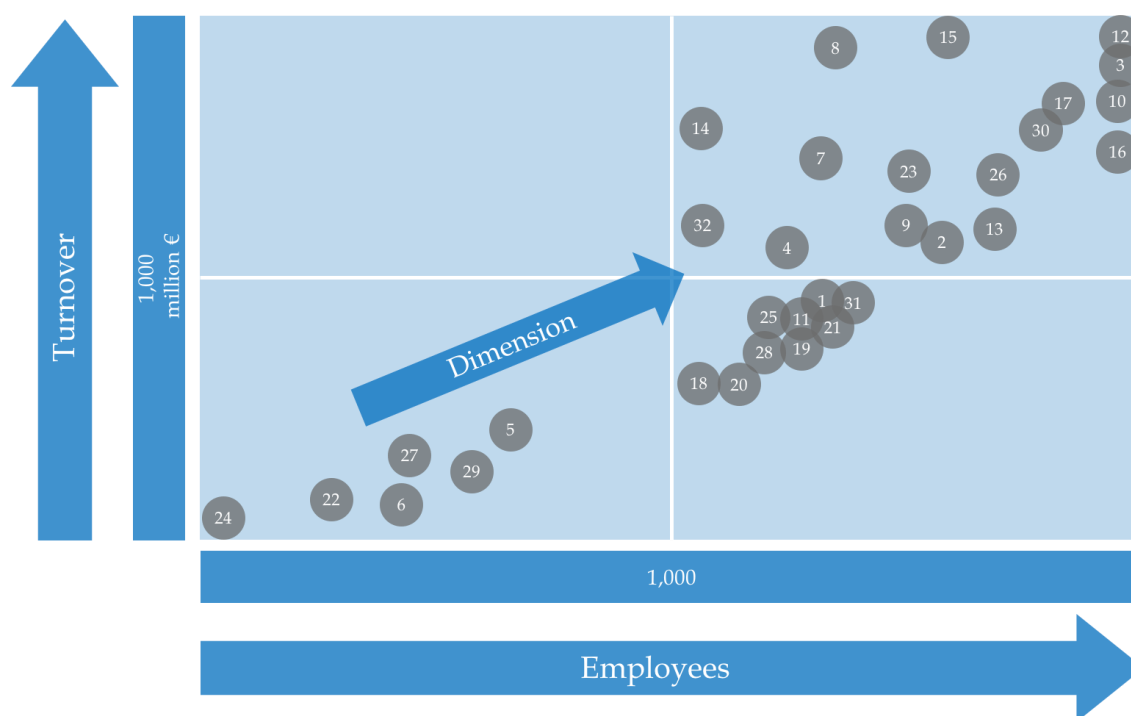


Figura B: Dimensione delle imprese

Inoltre, è possibile classificare le imprese in base all'orientamento della soluzione implementata, differenziando, dunque, tra Extranet a monte e a valle. In dettaglio, si può osservare come le imprese non siano uniformemente distribuite da questo punto di vista, bensì, sono maggiormente orientate verso l'adozione di una Extranet a monte. In particolare:

- 15 imprese (45%) hanno implementato solamente un Portale Web a monte;
- 9 imprese (28%) hanno implementato una Extranet sia per clienti che per fornitori;
- 8 imprese (25%) hanno implementato solamente un Portale Web a valle.

Inoltre, dato che alcune delle imprese intervistate hanno implementato più di una soluzione Web-based, l'analisi porta come risultato finale 45 Extranet, di cui 28 (62%) a monte, mentre 17 (38%) a valle.

Un'ulteriore classificazione è stata utilizzata per comprendere eventuali correlazioni tra i settori di mercato e la tendenza delle imprese ad implementare Portali Web a monte oppure a valle. A tal proposito, è stata adottata una matrice che mostri lungo il primo asse "l'orientamento della soluzione" (a monte o a valle), mentre sul secondo asse dei "macro-settori". Inoltre, dato che è graficamente sconveniente rappresentare 20 settori, questi sono stati aggregati in tre macro aree (Manufacturing, Service e Distribution).

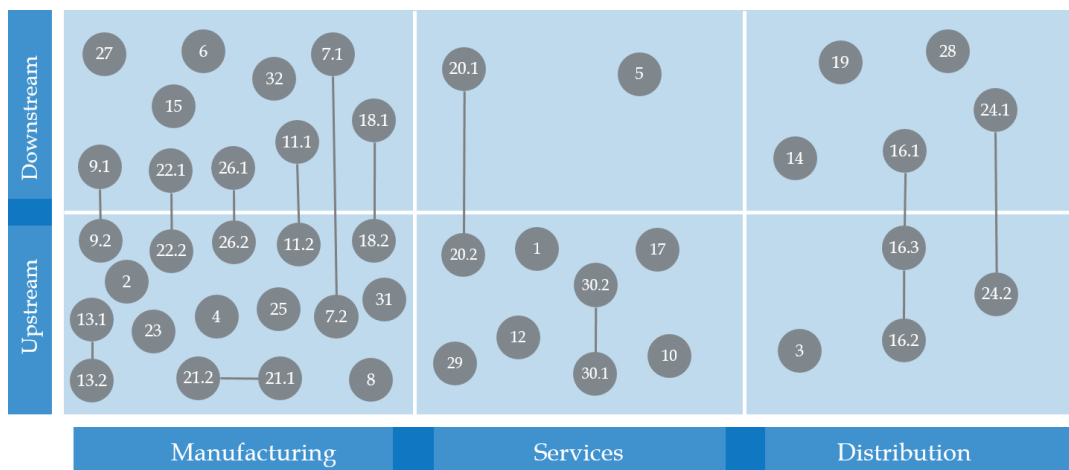


Figura C: Extranet per macro area

Dalla matrice sopra mostrata, si evince come la maggior parte delle soluzioni siano state implementate dalla macro area manifatturiera (58%) (le imprese di tale area tuttavia sono state intervistate in numero maggiore, quindi i dati mostrati non hanno evidenza statistica). Inoltre, i punti nella matrice sono ben distribuiti (in termini di orientamento della soluzione) sia per quanto riguarda l'area manifatturiera sia per quella di distribuzione. Contrariamente invece, per i fornitori di servizi esiste una maggiore propensione verso le soluzioni Extranet a monte.

### Penetrazione delle Extranet

La penetrazione delle Extranet è stata assunta come l'abilità della soluzione (e dunque della relativa impresa) di essere estesa verso la maggior parte delle categorie di partner e, allo stesso tempo, di coinvolgere il più possibile gli attori target. Per meglio comprendere tale penetrazione, è stata adottata una matrice (sia per le soluzioni a monte sia per quelle a valle), che mostra nell'asse "x" il numero di categorie di partner (clienti o fornitori) impattati dalla soluzione; in particolare, verranno classificati come "all" (se la soluzione è usata per relazioni con tutte le categorie di partner) oppure "some" (se il Portale Web è usato per relazioni con solo parte delle categorie di partner dell'impresa). La seconda dimensione, rappresenta sull'asse "y" la percentuale di partner coinvolti per le categorie selezionate e non del totale dei partner dell'impresa.

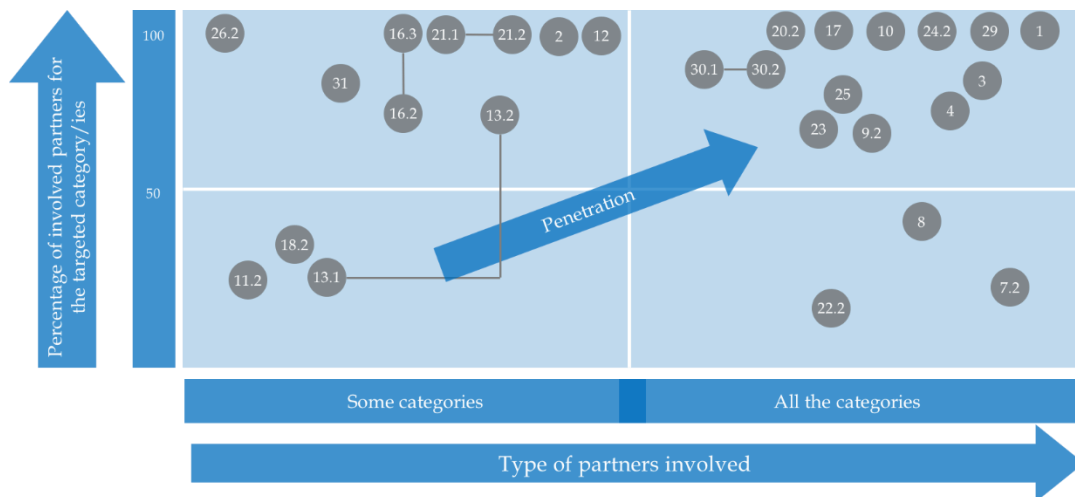


Figura D: Penetrazione delle Extranet a monte

Tramite l'analisi della matrice, emerge che i punti non sono uniformemente distribuiti, bensì che la maggior parte di essi (77%) si posiziona nella parte alta della matrice stessa. Ciò significa che le imprese riescono in maniera sostanzialmente corretta ad integrare, tramite la soluzione Web-based, i fornitori target. Un'ulteriore importante aspetto da mostrare è che il 40% delle imprese coinvolge attraverso le Extranet solo una parte della totalità di fornitori. Tuttavia, durante le interviste è emerso come questo aspetto (nella maggior parte dei casi) sia il risultato di una scelta strategica e non una mancanza imputabile alla soluzione stessa o alle scarse capacità dell'impresa di integrare i propri partner di filiera. In particolare, può dipendere sia dal fatto che la Extranet non sia adeguata o conveniente per alcune categorie di fornitori, oppure dal fatto che alcuni partner vengono integrati tramite altre tecnologie quali L'EDI.

Inoltre, nella parte bassa della matrice potrebbe sembrare che le soluzioni non abbiano avuto il successo previsto dato che le relative imprese non sono state in grado di integrare una parte significativa dei fornitori target. Tuttavia, le reali ragioni riscontrate sono: (i) scelte strategiche (vengono scelti partner Pareto ottimali), (ii) pochi partner appartenenti ad un'unica categoria, ciononostante contando una parte significativa dei volumi di business, (iii) soluzione appena implementata, (iv) l'impresa ha riscontrato difficoltà relative alla natura piccola e artigianale di alcuni fornitori. Coerentemente, la figura sottostante mostra la situazione a valle.

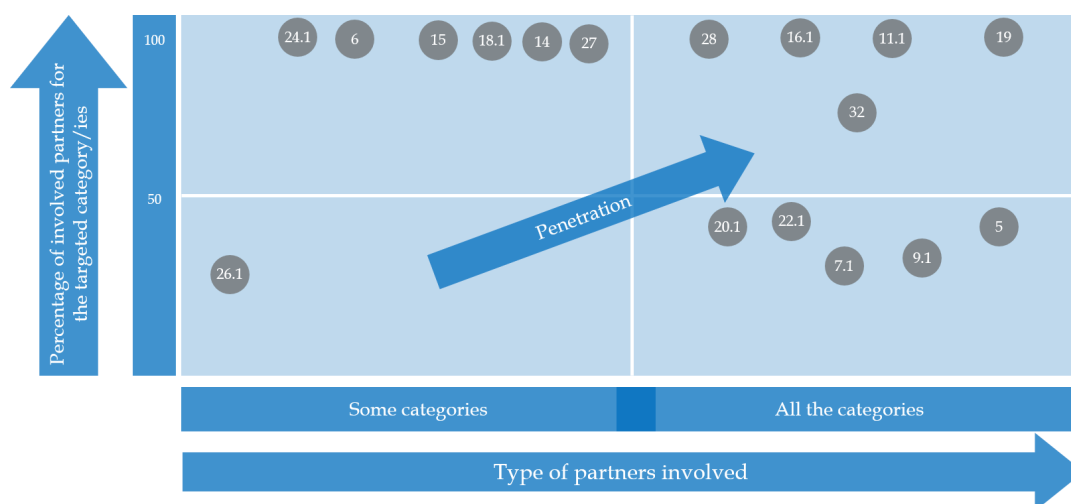


Figura E: Penetrazione delle Extranet a valle

In maniera simile rispetto alla figura a monte, la parte alta della matrice è la più popolata (65%) e circa il 40% delle Extranet coinvolge solamente alcune categorie di partner. Per quanto riguarda invece la parte bassa della matrice, ci sono differenti ragioni che giustificano il basso coinvolgimento degli attori di filiera (scelte strategiche, canali paralleli come l'EDI, scarso livello di competenze dei partner e resistenze).

### Focus sui processi

In maniera tale da avere una descrizione esauriente, è stata adottata una mappa che mostri in maniera dettagliata la copertura dei processi. In particolare, per quanto concerne i quelli supportati dalle Extranet a monte, il 50% delle imprese analizzate supporta almeno due processi; inoltre tra le restanti 50% che ne supportano solo uno, la maggior parte ha implementato soluzioni pre-transazionali (50%) o collaborative (33%).

I processi maggiormente supportati sono quelli pre-transazionali (58% delle imprese) seguiti da quelli transazionali (50% delle imprese) ed infine quelli collaborativi (46% delle imprese).

Per quanto riguarda invece la situazione a valle, emerge come il 76% delle imprese supporti attraverso la propria Extranet - differentemente rispetto a quanto accade a monte (50%) - almeno una sotto-fase del processo transazionale. In maniera simile, risulta che il 65% delle imprese supporta processi collaborativi con i propri clienti, contrariamente al solo 33% con i fornitori. Pertanto, basandosi su questi dati, è possibile affermare che le Extranet a valle sono più orientate verso l'eExecution e eCollaboration rispetto a quelle a monte.

### Maturità delle Extranet

Al fine di comprendere la maturità delle soluzioni, i portali Web sono stati ulteriormente mappati in base ai partner coinvolti (asse "y") e all'età della soluzione (asse "x"). La figura seguente, mostra la situazione a monte.

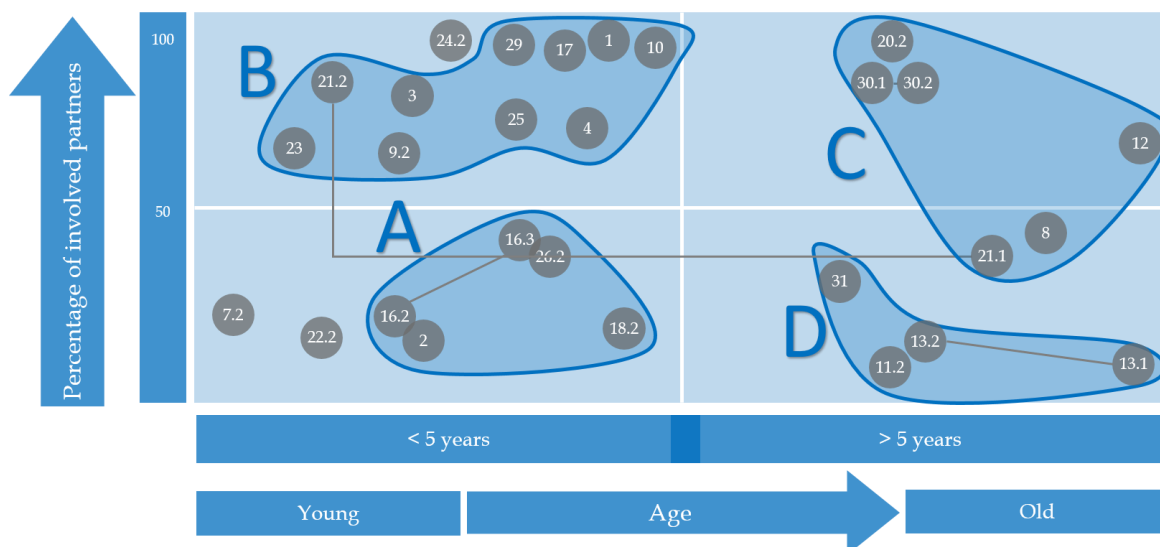


Figura F: Maturità delle Extranet a monte in base all'età

Analizzando la matrice, è possibile raggruppare le imprese in quattro cluster:

- Il cluster A, chiamato “in progress integrators” è popolato da soluzioni abbastanza giovani, dove le relative imprese hanno deciso di integrare solamente una determinata parte di attori;
- Il cluster B, chiamato “focused integrations”, include Extranet giovani e maggiormente focalizzate nella fase pre-transazionale;
- Il cluster C, chiamato “stable integration”, è composto da Extranet che, operando da più di 5 anni, hanno raggiunto un livello stabile di integrazione e rappresentano dei punti di riferimento storici per la Supply Chain di appartenenza;
- Il cluster D, chiamato “collaborative solutions”, è popolato da soluzioni che mostrano caratteristiche maggiormente collaborative.

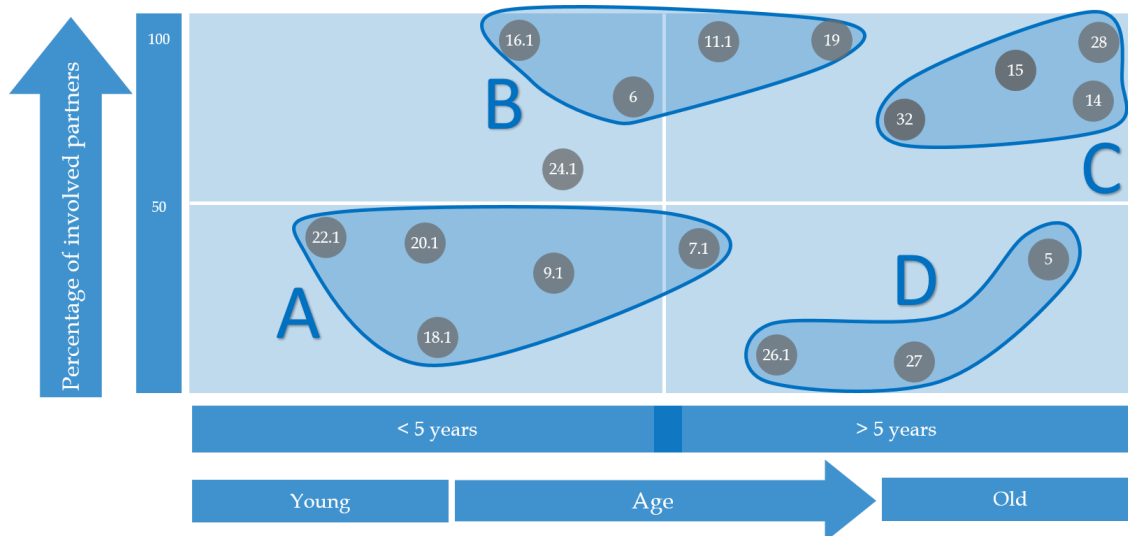


Figura G: Maturità delle Extranet a valle in base all'età

Per quanto riguarda la situazione a valle, sono stati identificati gli stessi quattro cluster:

- Il cluster A, chiamato “in progress integrators” è popolato da soluzioni abbastanza giovani che, per adesso hanno coinvolto solamente poche categorie scelte di clienti come piccole-medie imprese;
- Il cluster B, chiamato “focused integrations”, include Extranet che hanno raggiunto un buon livello di integrazione, sebbene alcune di queste siano abbastanza giovani e più focalizzate verso una diffusione capillare composta da molti piccoli-medi clienti da servire all’interno del paese.
- Il cluster C, chiamato “stable integration”, è composto da Extranet storiche che rappresentano un punto di riferimento per le soluzioni a valle grazie al loro alto livello di coinvolgimento e completezza in termini di copertura dei processi;
- Il cluster D, chiamato “collaborative solutions”, è popolato da soluzioni che mostrano caratteristiche maggiormente collaborative.

### **Benefici e criticità**

Il focus è stato successivamente spostato verso i benefici e le criticità che le imprese hanno dovuto e stanno tutt’ora affrontando relativamente all’implementazione delle Extranet, sia da un punto di vista interno che esterno. Indipendentemente da soluzioni a monte o a valle, quasi tutte le imprese intervistate hanno raggiunto un considerevole livello di efficienza ed efficacia relativamente all’implementazione di una Extranet, come anche un risparmio di tempo precedentemente dedicato ad attività non a valore aggiunto. Per questa ragione, è possibile classificare questi ultimi come i benefici “standard” garantiti con l’adozione di una Extranet rispetto alle soluzioni tradizionali. Inoltre le imprese hanno percepito come ulteriori benefici, una migliorata disponibilità dei documenti, una maggiore tracciabilità e controllo ed infine una più elevata fedeltà dei partner.

Per quanto riguarda invece le criticità, il principale elemento che le imprese intervistate hanno portato è relativo al cambiamento, da un punto di vista sia interno che esterno. Inoltre, i progetti digitali delle imprese risultano rallentati da una mancanza di competenze specifiche dei partner di filiera (non abbastanza strutturati da accogliere soluzioni digitali B2b). Infine, due criticità meno diffuse riguardano il continuo e rapido sviluppo delle tecnologie come anche problemi di sicurezza (caratteristica intrinseca di Internet).

### **Conclusioni**

Dall’analisi del censimento, è emerso come non ci siano settori con un particolare picco di concentrazione delle Extranet, dato che queste sembrano essere distribuite abbastanza omogeneamente nei diversi business.



Inoltre, alcuni settori influenzano fortemente gli obiettivi e le funzionalità come anche i processi supportati delle soluzioni implementate. Il settore del fashion insieme a quello dell'automotive sono ad esempio più collaborativi, mentre ci sono altri settori vincolati ad adottare Extranet solo relativamente alla fase pre-transazionale (imprese che lavorano su commissione).

Un altro aspetto rilevante che emerge da questo lavoro, è che le Extranet possono essere usate per supportare l'integrazione della coda lunga. Infatti, grazie alla loro flessibilità e poche barriere all'adozione, i Portali Web vengono utilizzati per integrare piccoli e medi attori, non in grado di gestire altre tecnologie quali l'EDI, in quanto richiedono competenze tecnologiche e strutturali spesso non possedute.

Inoltre, è possibile far notare come il maggior beneficio relativo all'implementazione di una Extranet è un miglioramento generale sia dell'efficienza che dell'efficacia, per quanto riguarda sia le attività interne che le relazioni esterne con i partner, come anche un risparmio di tempo precedentemente dedicato ad attività non a valore aggiunto.

Infine, la principale criticità che le imprese intervistate hanno percepito nell'implementazione di una Extranet è relativa alle resistenze al cambiamento, sia interne che esterne. Queste, riguardano prevalentemente la difficoltà nel far comprendere i reali benefici delle soluzioni digitali, sia ai lavoratori, sia ai partner di filiera.



# Chapter 1: Literature review

## 1.1 Supply Chain

The Supply Chain Council (SCC) define Supply Chain as the network created amongst different companies producing, handling and/or distributing a specific product. Specifically, the Supply Chain encompasses the steps it takes to get a good or service from the supplier to the customer. This theme has been widely discussed and different definitions of Supply Chain could be found in literature.

Christopher, 1992	<i>A Supply Chain is the network of organizations that are involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services delivered to the ultimate consumer.</i>
La Londe and Masters, 1994	<i>A set of firms which pass these materials forward can be referred to as a Supply Chain. Normally, several independent firms, are involved in manufacturing a product and placing it in the hands of the end user: raw material and component producers, product assemblers, wholesalers, retailer merchants and transportation companies are all members of a Supply Chain.</i>
Lambert, Stock, and Ellram, 1998	<i>A Supply Chain is defined as the alignment of firms that brings products or services to market.</i>
Mentzer et al., 2001	<i>A Supply Chain is defined as a set of three or more entities (organizations or individuals) directly involved in the upstream and downstream flows of products, services, finances, and/or information from a source to a customer.</i>
Mahesh S. Raisinghani, 2009	<i>A network of facilities and distribution options that performs the functions of procurement of materials, transformation of these materials into intermediate and finished products, and the distribution of these finished products to customers.</i>
Juzhi Zhang, Erfeng Zhou, Qinglong and Susan Li, 2014	<i>A system of organizations, people, technology, activities, information and resources involved in moving a product or service from supplier to customer.</i>

Table 1: Supply Chain definitions

Despite some small differences, every definition assume that final consumer is considered a member of the Supply Chain and that any one organization can be part of numerous Supply Chains (Mentzer et al., 2001). Moreover, it is important to realize that implicit within these

definitions is the fact that Supply Chains exist whether they are managed or not (Mentzer et al., 2001).

Nowadays Supply Chain's topic has acquired great importance because the contest in which companies operate has changed a lot in the last decades: business actors have to face with an increased competition, globalization, several technological changes, and more demanding customers. Companies will no longer compete against other companies, but Supply Chains will compete against other Supply Chains for market supremacy (Fawcett and Magnam, 2002).

This changing process has started in the 80', when the economic downturn encourages investments in Supply Chain initiatives that generate short-term gains - for shareholders - using ROI as a key performance indicator (Grey et al., 2005). The drive to increase shareholder value did lead to focus on core business and pushed companies to continuously assess outsourcing opportunities (Heikkila and Cordon, 2002). This phenomenon has been proved in 1991 by a study of "The Outsourcing Institute" on 1.200 USA's companies, aiming at finding out motivations beyond outsourcing. The main results were so resumed by Venturini (1998):

- difficulties in the management or control of a business functions;
- lack of specific skills within the company;
- reducing operating costs, thanks to increase the share of variable costs over fixed ones;
- increased flexibility and risk distribution to multiple actors;
- exploitation of the greater specialization of the provider;
- improvement of some KPIs such as ROI;

At the same time different trend affect global economy and highlight the importance of Supply Chain:

- Growth of international specialization: a business area focuses on the production of a limited scope of products or services in order to gain greater degrees of productive efficiency within the entire system (Antràs and Helpman, 2004);
- Global sourcing: the practice of sourcing from the global market for goods and services across geopolitical boundaries aiming at exploiting global efficiencies (P. K. Vasudeva, 2011);
- Emphasis on time and quality-based competition: getting a defect-free product to the customer faster and more reliably than the competition is no longer seen as a competitive advantage, but a simple requirement by the market (Mentzer et al., 2001);
- Marketplace uncertainty: global orientation and increased performance-based competition, combined with rapidly changing technology and economic conditions,

contributed to increase marketplace uncertainty. This uncertainty requires greater flexibility both in the company and in the Supply Chain (Mentzer et al., 2001).

According to this changing scenario, Mentzer et al. (2001) identify three degrees of Supply Chain complexity, from a simpler one to a complex chain which represent the actual trend:

- Direct Supply Chain: it consists of a company, a supplier and a direct customer involved in the flow of products, services, finances or information;



Figure 1: Direct Supply Chain (Mentzer et al.,2001)

- Extended Supply Chain: it includes in the chain the suppliers of the direct supplier and the customer of the immediate customer. All these actors are involved in the flows;

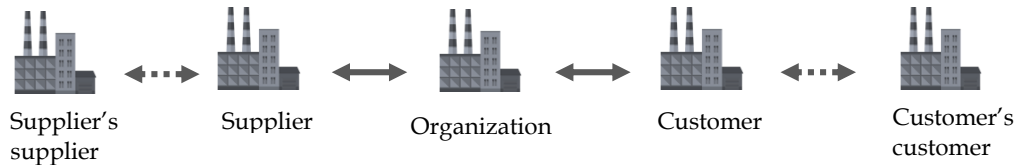


Figure 2: Extended Supply Chain (Mentzer et al.,2001)

- Ultimate Supply Chain: it includes all the organizations and entities involved in the flows, from the ultimate supplier to the ultimate customer;

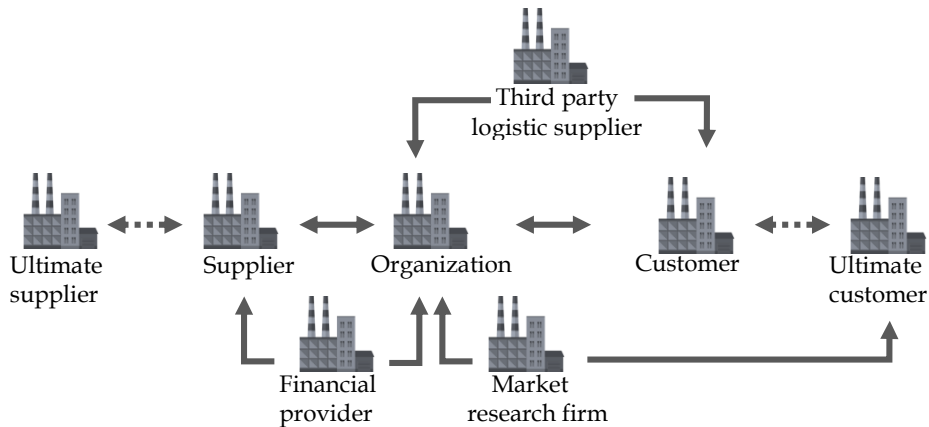


Figure 3: Ultimate Supply Chain (Mentzer et al.,2001)

## 1.2 Supply Chain Management

### 1.2.1 Definitions and framework

According to the above, Supply Chain is considered a strategic leverage, therefore a means by which a competitive advantage could be build and sustained in the long run (Webb, 2007). Consequently, aiming at improving long-term performance of individual companies and entire

Supply Chain, Supply Chain Management (SCM) acquires great importance (Mentzer et al., 2001). The Council of Supply Chain Management Professionals (CSCMP) defines the concept of Supply Chain Management as a practice which encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third party service providers, and customers. In essence, Supply Chain management integrates supply and demand management within and across companies.

Despite SCM has been subject of studies for more than 30 years, a unique definition is still matter of discussion and it is possible to define SCM according to three different approaches (Mentzer et al., 2001):

- SCM as a Management Philosophy: as a philosophy, SCM takes a systems approach to view the Supply Chain as a single entity, rather than as a set of fragmented parts, each performing its own function (Ellram and Cooper, 1990; Houlihan, 1988; Tyndall et al., 1998). In other words, the philosophy of Supply Chain management extends the concept of partnerships into a multi-firm effort to manage the total flow of goods from the supplier to the ultimate customer (Ellram, 1990; Jones and Riley, 1985);
- SCM as a Set of Activities to Implement a Management Philosophy: in adopting a Supply Chain Management philosophy, firms must establish management practices that permit them to act or behave consistently with the philosophy (Mentzer et al., 2001);

<b>Set of activities by Mentzer et al. (2001)</b>
<i>1. Integrated Behavior</i>
<i>2. Mutually Sharing Information</i>
<i>3. Mutually Sharing Risks and Rewards</i>
<i>4. Cooperation</i>
<i>5. Integration of Processes</i>
<i>6. Partners to Build and Maintain Long-Term Relationships</i>
<i>7. The Same Goal and the Same Focus on Serving Customers</i>

Table 2: Set of activities by Mentzer et al. (2001)

- SCM as a Set of Management Processes: SCM is the process of managing relationships, information, and materials flow across enterprise borders to deliver enhanced customer service and economic value through synchronized management of the flow of physical goods and associated information from sourcing to consumption (La Londe and Masters, 1994). Looking at processes is also useful to consider the SCOR (Supply Chain Operations Reference) model, developed by Supply Chain Council (SCC) which define SCM as a

process-oriented approach (P. Metz, 1998). It is a management tool that describes the entire process from the supplier's supplier to the customer's customer, allowing to describe business activities, in order to satisfy customer demand. In particular, SCOR identifies five main business processes (Sianesi and Spina, 2011): plan, source, make, deliver and return. These latter four are execution-type processes, triggered by the plan process or by customer Orders (Sianesi and Spina, 2011). Focusing on planning, this process - that is traditionally carried out by each company independently - thanks to SCM adoption, takes place in a collaborative and optimized way with the participation of all SC actors.

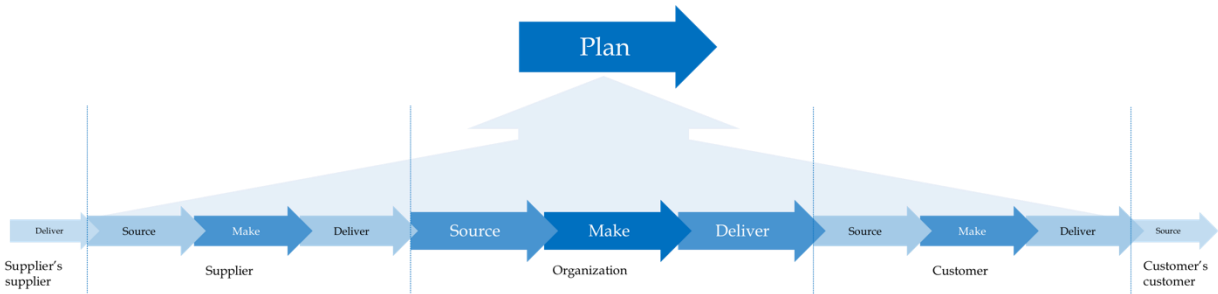


Figure 4: The main management processes of the SCOR model (Sianesi, Spina, 2011)

The table below summarize the relevant Supply Chain Management wordings:

<p>Stevens, 1989</p>	<p><i>The objective of managing the Supply Chain is to synchronize the requirements of the customer with the flow of materials from suppliers in order to effect a balance between what are often seen as conflicting goals of high customer service, low inventory management, and low unit cost</i></p>
<p>La Londe and Masters, 1994</p>	<p><i>Supply Chain strategy includes: "... two or more firms in a Supply Chain entering into a long-term agreement; ... the development of trust and commitment to the relationship; ... the integration of logistics activities involving the sharing of demand and sales data; ... the potential for a shift in the locus of control of the logistics process."</i></p>
<p>Cooper et al., 1997</p>	<p><i>Supply Chain management is "... an integrative philosophy to manage the total flow of a distribution channel from supplier to the ultimate user."</i></p>
<p>Monczka, Trent, and Handfield, 1998</p>	<p><i>SCM requires traditionally separate materials functions to report to an executive responsible for coordinating the entire materials process, and also requires joint relationships with suppliers across multiple tiers. SCM is a concept, "whose primary objective is to integrate and manage the sourcing, flow, and control of materials using a total systems perspective across multiple functions and multiple tiers of suppliers."</i></p>

Mentzer et al., 2001	<i>SCM is the systemic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the Supply Chain, for the purposes of improving the long-term performance of the individual companies and the Supply Chain as a whole</i>
Levi, Kamansky, and Levi, 2005	<i>SCM is a series of approaches to effectively integrate suppliers, manufacturers, warehouses and stores, so that merchandise is produced and distributed in the right quantities, at the correct location and at the right time, so as to minimize the overall cost of the system by meeting the service level requirements</i>

Table 3: Supply Chain Management definitions

## 1.2.2 Benefits and Criticalities

Once the definition is clear, it is useful to highlight the main results coming from SCM, the barriers and ways in order to overcome these latter.

According to Mainardi et al. (1999), Gryna (2001), Jacobs (2004), Mentzer et al. (2001) SCM is known to bring substantial benefits if effectively implemented, of which the most important are:

- Savings on inventories carrying and other logistics costs;
- Improved quality of the services provided, such as the ability to meet customer requests;
- Increased company productivity and profitability, included employees' productivity;
- Reduced risks;
- Improved cash flow cycle time;
- Reduce purchasing price.

Fawcett, et al. (2008) and, Sheridan and Leibs (1999) pointed out a series of barriers that hinder SCM adoption:

- Lack of top management support;
- Non-aligned strategic and operating philosophies;
- Inability or unwillingness to share information;
- Lack of trust among Supply Chain members;
- Unwillingness to share risk and rewards;
- Inflexible organizational system and processes;
- Cross-functional conflicts and "turf" protection;
- Inadequate performance measures;
- Resistance to change;



- Lack of training for new mindsets and skills.

In its work Fawcett (2008) also identified a series of bridges that implemented in the right way, help companies to overcome barriers and capitalize benefits:

- Alignment mechanisms;
- Performance measurement;
- Alliance design;
- People empowerment;
- Information system;
- Cross-functional process change.

### 1.2.3 Models

After a literature review, it is possible to state that SCM was born from the necessity to coordinate several business partners, internal corporate departments, business processes and diverse customers across the Supply Chain, (Turban et al., 2011). This coordination is at the core of gaining competitive advantage (Farhoomand, 2005). Following these concepts and aiming at giving them a formal structure Mentzer et al. (2001) developed its model that represents SCM as a pipeline, showing directional Supply Chain flows (products, services, financial resources, the information associated with these flows, and the informational flows of demand and forecasts). The traditional business functions of marketing, sales, research and development, forecasting, production, procurement, logistics, information technology, finance, and customer service, manage and accomplish these flows from the supplier's suppliers through the customer's customers to ultimately provide value and satisfy the customer (Mentzer et al. 2001).

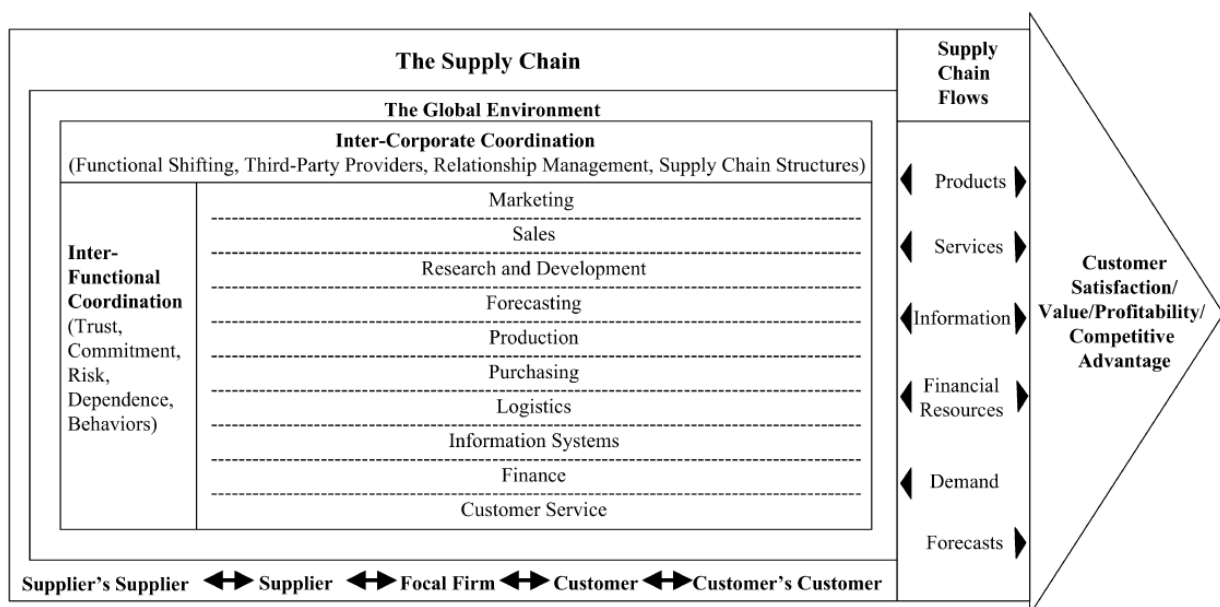


Figure 5: Supply Chain Management model (Mentzer et al.,2001)

The model should serve as a guide and reminder to practitioners to include all the typical business functions in Supply Chain management planning, organization, and processes. Without such inter-functional coordination, Supply Chain management cannot achieve its full potential. The same can be said for including all the Supply Chain flows in any Supply Chain management planning, organization, or process (Mentzer et al. 2001). Moreover, it suggests that SCM succeeds if all the members of the Supply Chain have the same goal and the same focus on serving customers (La Londe and Masters, 1994) for this reason SCM requires partners to build and maintain long-term relationships (Cooper et al., 1997; Ellram and Cooper, 1990; Tyndall et al., 1998).

## **1.3 eSupply Chain Management**

### **1.3.1 Overview**

#### ***1.3.1.1 Definitions and framework***

As it has been clarified in the previous chapters, at the core of gaining competitive advantage through SCM, there is integration (Palma-Mendoza, 2014), mutually sharing information (Cooper et al., 1997; Tyndall et al. 1998), mutual trust (Gunasekaran and Ngai, 2004), cooperation among the Supply Chain members (Ellram and Cooper, 1990; Tyndall et al., 1998), coordinate planning and control (Cooper et al. 1997; Dowst, 1988) and collaboration on new product development and product portfolio decisions (Drozdowski, 1986). In order to do that companies have turned their attention to e-business technologies (Auramo et al., 2002; Cagliano et al., 2003; Chen and Holsapple, 2012; Wiengarten et al., 2013).

In a growing virtualization context, the results of leader companies depend on their ability to manage complex ecosystems without having direct control. In such a scenario become fundamental the eSupply Chain solutions (eSC), or rather ICT-based tools to automatically support, executional or collaborative processes, which involve a company and its main partners, in order to reach the benefits of planning and process management from the perspective of "extended enterprise" (Cagliano, 2009). In particular, the proliferation of the internet offers news solutions and facilitate integration (Lee, 2001; Deeter-Schmeltz, 2003; Ronchi, 2003; Power, 2005; Croom, 2005; Michelino 2008; Gunasekaran and Ngai, 2008; Koh et al., 2008; Bayraktar et al., 2008).

#### ***1.3.1.2 Benefits and criticalities***

According to literature advances in information technology (IT) have enabled the coordination and collaboration that underlie today's SCM strategies (Cachon and Fisher, 1997; Waller et al., 1999; Frohlich and Westbrook, 2001; Fawcett et al., 2007) and in particular, eSCM seems to

provide different benefits (Hammer, 1990; Kurt Salmon Associates Inc., 1993; Anand and Mendelson, 1997; Clark and Hammond, 1997; Lee et al., 1997; Lee and Whang, 2000; Li, 2000; Hult et al., 2004; Kulp et al., 2004; Cai et al., 2006; Shah and Shin, 2007):

- Shorter lead-times;
- Smaller batch sizes;
- Reduced inventory levels;
- Faster new product design;
- Shorter Order fulfillment cycles;
- Improved coordination in Supply Chain activities;
- Improved operations, and firm performance.

What so far expressed can be found also in other works: the introduction of ICT tools has enabled many companies to achieve significant competitive advantages in terms of reduction of relational and transactional costs, improving the response capacity and, therefore, services and customer satisfaction (Sohal et al., 2001; Chou et al., 2004; Chong et al., 2009). ICT solutions enable to mitigate the tradeoff between efficiency and effectiveness: on one hand they allow a costs reduction, on the other, thanks to SC coordination, they guarantee a better service level (Mecker, 1999; William, 2004).

Looking at eSCM barriers they can be split into external and internal barriers (Capgemini Consulting and GT Nexus, 2016) and each one of them can in turn be divided into:

- Lack of the required skills across their workforce (Capgemini Consulting and GT Nexus, 2016);
- Difficulties in change management, mainly due to culture (Emmelhainz, 1993; Iskandar et al., 2001; Jimenez-Martinez and Polo-Redondo, 2004; Perego et al., 2008; Becker, 2008; Iyer et al., 2009);
- Unclear or hardly measurable benefits, that represent the main problem for companies that have not yet adopted technologies (Emmelhainz, 1993; Iskandar et al., 2001; Jimenez-Martinez and Polo-Redondo, 2004; Perego et al., 2008; Becker, 2008; Iyer et al., 2009; Perego and Salgaro 2010; Capgemini Consulting and GT Nexus, 2016).

### **1.3.1.3 Models**

Taking into account all these observations it could seem natural to look at ICT as the final solution to solve the management complexity of the Supply Chain, but they have to be considered only as enablers of benefits. These latter in fact, depend on technical, organizational and managerial

aspects (Chandrashekar and Sahry, 1999; Michelino, 2008), and a strong commitment at every level, as well as change management campaign must be adopted (Vlosky and Kallioranta, 2004). As a matter of fact, ICT has just to be considered a means of business strategy, able to change relationships, boundaries and internal influences the Supply Chain (Porter, 2001). Efforts to integrate with customers and suppliers must still be supported by a strategic and holistic view of the Supply Chain (Vlosky and Kallioranta, 2004; Power, 2005), tools alone are not sufficient; it is necessary to undertake organizational and technological changes together with a co-alignment in structure, management processes, strategy, technology and individuals/roles for successful e-business adoption (Chen and Ching, 2002; Palma-Mendoza, 2014).

According to Michelino (2008), Supply Chain Management supported by ICT technologies (eSCM) is tightly due to the interaction of three different aspects:

- Supply Chain Management processes;
- Inter-firm relationships governance;
- ICT based tools.

These three aspects cannot be thought one apart from the other (Michelino, 2008). The main idea is that technologies have to be considered just as enablers operating together with organizational, relational and human resources. In fact, it is important to underline that benefits cannot be achieved only through technologies adoption, being the result of a number of different technical and managerial issues (Power, 2005; Michelino, 2008; Palma-Mendoza, 2014).

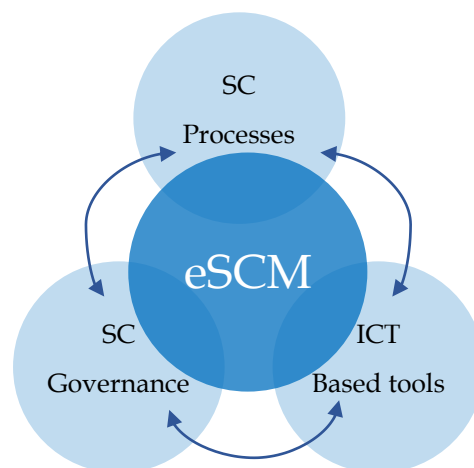


Figure 6: eSupply Chain Management elements (Michelino, 2008)

Even Cagliano (2009) underlines this concept: it can be said that the efficiency and effectiveness of eSCM depend on the consistency between the characteristics of the environment in which the integrated actors operate and the way in which the relationship of those actors are managed. Relationship management is based in turn on three key factors (Cucchiella et al., 2002):

- The structures adopted to organize the relations between the actors in the Supply Chain;

- The criteria used to manage relationships;
- The coordination activities of relations.

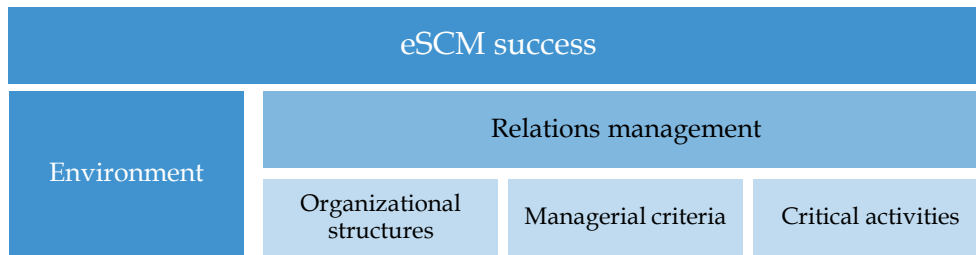


Figure 7: Characterization of the eSupply Chain (Personal processing)

Once the eSCM concept has been clarified it is useful to classify the e-business solutions. In a recent study (2016), Capgemini Consulting and GT Nexus (consulting companies) have defined digital transformation as the most important business trends of our time, and pointed out that the vast majority of digital transformation research projects fall into one of these categories:

- Digital transformation inside a single organization: for example, how digital technologies transform internal ERP systems, Human Capital Management and Finance & Accounting;
- Digital transformation between organizations and their customers: for example, how digital technologies transform Customer Relationship Management, Marketing Automation, POS systems and e-commerce;
- Digital Transformation between organizations and all of their partners across the value chain.

In this work the focus will be on the third category and the possible ICT solutions will be analyzed following Bertelé et al. (2004) model, which define eSCM according to two dimensions:

- The first identifies the two macro-areas of application in terms of processes impacted by new technologies, eSupply Chain Execution and eSupply Chain Collaboration;
- The second identifies the technological choices of the company, or rather if company makes use of application-to-application technologies (A2A) (such as EDI or proprietary software), technologies based on EDI on internet, or Extranet, both Web-based and XML-based.

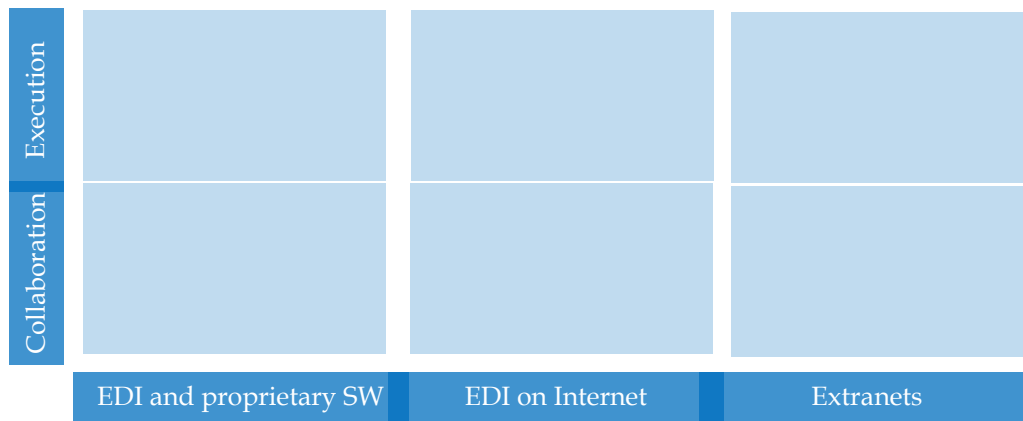


Figure 8: eSupply Chain classification model (Bertelé et. al., 2004)

## 1.3.2 eSupply Chain Execution

### 1.3.2.1 Definitions and framework

The eSupply Chain Execution is the integration and digitalization of the Order-to-Payment cycle, including logistics and administrative activities (Perego et. al., 2010) and more generally of the trade process. This latter can be defined as the course of action by which trade partners create, exchange and process documents in a commercial transaction (e.g. purchase Orders, purchase Order confirmations, Delivery Notes, notifications of acceptance of goods, Invoices, credit/debit notes, notifications of payment) including all the documents exchanged through the banking system (e.g. payment Orders and bank statements) (Shin, 2002; De Boer, 2008; Perego and Marazzi, 2010).

The integration of the trade process can be achieved by exchanging structured electronic documents, so that they can be directly processed by the information system of the receiving company (Mackay and Rosier, 1996; Perego and Marazzi, 2010), as well as by managing the trade process as a single inter-company course of action through an effective workflow that links all the involved functions (Chung et. al., 2007; Perego and Marazzi, 2010). Usually eSupply Chain Execution supports the exchange of documents, data alignment and payment services (i.e. exchange of purchase Orders, purchase Orders responses, electronic Invoices, etc.) (Perego et. al., 2010). In particular, eSupply Chain Execution refers to the management, through ICT tools, of operational Supply Chain processes (Bertelé et. al., 2004; Perego et. al., 2010) that could be divided in their logical components (Bertelé et. al., 2004):

- Presales support, or rather the sharing of all relevant information to the next Order issuing phase (products, prices, availability, terms of delivery);
- Order issuing, from the Order creation (including the phase of configuration of complex products) to the confirmation by the supplier of economic and logistic conditions;

- Logistics, from handling and picking of goods to delivery to customer hub (or a logistics service provider);
- Administrative and accounting cycle, from Invoicing to payment processing (including accounting reconciliation activities);
- After-sales support, which are is a set of activities, highly dependent on sectors, such as complaint management, management of technical support requests and sharing of account information.

According to Bertelé et. al. (2004), it is possible to define eSupply Chain Execution as: whatever above mentioned activities supported by ICT tools that could be mapped according to their functionalities:

- Tools to support the content management;
- Tools to set and support document workflow management;
- Tools which allow the integration with internal transactional applications;
- Tools for document management and exchange with customers and suppliers;
- Tools for integration with external applications of customers or suppliers;
- Tools for data alignment (catalogs and price lists).

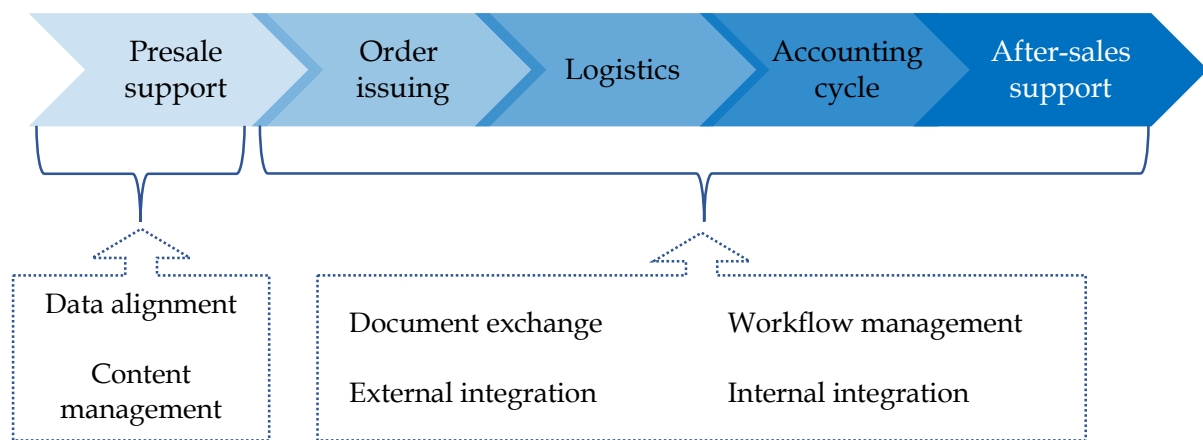


Figure 9: eSupply Chain Execution process (Bertelé et al., 2004)

The eSupply Chain Execution solutions aims at dematerializing and integrating management processes, allowing to reduce paper consumption (De Boer et al., 2008; Perego and Salgaro 2010), search time and data entry and error (Pramatari, 2007; Piotrowicz and Irani, 2009; Perego and Salgaro 2010). In this sense, the benefits are obtainable both from the perspective of efficiency, and effectiveness (Gunasekaran and Ngai, 2004; Bertelé 2004; Hong et al. 2010), reducing operating costs of coordinating economic transactions and the cost of coordinating production (Malone et al., 1987; Bertelé et. al., 2004; Ronan, 2004; Perego et al., 2010) with the automation of the activities, and improving the level of customer service (Bertelé et. al., 2004).

Once logical phases and tools have been defined, it is useful to look at processes that could be impacted by eSupply Chain Execution. These processes are not referred to a single company but to the whole Supply Chain and are so characterized (Bertelé et al., 2011):

- Larger boundaries than those of the individual company, with the involvement of different actors often distributed across multiple levels of the Supply Chain;
- The process output depends on the actions of each actor involved;
- They impact on the performance (KPIs) of all the actors involved.

The processes impacted by eSupply Chain Execution, which have been identified are:

- The transactional (trade) process, which includes the Order-Delivery-Invoicing-Payment cycle (Perego and Salgaro, 2010, Bertelé et al., 2011), but also the pre-sales and post-sales activities as well as exchange of relative information (Bertelé et al., 2011). For example, in the pre-sale phase, it is possible to share information on product specifications and availability, while in post-sales phases it is possible to exchange information on evaluation of vendor performance, on service requests, maintenance and reverse logistics;
- The planning process, or rather the definition of what to buy, produce, store and distribute, in what place and at what time (Becker, 2008, Bertelé, et. al. 2011). They will also include demand forecasting, inventory definition (Karthik, 2009), organization of delivery, planning and management of production and procurement (Bertelé et al., 2011);
- The design process, which includes all the steps, starting from the definition of the requirements, to the detailed design of a product, a process or a plant (Michelino, 2008; Bertelé et al., 2011);
- The traceability process, which includes activities related to the "tracking and tracing" (Michelino, 2008). Tracking means the ability to locate a product at any point of Supply Chain in order to be able to withdraw or recall it. Tracing, however, refers to the identification of the origins and characteristics of a product at any stage of the Supply Chain (Bertelé et al., 2011);
- The marketing process, in which it can be identified a coherent marketing strategy planning phase (which leads to the fulfillment of the target customer needs and the formulation of an appropriate value proposition) and the operational phase, in which what so far planned is translated in executive, by defining concept, price, promotion and distribution of products / services (Bertelé et al., 2011).



### 1.3.2.2 Order - Delivery - Invoicing - Payment cycle

Referring to the above mentioned processes, eSupply Chain Execution focuses fundamentally on transactional one. This can be defined as the set of activities that occur from the customer's demand the satisfaction of the latter through the purchase of a goods or services (Bertelé et. al., 2004). The process could be divided into three sub-components (Bertelé et. al., 2007):

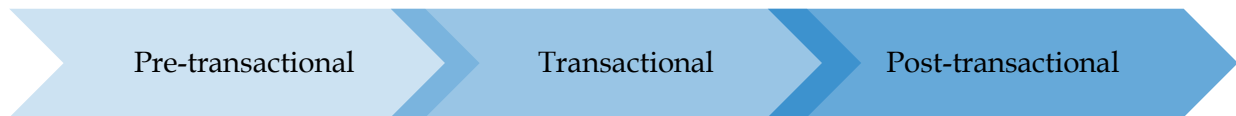


Figure 10: Transactional process (Bertelé et al., 2004)

- The pre-transactional process allows the customers to define, according to their needs, the requirements that the product/service must have, to select the most suitable supplier and make sure that this latter has understood the specific requirements, so that there is alignment between supply and demand. The actors involved are the purchase department of customer and the marketing and sales department of supplier. This process will be deeper described in the eProcurement chapter (1.3.4);
- The transactional (B2b trade) process refers to the entire Order cycle that involve Order issuing/confirmation, delivery, Invoicing and payment;
- The post-transactional process includes a series of action that conclude the commercial transaction such as vendor rating (evaluation of supplier performance according to pre-defined KPIs) and claim's management.

More in depth, the B2b trade - composed by Order, Delivery, Invoicing and Payment phases (Perego and Salgaro, 2010; Bertelé et. al., 2011) - has got the attention of several studies and so it will be presented in details. The process starts with the retailer's decision to issue a purchase Order to a manufacturer.

This typically occurs in two ways: the retailer issues an Order directly to the manufacturer, or an agent periodically visits the retailers and collects the Orders. After the Order is received by the sales department, the manufacturer checks the availability of the goods and the financial position of the retailer, and if both checks are successful sends an Order confirmation to the retailer, who checks that the confirmation corresponds to the original Order. In the meanwhile, the physical processes start. When the goods are ready to be delivered, a Delivery Note is prepared and attached to the load. The goods are then shipped by the supplier, and when the retailer receives the load, the Delivery Note is checked against the goods and the Order, and the goods intake is registered. Meanwhile, the manufacturer prepares an Invoice that is delivered to the retailer. When the Invoice is received, it is checked against the Delivery Notes and the Orders. If the

checks are positive, payment is initiated either by the manufacturer in the case of direct debit or by the retailer with credit transfer.

After the payment is received, the manufacturer checks that it corresponds to one or more Invoices. If there is a problem in any of the checks in the cycle, the effects may vary from a simple phone call in case of problems with a purchase Order, to the issue of new documents such as credit/debit notes, or the delivery of different goods if there have been errors in the delivery phase, due for example to an incorrect interpretation of the Order (Perego and Salgaro, 2010; Indicod-ECR, 2016).

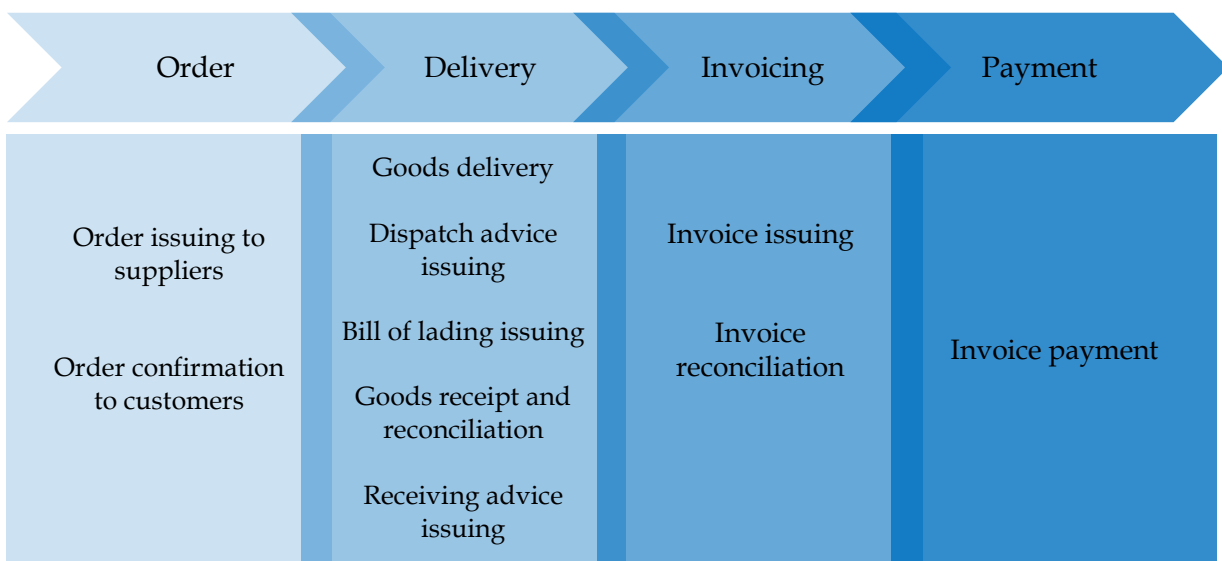


Figure 11: Order - Delivery - Invoicing - Payment cycle (Bertelè et al., 2004)

#### 1.3.2.2.1 Order

Once determined the goods (or service) and the supplier, able to meet identified needs, the client company will draw up the Order document. Within this document are typically present structured information about the customer, the supplier, the required products, quantities, prices, delivery times and transportation. On the other hand, the supplier can draw up an Order Confirmation, by which confirms the receipt of the Order or report possible changes.

#### 1.3.2.2.2 Delivery

At this phase it is physically set up the goods and deliver to the customer. The shipment is accompanied by the following documents:

- Bill of lading (BOL), is issued to justify the transfer of a goods from the assignor to the assignee through the transport, both if the latter occur directly by customer or supplier and if it is outsourced to a third part. Delivery Note, which is mandatory from July 19, 2009, and has to be filled in by the assignor and accompany the goods in the vehicle used for this activity by carrier. The BOL (bill of lading) is equivalent to the Delivery Note, as long as it is integrated, where necessary, with all the data provided by the latter and the

wording: "DOCUMENTO VALIDO AI SENSI DEL D.M. 30-6-2009 n.554 Pubblicato in G.U. N° 153 del 4/7/2009";

- Dispatch Advice, containing information about delivery, sent by the supplier to customer so that the latter receives it before physical arrival of goods;
- Receiving Advice, that certifies the receipt of goods;

Responsibility note, issued by hauler, which attest that the latter has taken on responsibility the goods, waiting for the shipment.

### 1.3.2.2.3 Invoicing

Once Order and delivery data are matched, the supplier set up the Invoice and sent to the customer. The Invoice is a commercial document which has civil consequences, financial, tax/financial (VAT deduction, and deductibility of costs) and penalties (tax crimes and failures). The receivable Invoice, being a sensitive document, is regulated by the legislator. During Invoicing, takes place also customer reconciliation between Invoice and the documents exchanged before.

### 1.3.2.2.4 Payment

The final phase of the Order cycle is the payment of the Invoice by customer that could send back a payment notice. Here management of receipts and payments are also carried out.

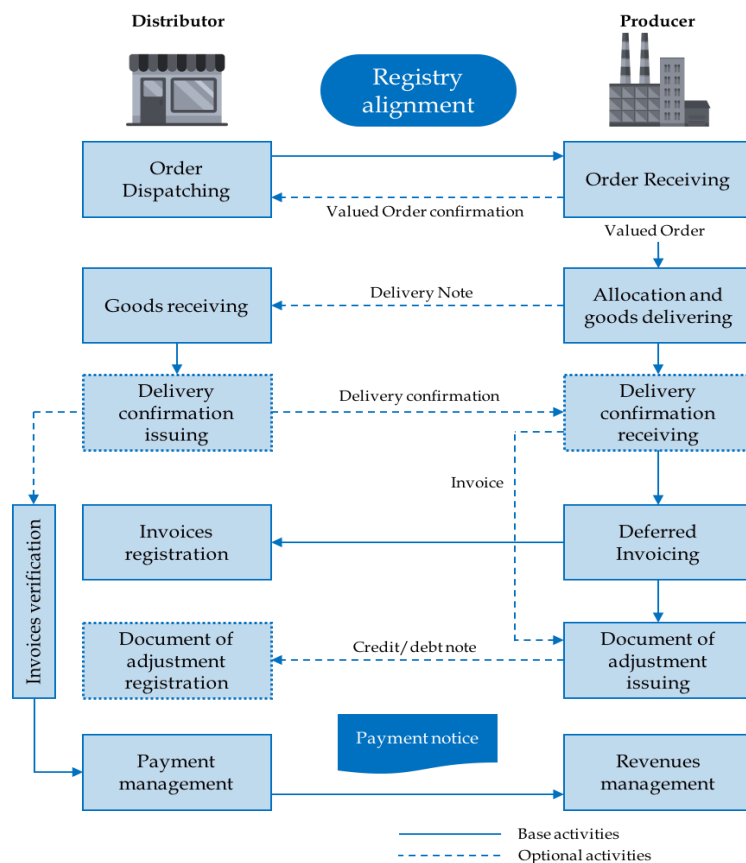


Figure 12: Fast Perfect Order (Indicod-ECR, 2016)

### 1.3.2.3 Benefits

According to literature the adoption of eSupply Chain Execution solution provide different benefits that can be ordered following Dearing (1990) classification: strategic and operational. While the former can be summarized as a better relationship with trade partners resulting in long-lasting relationships and an increase in information flows, the operational benefits can essentially be broken down into four classes (Perego and Salgaro, 2010):

- Reduction in the execution costs of interface activities, mainly as a result of an increase in workforce productivity (Sanders and Premus, 2002; Fink, 2006; Iyer et. al., 2009; Nurmilaakso, 2009; Piotrowicz and Irani, 2009, Perego and Salgaro, 2010) and, second, thanks to a reduction in the cost of expendable materials. By using integration technologies (software and standardization of procedures) to automate document management activities, human intervention is necessary only to control activities and manage exceptions (Davis and Leonard, 2006; Perego and Salgaro, 2010).
- Improvement in process accuracy, primarily as a result of the elimination or drastic reduction of tasks with a very high-manual component (Pramatari, 2007; Piotrowicz and Irani, 2009; Perego and Salgaro 2010) and the consequent reduction in the costs of management of non-conformity issues (Fink, 2006; Perego and Salgaro 2010).
- Reduction in the space occupied to archive fiscal documentation (De Boer et al., 2008; Perego and Salgaro 2010).
- Cut-back in process execution (or cycle) times with the simplification of activities and the possibility to control processes using a “workflow” logic (Power, 2002; Pramatari, 2007; Davis and Leonard, 2006; Pawar and Driva, 2000; Piotrowicz and Irani, 2009; Perego and Salgaro 2010).

All these benefits depend on the level of integration between parties; the greater the level of B2b Supply Chain integration, the better the performance (Iyer et. al., 2009). This supposes that integration occur at different level that can be divided in:

- Conventional scenario: no integration and dematerialization of the Order-to-Payment cycle (Iyer et. al., 2009, Perego and Salgaro 2010);
- Intermediate scenario: some of the activities are electronically supported and integrated, while the others are still managed conventionally. At present, this is the situation with the most companies in the industry (Perego and Salgaro 2010; Perego and Marazzi, 2010);
  - Unilateral exchange of Orders or Invoices: in the unilateral exchange of Orders, the customer sends a structured electronic Order to the supplier. At the same time, it is assumed that the customer company does not receive structured documents

from the supplier. The opposite applies to the unilateral exchange of Invoices (Perego and Marazzi, 2010);

- VAT-compliant electronic Invoicing: suppliers issue Invoices as electronic documents, applying on them their own digital signature and time stamp in order to guarantee their authenticity and integrity, and commercial partners must sign an electronic Invoicing agreement for the exchange of Invoices. The electronic Invoices must then be electronically archived by both parties by applying on the batch of Invoices the time stamp and digital signature (Perego and Marazzi, 2010);
- Integration of the Invoice-to-Payment cycle: data exchanges related to administrative and financial activities (Invoices, credit/debit notes, payment Orders and receipts, transaction notifications) take place through structured electronic documents, on the basis of shared process rules. However, the archives - be they payables, or receivables - remain in paper format (Perego and Marazzi, 2010);
- Integration of the Order-to-Invoice cycle: data exchanges related to the logistical-commercial aspects (Orders, Order confirmations, transportation documents, sending notifications, Invoices) take place via structured electronic documents, on the basis of shared process rules. Even in this case, we assume that the archives remain in paper format (Perego and Marazzi, 2010);
- Full integration of the trade process: the entire document flow is managed and transferred in structured digital format, which can be directly processed by company information systems. Both the accounts payable and receivable archives are electronic, in accordance with electronic Invoicing legislation (Perego and Salgaro 2010; Perego and Marazzi, 2010);

### 1.3.3 eSupply Chain Collaboration

#### 1.3.3.1 Definitions and framework

eSupply Chain Collaboration is nowadays a matter of discussion thanks to its potential impact on Supply Chain, it involves sharing of electronic information to support operational planning processes (demand planning, inventory management, Supply Chain monitoring and control), the development and design of new products, aiming at improving process efficiency through collaboration in decision-making and execution phases (Bertelé et. al., 2004). Differently from eSupply Chain Execution it is possible to find out, among literature, different definitions of eSupply Chain Collaboration, of which some relevant are resumed in the table below:

Anderson and Lee, 1999	<i>Supply Chain Collaboration occurs when industry participants collaborate on planning and execution of Supply Chain strategy to achieve a synchronized Supply Chain</i>
---------------------------	---

Mentzer et al., 2000; Muchstadt et al., 2001; Matopoulos et. al., 2007	<i>The eSC Collaboration's notion implies that the chain members, two or more, become involved and actively work together in coordinating activities which span the boundaries of their organizations in order to fulfil and satisfy customers' needs</i>
Simatupang and Sridharan, 2003; Whipple, 2007	<i>Collaboration is defined as occurring when two or more independent companies work jointly to plan and execute Supply Chain operations with greater success than when acting in isolation</i>
Glenn Richey, 2010	<i>The eSC Collaboration encompasses planning and management as well as coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party providers, and ultimately consumers.</i>

Table 4: eSupply Chain Collaboration definitions

Based on existing relevant literature, a general research framework for Supply Chain Collaboration is suggested; two pillars are distinguished, which are: dealing with the design and the government of Supply Chain activities, and the establishment and the maintenance of Supply Chain relationships, respectively (Matopoulos et. al., 2007).

The first pillar in the framework is related to the design and government of Supply Chain activities consisting of three elements. The first element is about taking the decision of selecting the appropriate partner, not all of them can become close collaborators and a selection is needed, based on the expectations, perceived benefits and drawbacks, and the "business fit" of companies (Matopoulos et. al., 2007). The second element involves selecting the activities on which collaboration will be established since not all the activities require the same amount of involvement and close relationship (Sahay, 2003; Matopoulos et. al., 2007). The plethora of the activities constitutes the "width" of collaboration (Matopoulos et. al., 2007). After selecting the activities, the third element is to identify in what level (depth) companies will collaborate: strategic, tactical, operational (Stevens, 1989; Chopra and Meindl, 2001; Fawcett and Magnan, 2002; Matopoulos et. al., 2007). Finally, another important element for the design and governing of Supply Chain activities includes the decision of selecting the appropriate technique and technology to facilitate information sharing (Matopoulos et. al., 2007).

The second pillar concerns the establishment and maintenance of Supply Chain relationships (Matopoulos et. al., 2007). The critical elements that have been also cited in the literature include risk and rewards sharing (Stank et al., 1999; Barratt and Oliveira, 2001; La Londe 2002; Matopoulos et. al., 2007), trust, power and dependence (La Londe 2002; Matopoulos et. al., 2007).

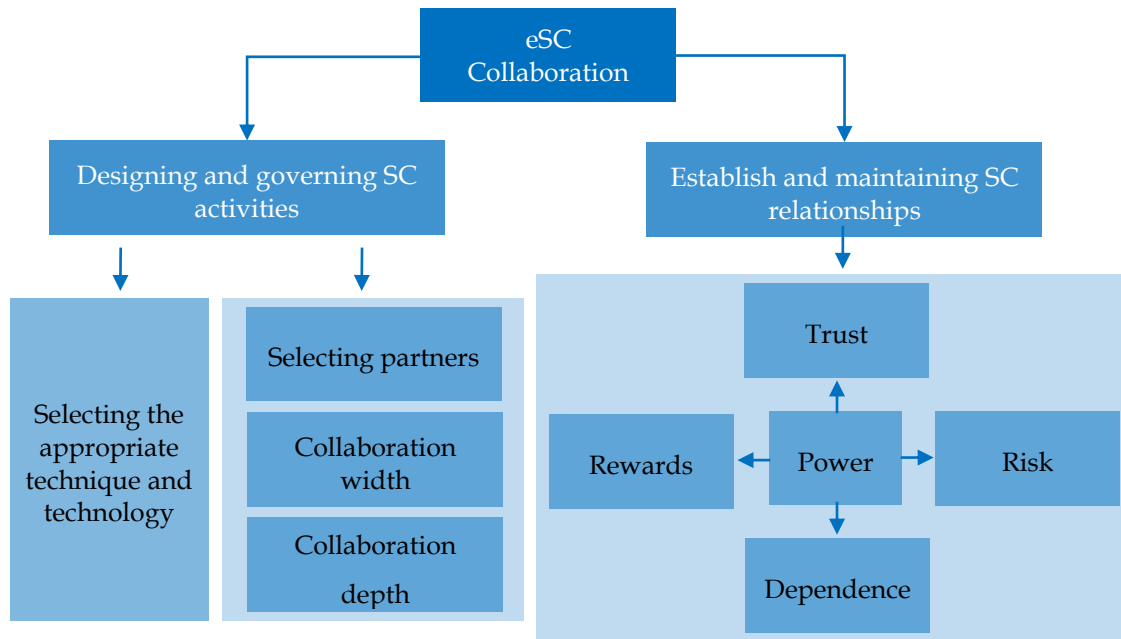


Figure 13: eSupply Chain Collaboration framework (Matopoulos et. al., 2007)

Once a general framework has been established, it is useful, in order to better understand eSupply Chain Collaboration, to look at processes that are most impacted by this approach and the functionalities that could support the processes:

- Monitoring and control of Supply Chain, from the sharing of information (sales data, availability of production capacity, etc.) and key evaluation metrics, to the reporting of SC critical events (Bertelé et. al., 2005). The main functionalities that support these process are (Bertelé et. al., 2005):
  - Integration with internal application;
  - Reporting and data analysis;
  - Alert system;
  - Quality management.
- Collaboration about planning activities, from demand forecasting, to promotion and the stock management (Bertelé et. al., 2005). The main functionalities that support these process are (Bertelé et. al., 2005):
  - Promotion management;
  - Events management and exception handling;
  - Vendor Managed Inventory (VMI), that is a technique developed in the mid-1980s, whereby the manufacturer (supplier) has the sole responsibility for managing the customer's inventory policy, including the replenishment process, based on the variation of stock level in the customer's main warehouse or distribution center (Blatherwick, 1998; Pramadari, 2007). VMI is probably the first trust-based business



link between suppliers and customers (Barratt and Oliveira, 2001; Pramatar, 2007);

- Continuous Replenishment Program (CRP), moves one step ahead of VMI and reveals demand from the retailers' stores (Pramatar, 2007). The inventory policy is then based on the sales forecast, built from historical demand data and no longer purely based on the variations of inventory levels at the customers' main stock-holding facility (Andraski, 1994; Pramatar, 2007);
- Collaborative Planning, Forecasting and Replenishment (CPFR) can be seen as an evolution from VMI and CRP, addressing not only replenishment but also joint demand forecasting and promotions planning, focusing on promotions and special-line items (Holmstrom et al., 2002; Pramatar, 2007). CPFR is based on extended information sharing between retailer and supplier, including point-of-sales (POS) data, forecasts and promotion plans. VMI and CRP are more about efficient replenishment and supply, whereas CPFR puts more emphasis on the demand side (Pramatar, 2007).
- Collaboration about new products development, sharing of the main technical documents and managing project workflow (Bertelé et. al., 2005). The main functionalities that support these process are (Bertelé et. al., 2005):
  - Sharing of technical document such as CAD drawings;
  - Revision management;
  - Notification systems;
  - Virtual community;
  - Knowledge management.
- Collaboration about communication and marketing processes. It goes from sharing key information (information on products and prices, phase-in and phase-out plans, etc.) to the management of customer relationship (for example, development of a customized offer, request management for information and technical assistance) (Bertelé et. al., 2005). The main functionalities that support these process are (Bertelé et. al., 2005):
  - Promotion management;
  - Virtual community;
  - Knowledge management.



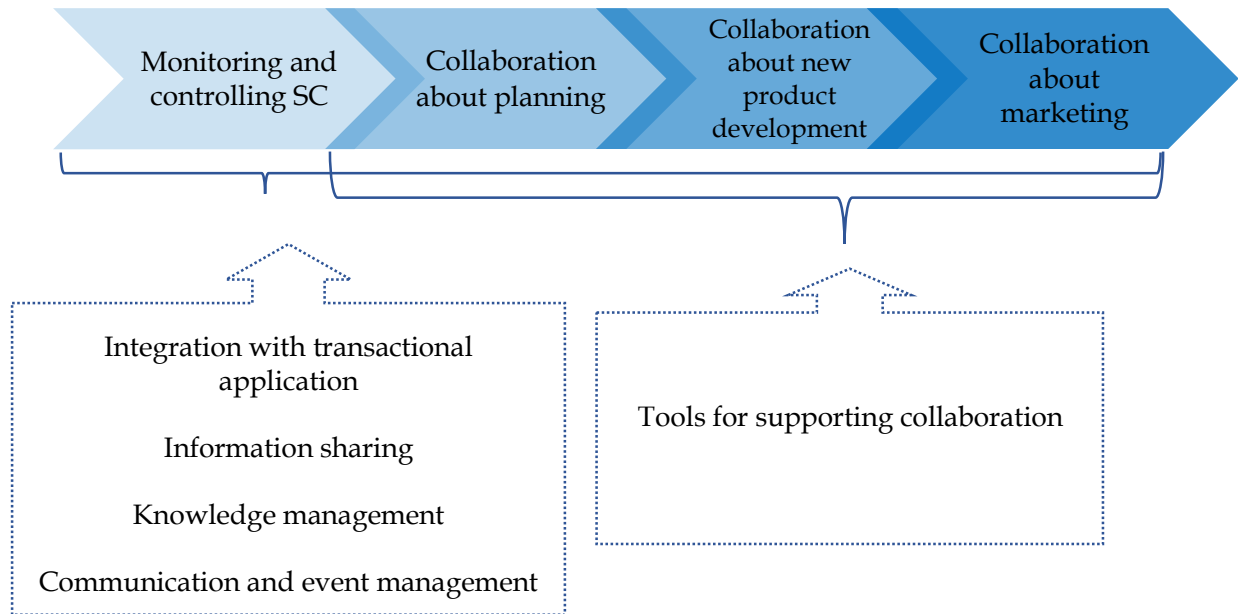


Figure 14: eSupply Chain Collaboration process (Bertelé et al., 2004)

### 1.3.3.2 Models

As it has been clarified above, there are numerous collaborative functionalities that support several process and their combination set up different collaborative forms. In this scenario different authors proposed model to map the possible forms of collaborations and subsequently it will be proposed Holweg et. al. model., according to whom, Supply Chain collaboration could be mapped according to the type of information shared. In particular, he highlights two types of collaboration: about inventory information and about planning, but there are more dimensions that one can collaborate on, such as the promotions or new product introductions, however these are the ones most commonly used in practice (Holweg et. al 2005).

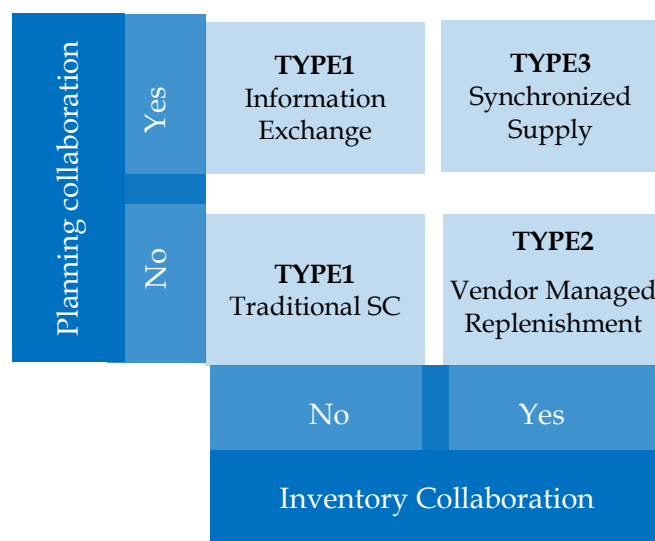


Figure 15: eSupply Chain Collaboration model (Holweg et. al 2005)

- Type 0 – The Traditional Supply Chain: “traditional” means that each level in the Supply Chain issues production Orders and replenishes stock without considering the situation

at either up or downstream tiers of the Supply Chain and the only information that is available to the supplier is the purchase Order issued by the retailer. Relying on purchase Orders only, often cause the bullwhip problem, as there is no visibility of the actual demand, so the human psyche is tempted to order some 'just-in-case'. As a result, the variance of Orders increases as demand moves up chain, causing significant costs in the system (Holweg et. al., 2005);

- *Type 1 – Information Exchange*: information exchange (or information sharing) means that retailer and supplier still Order independently, yet exchange demand information and action plans in order to align their forecasts for capacity and long-term planning. Delays in translating the demand signal are removed, and unnecessary uncertainty is eliminated. Taking information sharing one step further is collaborative forecasting. This step is frequently advertised as a key objective in an implementation of VMI, but is less frequently taken. Linking the customer and supplier planning processes on a sufficiently detailed level is also a cornerstone towards implementing the CPFR strategy (Holweg et. al., 2005);
- *Type 2 – Vendor Managed Replenishment*: it means that the task of generating the replenishment Order is given to the supplier, who then takes responsibility for maintaining the retailer's inventory, and subsequently, the retailers' service levels (VMI). Having full visibility of the stock at the customer's site, the supplier is wholly responsible for managing the inventory (Holweg et. al., 2005);
- *Type 3 – Synchronized Supply*: synchronized supply eliminates one decision point and merges the replenishment decision with the production and materials planning of the supplier. Here, the supplier takes charge of the customer's inventory replenishment on the operational level, and uses this visibility in planning his own supply operations. However, the critical step that many companies have not been able to take so far is to incorporate customer demand information into their production and inventory control processes (Holweg et. al., 2005);

### 1.3.3.3 Benefits

The benefits that can be achievable through SC Collaboration, according to literature are multiple and in particular:

- Improvement in service level (Fliedner, 2003; Holweg et. al., 2005);
- Reducing inventories (Fliedner, 2003; Disney and Towill, 2003; Holweg et. al., 2005);
- Reducing obsolescence risk (Fliedner, 2003);

- Elimination of the bullwhip effect by linking the inventory and replenishment decisions (Lee, 1997; Smaros et al., 2003; Fliedner, 2003; Holweg et. al., 2005);
- Better utilization of production capacity as the extended visibility of the Supply Chain provides a certain additional flexibility to prioritize or delay customer replenishment without compromising service levels, thereby reducing the need for capacity buffers (Waller et al., 1999; Holweg et. al., 2005);
- WIP reduction (Waller et al., 1999);
- Increased asset utilization (Matopoulos et. al., 2007);
- Faster and more efficient new product development (Matopoulos et. al., 2007);
- Improved lead time (Fliedner, 2003);
- Better utilization of transportation resources, because shared information allows for better load consolidation (Le Blanc et al., 2004; Holweg et. al., 2005);
- Controlling the risk for constrained components or materials. For example, monitoring key items with long-lead times can create an early warning system of future supply constraints (Holweg et. al., 2005);
- By collaborating, firms are able to exchange both explicit and tacit knowledge in order to combine different knowledge streams across contrasting partner capabilities such that new knowledge can be created for mutual benefit (Lang, 2004; Whipple, 2007).

### **1.3.4 eProcurement**

#### *1.3.4.1 Definitions and framework*

In the following chapter it will be discussed another important macro process, that usually take place before eSupply Chain Management, the eProcurement, that could be defined as the integration, management, automation and the empowerment of an organization's procurement process, using tools and electronic technology, and web-based applications (Tatsis et. al. 2006; Hidayanto et. al. 2012). This solution implies internet technologies platforms and services that allow managing both strategic and day-by-day activities. eProcurement applications focus on creating efficiencies: their goal is to make the traditional purchasing procedures more efficient and cost effective (Wu, 2007; Turban et al., 2006; Caniato, 2010). But ePurchasing applications can have an even more strategic role; for instance, they facilitate continuous information exchange between buying and supplying organizations and the creation of long term relationships (Wu, 2007; Ronchi, 2003; Caniato, 2010). In the following table are summarized some eProcurement definition:

Giner Alor-Hernandez, et. al., 2013	<i>eProcurement is more than just a system for making purchases online. It provides an organized way to keep an open line of communication with potential suppliers during a business process, and it helps with the decision-making process by keeping relevant information neatly organized and time-stamped.</i>
A.K. Pani et. al., 2007; Jose Maria Alvarez-Rodriguez et. al., 2014	<i>The term e-Procurement refers to the use of electronic communications to deal with business process between sellers and buyers. It can be considered as the linking and integration of inter-organization business process and systems with the automation of the requisitioning, the approval purchase Order management and accounting processes through Internet-based protocols.</i>
Essig and Arnold, 2001; Boer de, et. al., 2002; Puschmann and Alt, 2005; M. José Garrido Samaniego et. al. 2009	<i>E-procurement is interpreted as the result of applying e-commerce technologies to an organization's purchasing activities. This concept currently encompasses activities ranging from purchasing via electronic catalogues to participation in a wide array of on-line auctions and markets, all aimed at enhancing and automating as much as possible the chain of value.</i>
David J. Lutz et. al., 2010	<i>The term "eProcurement" identifies the process of purchasing online goods, works or services, in a business to business or business to government transaction.</i>

Table 5: eProcurement definitions

#### 1.3.4.1.1 Drivers

The organizational objectives (Wu, 2007; Garrido et al., 2008) are those drivers pushing towards eProcurement adoption. Six main drivers emerge from the literature (Caniato, 2010):

- *Efficiency*, in terms of reduction of purchasing process costs;
- *Decentralization* (which is linked to the first one), as through automation companies pursue operational procurement process decentralization in order to centralize more-value added activities;
- *Control*, as most companies are willing to increase their control on total spending;
- Maverick buying reduction, in order to increase compliance to pre-negotiated contracts;
- *Supply base rationalization*, as eProcurement allow to manage the supply base in a more efficient and effective way;

- Transparency, as eProcurement provides higher transparency to both customers and suppliers on the overall purchasing process.

#### 1.3.4.1.2 Benefits

From the organizational perspective, there are many contributions underlining the objectives and the potential benefits related to eProcurement adoption (Boyle and Alwitt, 1999; Essig and Arnold, 2001). Benefits brought by an eProcurement system can have a twofold nature: economical and organizational (Garrido et al., 2008; Dai and Kauffman, 2006; Caniato, 2010).

eProcurement implies an increased efficiency in the organizational structure, especially in the reduction of purchasing department size and levels and of the number of functional areas involved in the purchasing process. This means that the process becomes faster, flexible and more agile; costs are lower and service to final customers higher (Garrido et al., 2008; Caniato, 2010). Other savings are generated by the reduction of transaction and administrative cost (Eadie, 2007), of clerical work, of purchasing cycle time (Davila et al., 2003).

Finally, eProcurement allows efficiency improvements in terms of productivity and purchasing process quality and accuracy (Harrigan et al., 2008; Garrido et al., 2008; Caniato, 2010). On the other hand, the soft organizational benefits regard: increased control on the spending, transparency in the relationship with suppliers, maverick-buying reduction, decentralization of procurement activities and supply base rationalization (Orr, 2002; Henriksen and Andersen, 2003; Davila et al., 2003; Henriksen and Mahnke, 2005; Kauffmann and Mohtadi, 2004; Puschmann et al., 2005; Batenburg, 2007; Angeles and Nath, 2007; Tatsis et al., 2006; McGaughey, 2002; Croom, 2005; Kim and Shunk, 2004; Fink, 2006; Walker and Harland, 2006; Timmers, 2000; Hope-Ross, 2001).

#### 1.3.4.1.3 Classification models and framework

eProcurement interactions could be classified according to different authors. Alvarez-Rodríguez (2014) state that depending on the type of interaction between agents, 2 models can be found:

- Sell-side model: a web-based system would be an example of this model in which an on-line supplier offers its services, on-line catalogue and buying system, through a typical web application. Buyers will select articles to proceed with the payment process. This simple model can be usually found in small and medium-sized (SME) companies (Alvarez-Rodríguez, 2014).
- Buy-side model: in this case, an organization needs to acquire some product or service and different suppliers participate in the buying process. In this context the buyer must select the most appropriate seller according to different. To do so buyers need to automatically gather all required data and information from the seller with the aim of making a decision

(matchmaking process between buyer requirements and seller profile) (J. M. Alvarez-Rodriguez, 2014).

In order to develop a consistent framework, it is useful to present the B2b solution classification that was proposed by Rangone and Balocco (2002), according to which, solutions could be classified following 2 dimensions:

- The subject which owns the application, that can be represented by a specific company, by an intermediary, or by another operator (Rangone and Balocco, 2002);
- The features offered by the application, which depend on the needs that the latter intends to satisfy. In this sense it is possible to distinguish between transactional functionalities, that meet the requirement of buying and selling products and services, and not transactional functionalities, that meet other requirements such as, the need of information or communication and interaction with other companies (Rangone and Balocco, 2002);

Crossing different functionalities with subjects, the following eProcurement models can be identified:

- "Many to many" *models*: even called eMarketplace: these solutions at supporting any chain business relationship, even if not strictly transactional (usually, eMarketplace simply to match supply and demand without allow the closure of the online transaction) (Rangone and Balocco, 2002);
- "Extranet-based" *models*: these are Internet applications, developed by single company, to interact with business partners (customers, suppliers, new products development partners). Such applications can be designed specifically to support the processes of purchase or sale (respectively eProcurement or eSelling) or to offer its Supply Chain partners different functionality (for example, the possibility of access to commercial information and, check the in stock inventory, interact with company personnel) (Rangone and Balocco, 2002);
- "One to many" *models*: in which subject can assume the characteristics of a eDistributor, supporting the sale of products and services (the online equivalent of the traditional distributors) and, in other cases, simply offer to partners various services such as, information content (Rangone and Balocco, 2002);

Another classification could be done taking as a reference, the contributions by authors like Monczka et al. (2004), Van Weele (2004) and Spina (2007), which classified the purchasing activities into three different macro-processes: strategic purchasing, sourcing and supply

(Caniato, 2010). Strategic purchasing includes activities that have a strategic relevance, like make or buy decisions and supplier relationship management. As a consequence, these are long-term and therefore low-frequency decisions. Sourcing and supply on the contrary, are more tactical or even clerical and repetitive in nature. On one side, they include everything that is connected with supplier selection (i.e. sourcing); on the other side, they include Order fulfilment (i.e. supply). This last phase is quite different when dealing with operations-driven (direct) goods or non-operations-driven (indirect) goods (Caniato, 2010). Many tools have been developed for supporting the operational processes of sourcing and supply (and procurement) phases. It refer to eAuctions, eTenders, RFx (request for information, proposal, quotation) and so on (Teich et al., 2004; de Boer et al., 2002; Caniato, 2010) as eSourcing tools. Similarly, eCatalogs, workflow management applications, eInvoicing, etc. are considered eSupply or eProcurement tools (Puschmann et al., 2005; Caniato, 2010).

Merging the two previous model it is possible to represent a framework scheme (Hitech Dimensions, 2002):

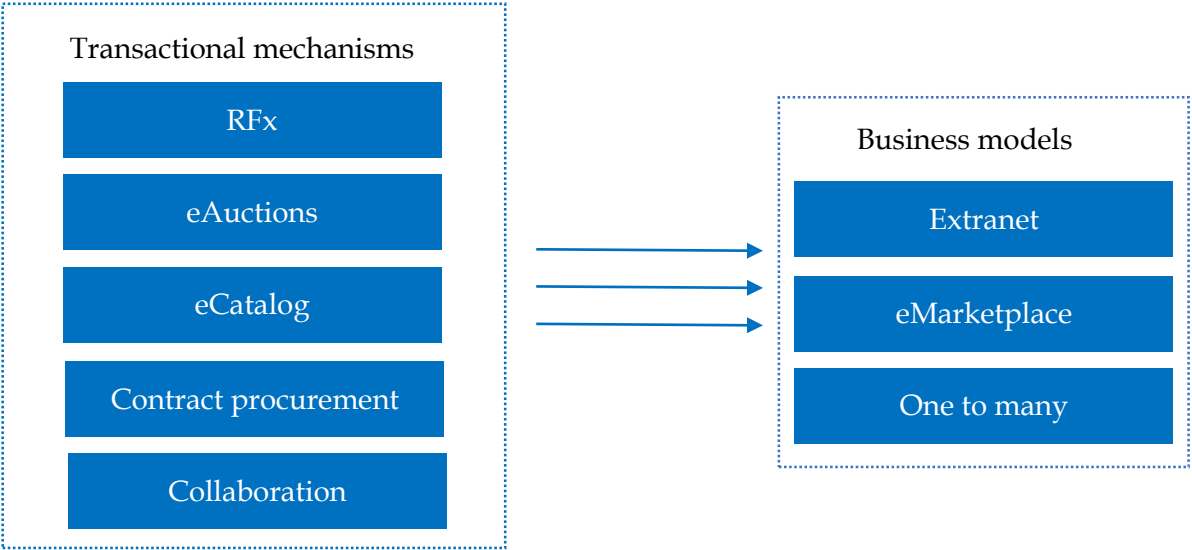


Figure 16: B2b procurement framework (Hitech Dimensions, 2002)

For the development of this work it will be considered the classification proposed by Beretlé et al. (2004) which identify two dimensions:

- The technological choices of the company, or rather if company makes use of Application-to-Application technologies (A2A) (such as EDI or proprietary software), technologies based on EDI on internet, or Extranet, both Web-based and XML-based. (usually eProcurement solution exploits Extranet tools);
- The processes impacted by the solution which are eSourcing and eCatalog.

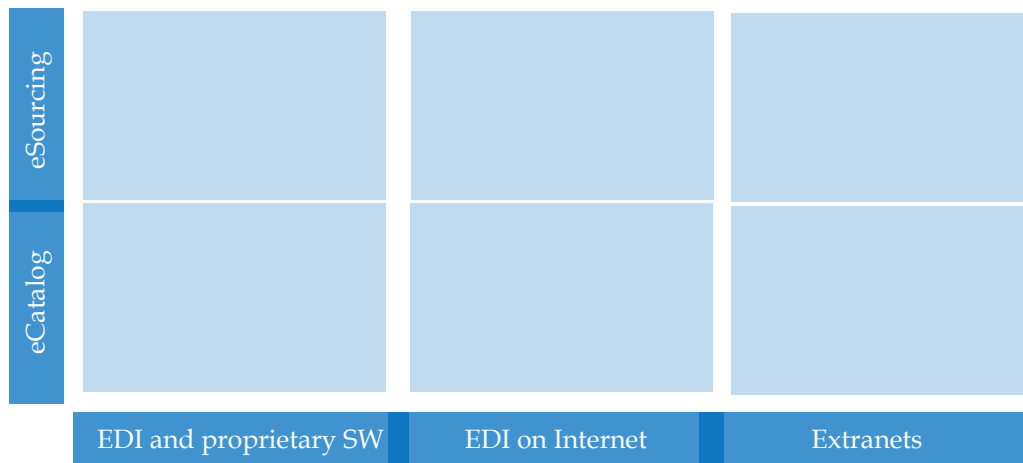


Figure 17: eProcurement classification model (Bertelé et. al., 2004)

### 1.3.4.2 eSourcing

#### 1.3.4.2.1 Framework

The eSourcing refers to various procurement processes, including auctions, RFx and activities such as commercial cooperation, relationships and selection of suppliers (Hitech Dimensions, 2002; Caniato, 2010). In order to better understand this process, it is useful to point out its main phases (Bertelé et. al., 2004):

- Needs analysis, aiming at understanding and classifying the main cost items, pointing out the main purchasing needs;
- Suppliers scouting, aiming at identifying the possible suppliers for each product category;
- Suppliers qualification, aiming at evaluating suppliers according to objective KPIs
- Offer request, which allows the buyer to ask, in a structured format, for offers, to each supplier according to needs.
- Trading phase, which can occur as an auction or RFx

The main tools which support the previous phase are (Bertelé et. al., 2004):

- Data analysis tools, that allows the automatic processing of purchasing data in order to support the decision process;
- Scouting tools, which allows, through a web-form and a Work Flow system, the pre-qualification of suppliers;
- RFx systems, which support the asynchronous interaction and negotiation between parties and in particular:
  - Request For Information (RFI): tool used by a potential buyer to request general information (such as the turnover, number of employees, any certifications, or the range of products offered) to companies that could potentially become sellers;



- Request For Proposal (RFP): tool used by the buyer, which wants to define the specifications (both technical and economic) of a product/service that he/she want to buy. Buyer asks to sellers for possible proposals that can meet his/her specific needs;
- Request For Quotation (RFQ): tool used by the buyer who want to ask the seller about purchasing price proposal, for a particular product/service whose specifications are known.
- eTender/eAuction tools, which support the real time and synchronous negotiation and trading with suppliers (Bertelé et. al., 2004). Today's landscape of online auctions has evolved to include: (1) a new breed of auction software, (2) a calmed enthusiasm and wiser (more realistic) approach toward the design and use of auctions, (3) the absorption of B2b auction companies into larger eSourcing solution vendors, and (4) the enterprising adoption of auctions for the procurement of services, such as marketing, insurance, legal, and information technology. When done properly, online auctions may offer companies increased visibility to market prices and hence a possibly more competitive price for the defined goods and services being sourced. The variable which define an electronic auction are:
  - Evaluation method: the evaluation could be mono-attribute, based only on one criteria, usually price (Bertelé et. al., 2004) and multi-attribute where, suppliers compete on price as well as other attributes, such as lead time, warranties, inventory stocking policies, non-defective parts per million, and discounts over accompanying basket of goods or discounts of future years (Elmaghraby, 2007). It is expected that multi-attribute auctions of this sort will increase overall value in the Supply Chain and allow both suppliers and the buyer to mutually benefit by reducing the lead time between initial RFI and final selection of the winner. Recent experimental work on multi-attribute auctions demonstrated their potential for increasing the buyer's utility without posing too complex a bidding problem for suppliers (Koppius and van Heck, 2003; Chen-Ritzo et al., 2005);
  - Starting price: it represents the initial point of the transaction (Bertelé et. al., 2004);
  - Reserve price: it represents a threshold, under which the transaction is not valid (Bertelé et. al., 2004);
  - Trading mechanism:
    - English: they are "open" or fully transparent as the identity of all bidders is disclosed to each other during the auction. The highest bidder at any given moment is considered to have the standing bid, which can only be

displaced by a higher bid from a competing buyer. If no competing bidder challenges the standing bid within a given time frame, the standing bid becomes the winner, and the item is sold to the highest bidder at a price equal to his or her bid;

- In which a sufficiently high price to deter all bidders is fixed and then, is progressively reduced until someone is willing to buy at the last current price. The winner will pay the final lowest price (Bertelé et. al., 2004);
- The price is progressively reduced and bidders excludes themselves if they are not able to sell at a lower price than the one reached (Bertelé et. al., 2004).
- Aggregation mechanism: it represents the way in which winner is selected when there are different lots of products and it is possible to bid for different lots at the same time (Bertelé et. al., 2004);
- Award mechanism: it can occur automatically often the end of the auction event or non-automatically, when auctioneer has the power to select a winner independently from the auction result (Bertelé et. al., 2004);
- Award price (Bertelé et. al., 2004).

The following image resume an ideal auction process (Elmaghraby, 2007):

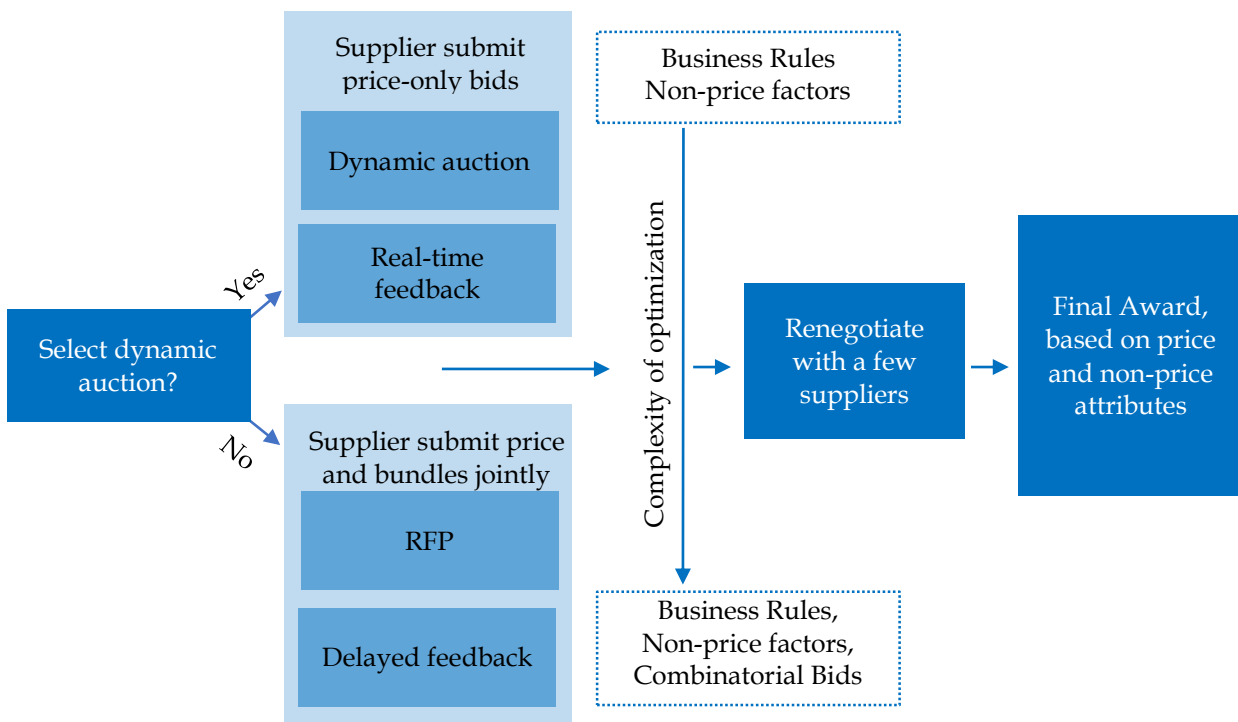


Figure 18: Ideal auction process (Elmaghraby, 2007)

- *eCollaboration tools*, already presented in the previous chapter, which in this case support the relation between buyer and seller staff, in order to cooperate regarding the purchase process;

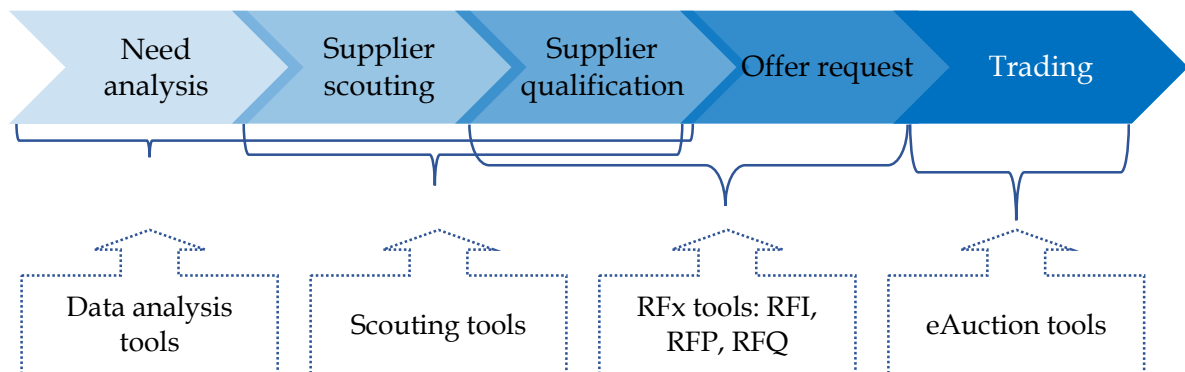


Figure 19: eSourcing process (Bertelè et al., 2004)

#### 1.3.4.2.2 Benefits

According to Bertelè et. al. (2004) the main buyer benefits are:

- Price reduction, that comes from different factors:
  - The possibility to involve more suppliers;
  - Psychological dynamics, inducted by the real time trading system;
  - The possibility to exploit contingent factors on the market;
- Increase in efficiency especially for high volume repetitive purchases, coming from:
  - Time reduction for interacting and communicating with suppliers during the offering and trading phase;
  - Time reduction during the evaluation of offers, thanks a higher standardization;
  - Time reduction for the qualification of suppliers;
  - Possibility to manage more event at the same time.
- More transparency, traceability and control over expenditure because the system keeps track of each event and create reports;
- Better knowledge of the market due to the availability of more data.

Also seller can obtain some advantages from eSourcing:

- Better opportunities for more competitive firms, since now there is more information symmetry;
- New business channels available also for small and medium companies;
- More transparency during the communication and trading phase;
- Benchmark possibility with competitors.

These benefits for sellers are in contrast with criticalities such as:

- An overemphasis on prices, which now represent the main metric;
- Risk of margin reduction, due to price war;
- Risk of drastically change important and durable relationships with partners.

### 1.3.4.3 *eCatalog*

#### 1.3.4.3.1 Framework

eCatalog means a recursively buying process, typically based on electronic catalog, accessible via the Web, according to pre-defined supply conditions such as products and services prices. They are therefore excluded purchases where Orders are generated automatically by internal application, in close connection with replenishment and production planning as well as knowledge of BOM, that constitute the finished product (Bertelé et. al., 2004). This process can be divided into its main phases (Bertelé et. al., 2004):

- Catalog management, which consist in the uploading and updating of catalog content;
- Purchase request generation, which aims at identifying the product/services that satisfy certain need, by surfing the eCatalog, and moreover at obtaining the estimate, accompanied with supply condition confirmation;
- Authorization and Order issuing, which refers to the expenditure authorization according to buyer decisional freedom and the Order issuing to suppliers;
- Logistics, which mean preparation of good and its delivery;
- Management of the administrative/accounting cycle, which include the checking of contractual condition, the Invoicing and payment.

The tools supporting this process are (Bertelé et. al., 2004):

- Web catalog interface, which define the structure in term of categories, attributes, and searching;
- Tools supporting the content management such as update of product list;
- Work Flow for the management of approval of purchasing request;
- RFX tools, supporting the purchase of products not included in the catalog;
- Tools for integration (middleware), with internal and external applications.

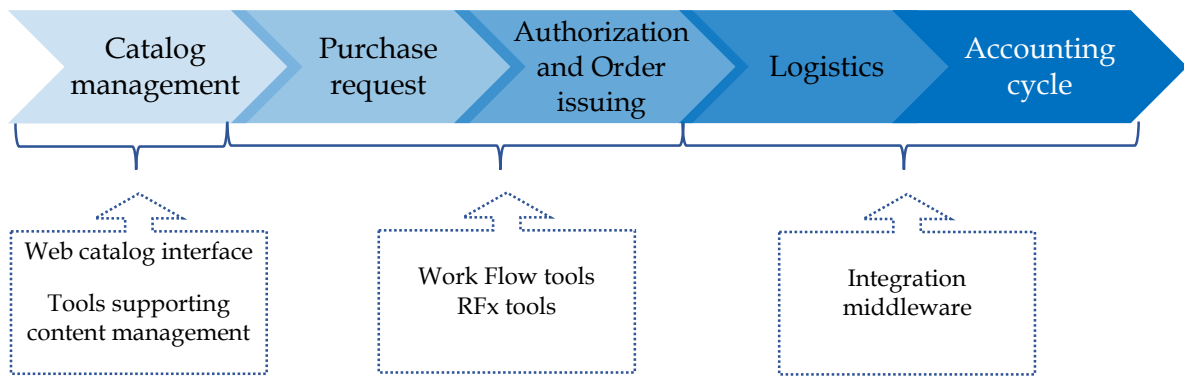


Figure 20: eCatalog process (Bertelè et al., 2004)

#### 1.3.4.3.2 Benefits

According to Bertelè et. al. (2004), buyers can reach different benefits from eCatalog:

- Greater efficiency of the recursive purchasing process, both internal (workflow automation) and external (automation of accounting cycle);
- Reduction of supply times thanks to lighter management of purchasing and Order requests;
- Reduction of price, as an indirect consequence of the web catalog, including the rationalization of suppliers' number, of the products' portfolio and reduction of the Maverick effect (i.e. the phenomenon whereby office workers tend to bypass the traditional process, by performing some supplies in first person, and then filling in the relative expense note);
- Improved process quality thanks to the centralization of purchasing and optimization of the latter.

Looking at sellers the benefits are (Bertelè et. al., 2004):

- Increased efficiency of Order fulfillment process, assuming that the supplier has integrated the eCatalog with its own enterprise applications;
- Increased customer switching costs, since customer has invested in the relationship.

## 1.4 eSupply Chain Management IT Technologies

In today's business environment, most organizations are facing significant pressure to make their operational, tactical, and strategic processes more efficient and effective. Information technology (IT) has become an attractive means of improving these processes. Consequently, organizations have implemented several strategies to improve effectiveness and to enhance efficiencies through the use of IT (Soliman and Janz, 2003).

IT technologies could be applied to a portfolio of relationships and give the opportunity to drive more efficiently processes, improve information flow and closer supplier relationships (Roberts and Mackay, 1998). Moreover, McLaren et al. (2002) pointed out that the technology to support the Supply Chain, is selected by companies depending on a costs-benefits ratio. Furthermore, technologies might be selected depending on the context of employment and on the kind of relationship the company would develop with Supply Chain partners (Roberts and Mackay, 1998).

Concerning these technologies exploited by companies, the set of B2b solutions is particularly heterogeneous. A first classification could be carried out, by distinguishing between solutions which require a strong human interaction and those oriented toward the direct communication of the companies' ERP interested in the business relationship. More in depth in the model, it is useful to further classify on the basis of the specific technologies adopted for the integration (Bertelé et al., 2004).

Interaction method					
U2A		A2A			
Stand-alone Extranet	Integrated Extranet	XML-based solutions	Traditional EDI	EDI on Internet	Proprietary solutions

Figure 21: eSupply Chain Execution classification model (Bertelé et al., 2004)

### ***User to application solutions (U2A)***

User to application solution are largely related to Extranet solution which allow the communication between buyer and seller using mainly Web pages and Web forms through a Web browser. A further classification identifies *stand-alone Extranet* and *Integrated Extranet*. While the former indicate isolated applications, thus not integrated with the company information system, the latter means solution interconnected with the information system of the company that promoted the Extranet.

### ***Application to application solutions (A2A)***

The application to application solutions allow to establish authorized interactions between the companies' information systems involved in the B2b relationship, limiting the human intervention only to a role of supervision and monitoring of exchanged information flows. Such A2A technologies could be classified in four categories:

- Proprietary solutions: B2b interactions based both on the documents exchange in non-standardized format (flat-file, with layout defined depending on the agreement between the actors involved in the communication) and on the access in the management system, ERP or legacy through applicative interfaces;

- Traditional EDI: B2b interactions based on the documents exchange in standardized format (e.g. EDIFACT is the standard recognized at international level by ONU, ANSI X12 diffused in the North America, ODETTE specific for the automotive industry). The integration is related to data and mainly occur through service providers, VAN (Value Added Network);
- EDI on Internet: it is the EDI technologies evolution, made possible thanks to the Internet diffusion; a further division, includes Internet EDI – which exploit Internet as alternative means in order to significantly reduce costs for the data exchange – and Web EDI – which exploit Internet and a Web browser to benefit of EDI services by the upload/download of documents through Web pages or Web forms. However, given its characteristics, Web EDI could be considered a boundary solution between A2A and U2A;
- XML-based solutions: set of technologies for integration which encompass solutions from the asynchronous exchange of documents in XML format (eXtensible Markup Language), to the usage of Web Services.

In the following paragraphs, the technologies which support the eSupply Chain execution processes will be analyzed more in detail.

### 1.4.1 EDI

Electronic Data Interchange (EDI) is a technology which was firstly introduced to the trucking industry in the early 1970s and has afterwards spread to almost all industries and business sectors (Pawar and Driva, 2000). EDI is an A2A technology to exchange data (in relation the above described classification), which allow a direct interaction between ERPs of companies (Bertelé et a., 2004).

In literature there are several EDI definitions, nevertheless the one proposed by Walton (1997) could be considered the most complete and precise: “*EDI is defined as the transmission of standard business documents in a standard format between industrial trading partners from computer application to computer application*” (Walton and Marucheck, 1997).

The reduction in communications, labor, and material costs as well as the gain in competitive advantage are among the reported benefits of implementing an EDI environment. However, the complexity related to the implementation (e.g. operational costs, high initial investment, compatible hardware and different standards) constrain the EDI system to particular contexts. Therefore, EDI could be suited to long-term recurring relationships between the customer and the supplier. Furthermore, the high level of daily documents exchange is considered a necessary condition in order to benefit from the efficiency generated by an EDI project. On the other hand,

an occasional relationship risks to frustrate the initial investment to implement the solution (Soliman and Janz, 2003).

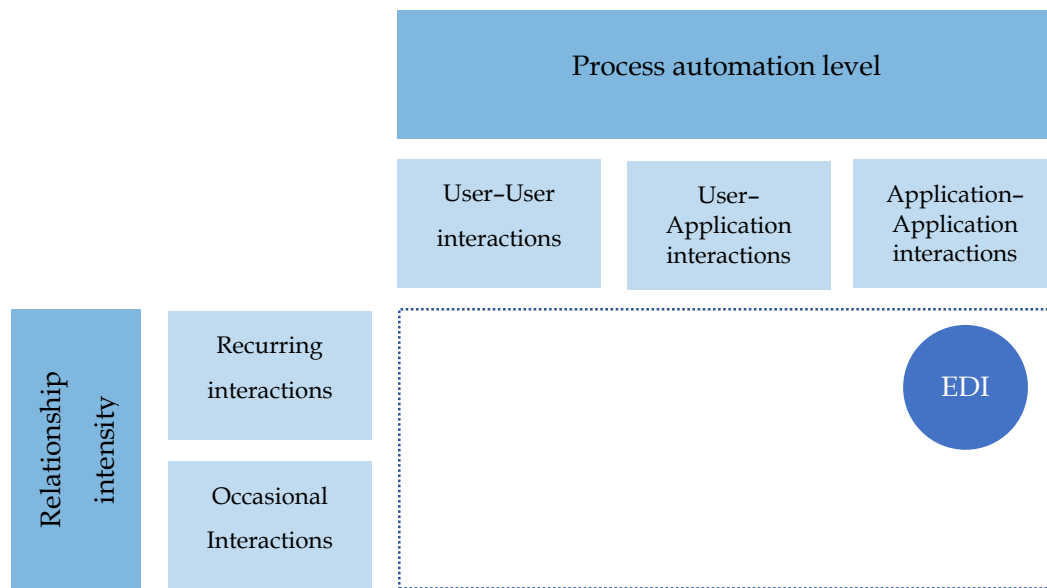


Figure 22: EDI application environment (Bertelé et al., 2004)

#### 1.4.1.1 Traditional EDI elements

The EDI introduction, require the adoption by companies of three necessary elements showed in the following figure:

- Technology: it is composed by the software, communication channels and communication protocols, which allows both the exchange of documents outwards and the integration with the company management information system;
- Communication standard: it is the shared format, agreed in advance between the parties and afterwards employed in the communications;
- Culture: it is the whole set of organizational capabilities and both cooperation and integration will among partners.



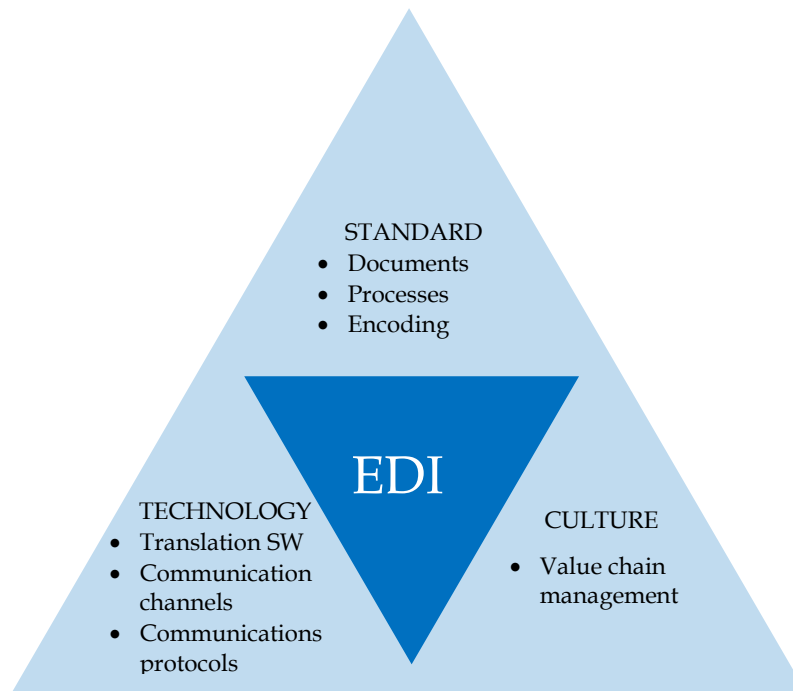


Figure 23: Traditional EDI elements (Bertelé et al., 2008)

### **Technology**

As far as the technology is concerned, the necessary components for an EDI system implementation are the translation software, communication channels and communication protocols.

The *translation software* is necessary to encode the message, from whatever format in EDI language and thereafter “package it” for the exchange through the communication channel. Furthermore, the software carries out the inverse activity of decoding. Finally - exploiting the software - the partner converts the EDI message, received in an adequate format to be then integrated into the management information system. A key requirement of EDI translation software is the ability to integrate the incoming EDI formats with internal business applications (Fu et al., 1999).

Both the encoding and decoding activities are enabled by the four levels on which is structured the software: Business Application, Interface Program, EDI translator and EDI envelope (Perego et al. 2008).

In the following figure, are reported the four software levels above-mentioned, moreover highlighting the output they produce.

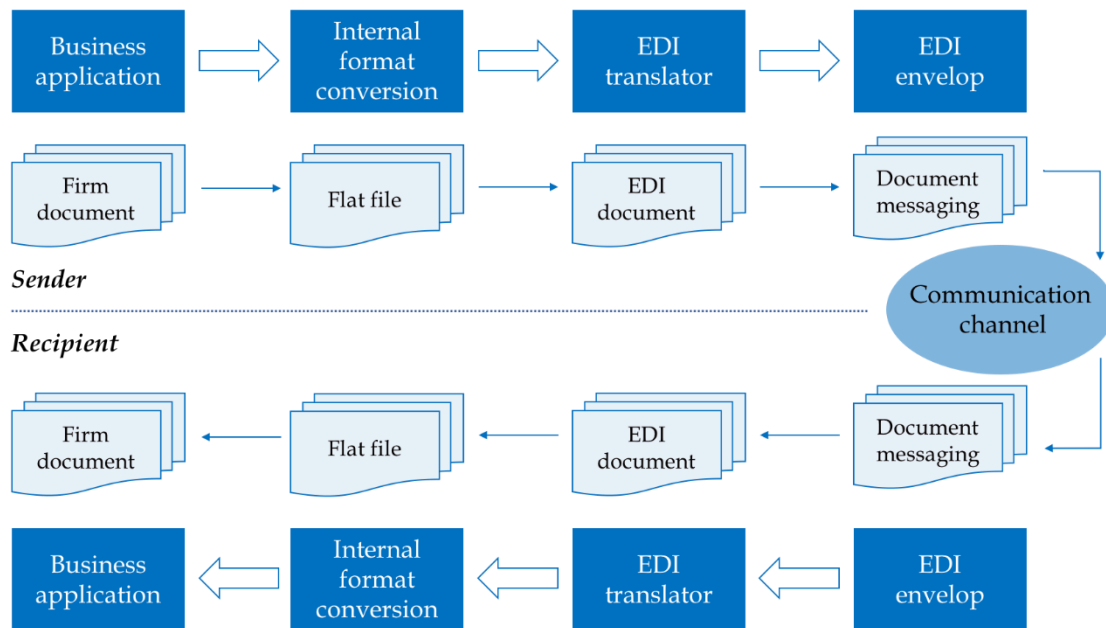


Figure 24: EDI software levels (Perego et al., 2008)

A communication channel includes the set of telecommunications network which allow the data exchange from the sender to the recipient; according to Fu et al. (1999) the main network categories employed in EDI are:

- Point-to-point private networks: they allow the direct interconnection of a small number of user exploiting a tailor-made private protocol. The solution has a low level of scalability, thus not allowing the communication with actors outside the network. They are most cost-effective alternative for transmitting high volumes of data;
- Hub & Spoke private networks: usually provided by a hub company, it is a closed network only available to its trading partners (the spokes). The messages are gathered in a central node and afterwards addressed to the recipient. This type of network is limited and is only available to those trading partners that have a close relationship;
- Value added network (VAN): they play the intermediary role, by offering a set of added value services which allow the transmission of reliable documents in a safe environment. Among the several services offered, some are: to support mail-boxing, protocol conversion, standard conversion, implementation assistance, auditing, and others;
- Public networks (internet): the Internet is a ubiquitous public network that provides many advantages over VANs, including low cost, worldwide connectivity, platform-independent, more flexibility and ease of use infrastructure. Indeed, it gives the opportunity of transfer data without the necessity to build a dedicated (private) network. Nevertheless, public networks do not guarantee the same safety level of VAN's networks which are open only to partners.

The *communication protocol*, is composed by a set of rules in order to have an efficient and safe transmission of data: in particular, the protocol defines:

- The format of the data sent and received;
- The sequence in which the data have been exchanged in order to allow the decoding of the message;
- Check the possible presence of errors;
- Accomplish the retransmission if requested.

The EDI data flow between two companies could be outlined in the following figure.

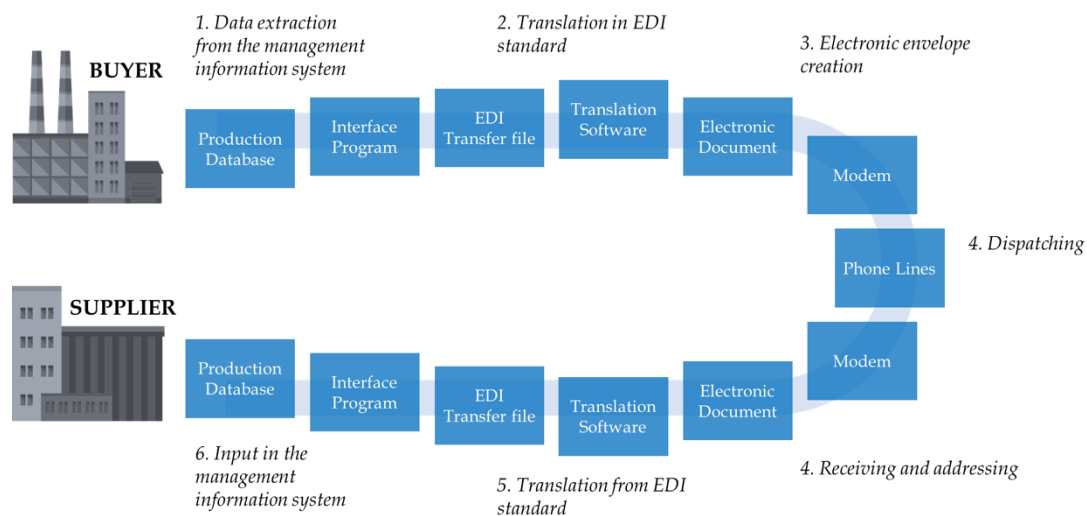


Figure 25: EDI system data flow (Perego et al., 2008)

### **Communication standard**

As far as the standard is concerned, it defines a set of rules and the techniques for structuring data in electronic messages to enable the management information systems at both ends to understand the transactions (Pawar and Driva, 2000). Both companies involved in the transmission agree and apply the standard so that the message could be properly sent and received. The communication standard allows the software to recognize the kind of message or document received, the identification of both the beginning and the end of the message, the reading of data which are properly linked to the related field of the document, in the right Order. Moreover, it guarantees the compatibility among the adopted technologies (software, communication network and protocols) in order to make operative the communications through the EDI technology.

The widespread standards could be classified in the following categories (Bertelé et al., 2008):

- Proprietary standards: they are directly developed by partners through a private agreement and addressed to the exclusive communication within the specific group of users which

take on the development costs. Since the earlier stages of EDI growth, the biggest companies imposed the standard to their clients and suppliers, leveraging on their bargaining power. The main limit of this standard category, are related to the high difficulties and costs that a company has to shoulder to maintain the relationship with its partners.

- Sector-based standards: they born from the need of a set of companies – which operate in the same industry – to communicate each other through the EDI technology, thus with a shared standard. They are less expensive compared to the proprietary ones, moreover allowing both vertical and horizontal communications in the industry.
- Public standards: they are developed by institutional organizations, industry association or international entities which shoulder in whole or in part the costs and commitment of development. The standard aims at foster the EDI technology diffusion by satisfying the different needs of a high number of potential users, thus avoiding the proliferation of closed networks and private standards.

A further communication standard classification is related with the coverage level of the Order cycle documents (Perego et al., 2007):

- Standards released by international organizations (ISO, UN.), which usually work as “meta-standard” to afterwards develop more specific subset. They try to cover the main documents of the full Order cycle;
- Industry standards which cover the commercial part of the Order cycle, from the Order to the Invoice;
- Financial standards which cover the financial part of the Order cycle, from the Invoice to the final payment.

### **Culture**

EDI could impose enormous changes on organizational culture, structure, procedures, and controls as well as, require a strong top management commitment (Angeles et al., 2001). The issue of adopting EDI technology is no longer in the reliability of technology but in the reliability of the trading parties (Ratnasingham, 2000).

Indeed, as trading partners move towards deeper and meaningful business relationships and both parties make a commitment to change or streamline business processes to achieve optimal benefits and even strategic advantage in the marketplace, they must organize cross-functional EDI teams (Angeles et al., 2001; Dailey, 1994). Due to this, it is important for trading partners to view each other as collaborators rather than as competitors in their joint endeavor. Nevertheless,

firms find it extremely excruciating to have to divulge information, particularly if the operations involve proprietary material (Angeles et al., 2001; Pitts, 1994).

Firms with greater bargaining power can influence trading partners to adopt EDI. When firms use coercive power to force less powerful trading partners to adopt EDI, they may be left in a more vulnerable situation and over time this perceived vulnerability becomes a constraint in their inter-organizational relationships, thus preventing improvements in coordination through expanded use of EDI (Ratnasingham, 2000).

Hence, proactive efforts have to be made in building trust when adopting EDI, in order to ensure that the technology will be used in ways that are beneficial to both trading partners over the long term.

**1.4.2 EDI on internet**

The growth of Internet allows several development of EDI technology, thus overcoming some of the barriers which over the years limited the technology diffusion. Internet potentialities firstly guaranteed lower connection costs, but also simpler solutions that would not require standard definition. In this way Internet allowed EDI technology to be used also for occasional transactions (Web EDI, XML EDI) (Bertelé et al., 2004).

Furthermore, EDI and internet-based technologies enabled organizations to access information faster, easier, and at real time. Thus, they allow faster processing speed, greater accuracy, reduced production lead time, reduced production costs, reduced transaction cost, increased delivery speed, and increased delivery reliability (Hong et al., 2010; Chen and Pauraj, 2004; Devaraj et al., 2007; Frohlich and Westbrook, 2002; Li et al., 2006; Park and Yun, 2004; Power and Sohal, 2002; Rosenzweig et al., 2003).

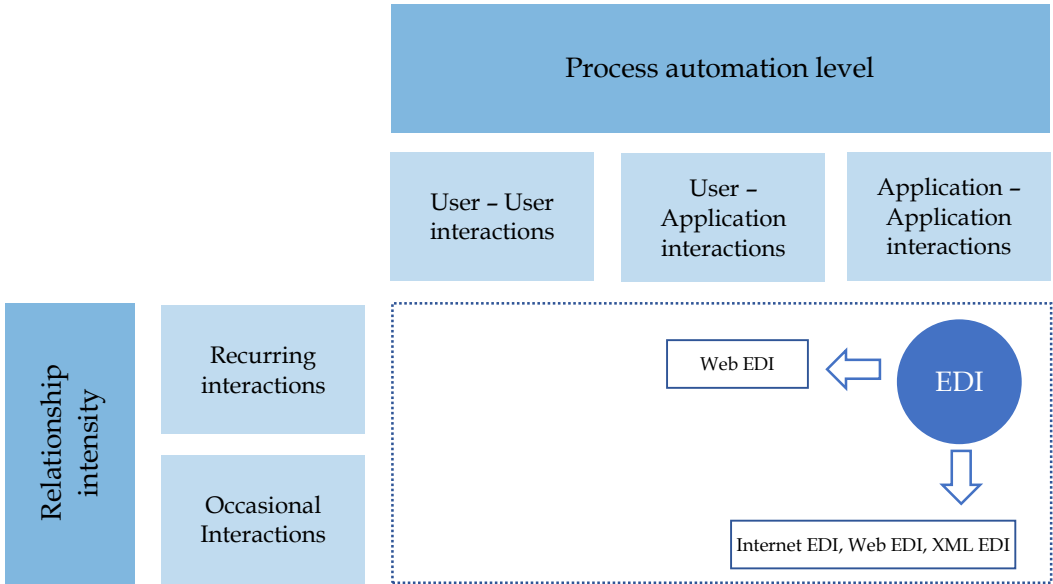


Figure 26: EDI technology evolution (Bertelé et al., 2004)

### 1.4.2.1 Internet EDI

Internet EDI is a set of reliable, accurate, and low-cost techniques, tools, and services, which allow an organization to conduct business with its partners via the Internet (Shang et al., 2005; Lehmann, 2002). Nowadays, it is clear that EDI is no longer constrained by the VANs but it can also be implemented over the Internet (Nurmilaakso 2008; Angeles, 2000). In this way, while smaller firms now have a chance to be included in the network, somewhat larger firms are enabled to implement EDI without having to use VANs (Angeles, 2000; Tucker, 1997).

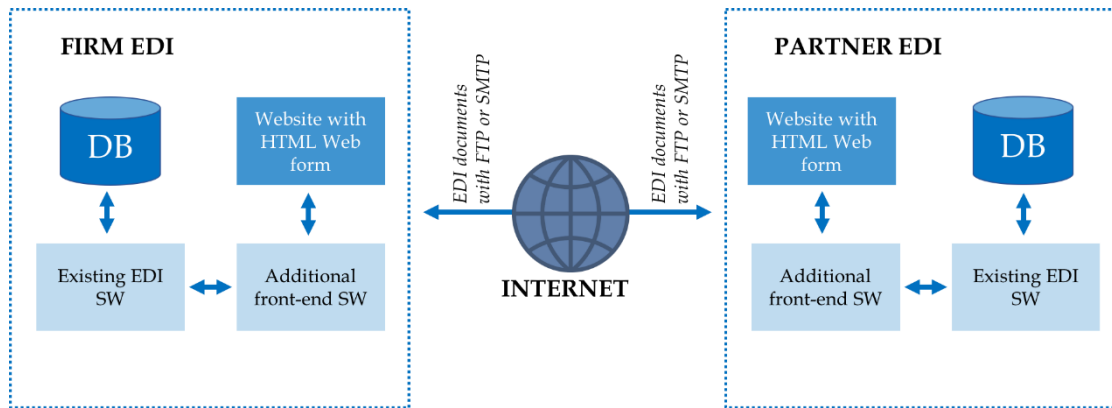


Figure 27: Internet EDI architecture (Perego et al., 2008)

Moreover, the emergence of Internet EDI has caused a shift in the conceptualization of EDI as an electronic technology integrating a single buyer and supplier, to a system that supports a single firm's linkages with a large number of Supply Chain partners (Narayanan et al., 2009).

Shang, Chen, and Liu (2005) identified four major differences between Internet EDI and Traditional EDI:

- Communication protocol: internet EDI works over the TCP/IP protocol. Moreover, Internet EDI allows business partners to connect instantly, regardless of their differences in backend systems. Thus, a much lesser degree of configuration is needed for Internet EDI;
- Deployment costs: traditional EDI costs includes purchasing EDI software, customizing EDI by developing conversion software, integrating EDI with the existing information systems, and establishing the data communications and networking infrastructure with business partners. Unlike a typical VAN, Internet EDI adopts an open networking infrastructure. Hence, it has a higher flexibility and scalability than traditional EDI without adding additional costs. For this reason, also small firms could exploit EDI technology.
- Efficiency and reliability: since it is not possible to control traffic on the Internet, it could happen that Internet EDI slows or terminates in the process of a transaction. In contrast, traditional EDI has a higher degree of reliability because VANs capability to provide higher quality of service level. The network traffic is regulated and its growth is managed.

As a result, users can have a guaranteed bandwidth and protection to access the traditional EDI;

- Security: Internet EDI is potentially less secure than traditional EDI because confidential information may be intercepted between the sender and recipient. However, as the technology becomes more mature, Internet EDI may gradually address the security issues.

### 1.4.2.2 Web EDI

The Web EDI could be considered a second development of the Traditional EDI enabled by the emergence of Internet. This evolution is mainly addressed to suppliers characterized by very limited commercial exchanges in volume and which do not have yet an EDI system, thereby buyers could push them to adopt a Web-based EDI technology (Agi et al., 2005). In particular, the Web EDI completely change one of the main principle of the Traditional EDI: it is related to user-to-application transactions, rather than application-to-application ones (Bertelé et al., 2004).

To use the Web EDI technology, suppliers do not need more than a personal computer equipped with an internet browser and a Web connection (Agi et al., 2005; Weitzel et al., 2000).

More in depth, the firm with an EDI system, build an interface accessible through a Web browser in a straightforward and simple manner, whereby the partner EDI-*non capable* input required data in a Web-form in HTML format (Hyper Text Mark-up Language). Afterwards, data are automatically translated in an EDI document which will be processed by a server infrastructure and then recorded in the management information system (Perego et al., 2008)

In this way, within minutes, even small firms with a PC and Web browser can access a Web site, fill out purchase Order forms, verify their credentials, complete secure transactions, and receive confirmation from trading partners (Angeles, 2000).

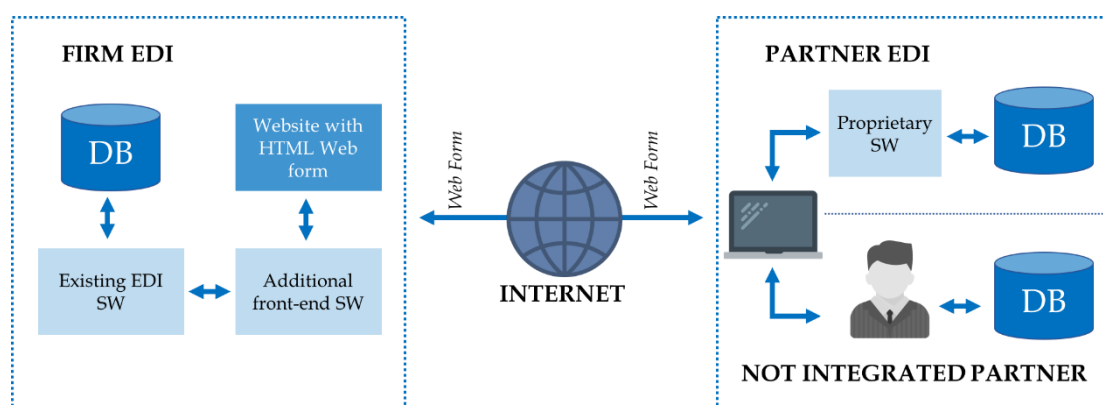


Figure 28: Web EDI architecture (Perego et al., 2008)

Therefore, Web-based EDI technology is being considered by some big industrial buyers as a means to eventually get all their suppliers EDI- connected. Thus they would be able to conduct all their data exchanges with suppliers by EDI means and definitively eliminate some parallel,

expensive and less efficient communication and control methods. The development of Web-based EDI systems was expected to increase considerably EDI adoption and use due to the low investment that these systems require (Agi et al., 2005).

Ranganathan et al. (2004) pointed out more detailed benefits related to the Web EDI against the Traditional EDI:

- Traditional EDI systems, were based primarily on the idea of locking in customers and suppliers, and thereby led to higher switching costs, greatly reduced by Web EDI;
- Web technologies are relatively inexpensive (low connection and transmission costs) and highly flexible;
- Ease of implementation and user-friendly interface;
- Platform independence, thus eliminating the costs related to the specific EDI software;
- Web EDI has the track-and-trace functionality.

### 1.4.3 Extranet

The Extranets are networks with a restricted access (according to predefined profiles) based on the Internet technology and aimed at supporting the integrated and collaborative management of the intercompany processes. An extranet allows for the exchange of resources (applications, database, information, etc.), provides services and process integration (Balocco and Rangone, 2002).

The Extranet models can support the integrated management of all the intercompany processes (not only transactional processes). They can support all the different types of interactions (application-to-application, user-to application and user-to-user). As a consequence, they can be considered as an extension of the EDI.

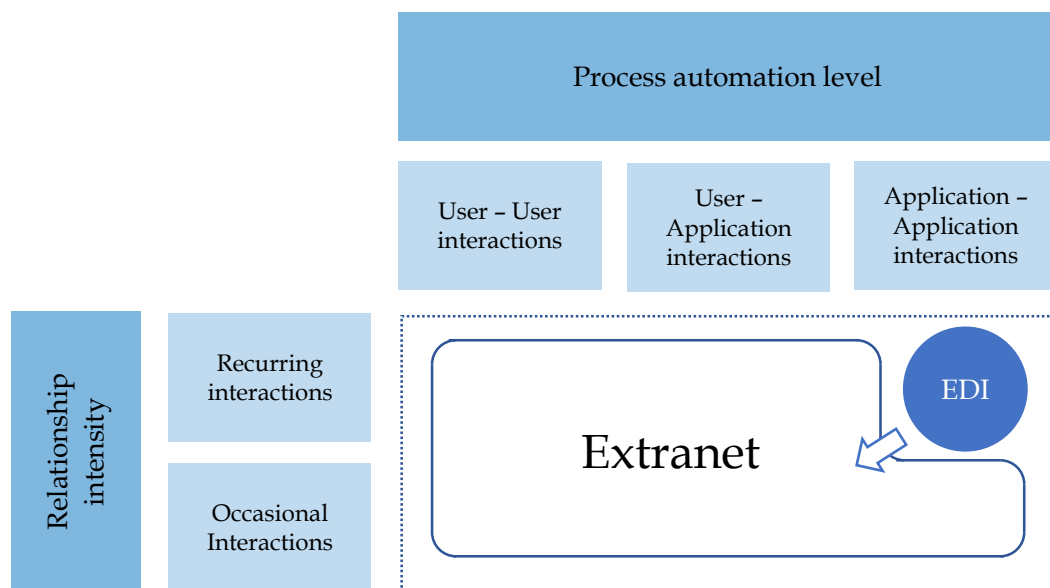


Figure 29: Extranets application environment (Bertelé et al., 2004)



## 1.5 Extranet

The following paragraph aims to describe deeply a further technology which support companies B2b relationships; the Extranets. After a detailed overview, the processes supported by the technology will be described as well as the main models and classifications in literature and finally, the whole set of benefits, criticalities and adoption barriers.

### 1.5.1 Definitions and framework

The Extranets are intended to bring online the main Supply Chain relationships of a company with its partners either suppliers or clients. This technology involves in particular purchase and sales processes as well as more collaborative ones (e.g. production planning or new products development) (Rangone et al., 2004).

More in depth, Lancioni et al. (2004) pointed out that Extranet principal applications have been in the areas of procurement, transportation scheduling, inventory management, Order processing, vehicle tracking, customer service, production scheduling and supplier relationship management. The same concept is also supported by other authors who explained that the impact on the value chain, focuses on the activities related to purchasing and those activities related to coordination costs (i.e. procurement, selling, technology development, and human resource management) (Foster, 2007; Anandarajan et al.,1998).

In literature there are several Extranets definitions, of which the most precise and complete are:

Riggins-Rhee, 1998	<i>An Extranet is a collaborative network that uses Internet technology to link businesses with their suppliers, customers, or other businesses sharing in a safe way information.</i>
Yen and Chou, 2000	<i>an Extranet is the use of internet/intranet technology to serve an extended enterprise, including defined sets of customers, suppliers or other businesses that share a common goal. An important feature of extranet is that they are typically behind firewalls and are closed to the public.</i>
Rihao Ling and Yen, 2001	<i>An Extranet is a private network that use the Internet protocols and the public telecommunication system to securely share part of the business's information or operations with suppliers, vendors, partners, customers or other businesses.</i>
Balocco and Rangone 2002	<i>The Extranets are networks with a restricted access (according to predefined profiles) based on the Internet technology and aimed at supporting the integrated and collaborative management of the intercompany processes. An</i>

	<i>extranet allows for the exchange of resources (applications, database, information, etc.), provides services and process integration.</i>
Laukkanen, Sarpola and Kemppainen, 2007	<i>The Extranet are one-to-many web-portals extending a company towards its Supply Chain partners, in facilitating information exchange between suppliers and buyers.</i>
Bak, 2016	<i>The Extranets facilitate information sharing between supply-chain members. Its use would allow the supply-chain members both suppliers and distributors to publish and gain several transactional and collaborative information.</i>

Table 6: Extranets definitions

### 1.5.1.1 Internet, Intranet and Extranet

Building on the previous definition by Rihao et al. (2001), it is possible to differentiate among Internet (public), Extranet (specific third parties, e.g. customers, partners, suppliers), and Intranet (employees) (Foster, 2007; Chaffey et al., 2003).

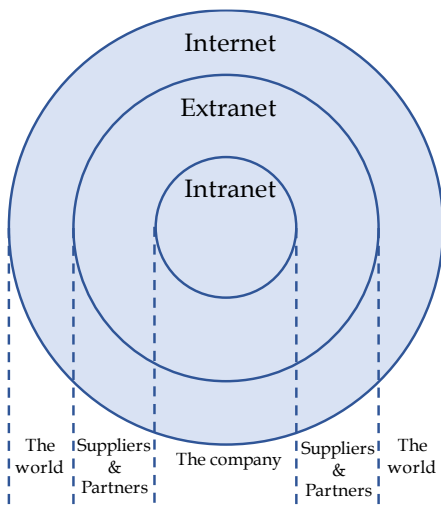


Figure 30: Access to Intranets, Extranets and the Internet (Chaffey et al., 2003)

The *Internet* ([www.netdictionary.com/html/i.html](http://www.netdictionary.com/html/i.html)), is a worldwide network of networks that use TCP/IP communications protocol (the rules that provide basic Internet functions) and share a common address space (Vlosky et al., 2000).

An *Intranet* is a private network used exclusively within (hence the term "intra") a company or organization. It uses Internet technology, but does not necessarily function through the Internet. Access is limited to employees or organization members only. A company may use an intranet to facilitate communications among its members

and deliver information and services to employees. This is particularly useful in large, multi-site organizations (Vlosky et al., 2000; Jade River, 1996).

An *extranet* represents a "bridge" between the public Internet site and the corporate (internal) Intranet site (Foster, 2007; Anandarajan et al., 1998) which links as a means for linking business partners to one another over the Internet (Vlosky et al., 2000). Overall, these concepts could be summarized as following:

	Internet	Intranets	Extranets
What is it?	The information superhighway	The use of Internet technology within a company or organization	A network that uses the Internet to link company intranets in order to enhance business-to-business relationships
Access	Open	Private	By agreement only
Users	Public	Organization members	Business partners
Information	General	Proprietary	Selective

Table 7: Similarities and differences between Internet, Intranets and Extranets (Vlosky et al., 2000; Baker, 1997)

Hence, The Web infrastructure serves as an implementation of this framework with the Intranet supporting intra-organizational business processes, the Extranet interconnecting an enterprise to its partners and the Internet linking the enterprises to their customers, other institutions and agencies (Tan et al., 2000).

### 1.5.1.2 Architecture

Recognizing the growth of extranets as a common part of doing business today is important and therefore the business enterprise must be ready with architectures, policies, and approaches to handle the introduction of extra- nets into their environment (Maier, 2000). An extranet allows a business partner to access part of the enterprise infrastructure (Verma et al., 2002).

As far as the architecture is concerned, an Extranet is a client/server interconnection model, more in depth, according to Verma et al. (2002) it includes:

- *An extranet client application*: this client application runs in the demilitarized zone (DMZ) of a business partner. It runs on a machine that has support for IPSec (IP Security);
- *An extranet server application*: this application runs in the DMZ of the enterprise, and communicates with the extranet client applications that are operational in the partner's DMZ.

Going into a greater detail, Nelli (2004) identified the following four logical components of an Extranet: presentation, logic application, common services and integration.

- *Presentation*: it defines the user interface for the application access through a Web-based environment. The user interface is the means by which an administrator can input the business-level policies within the network (Verma et al., 2002);
- *Logic application*: it implements the applications functionalities that the Extranet will have to make available to users though a Web browser;
- *Common services*: those services that are shared between different applications. They could be further classified in infrastructural services (necessary for the proper use of the application, such as identification, authentication, personalization, security etc.) and

application one such as search tools, directories, collaboration, Document Management System and Workflows;

- *Integration*: it is related to the definition of the connection way of all the Extranet applications with the companies' Information System (ERP, legacy, etc.). such integration, could occur at data, application or interface level.

The way the above levels are mapped in an informatics infrastructure, directly depend on the application the Extranet will provide and on the number of users it will have to manage.

### *1.5.1.3 Main differences compared to EDI*

Extranets are the logical evolution of Electronic Document Interchange (EDI) technology, which has been used for many years to connect companies together for Supply Chain integration (Yen and Chou, 2000). The main Extranets peculiarity is to enable User-to-User (U2U) and User-to-Application (U2A) interactions differently to EDI technologies which are limited to Application-to-Application (A2A) ones (Bertelé et al., 2008).

Furthermore, Extranets exploit one communication standard (TCP/IP) regardless of the industry and support whatever Supply Chain process. On the contrary, one of the main obstacles of EDI is that it depends on industry-specific communication standards (Soliman and Janz, 2003).

For these reasons Extranets are the proper solution either when transactions among the Supply Chain actors are occasional or when the aim is the integration with small partners. Indeed, according to Watson and McKeown (1999), since EDI requires the use of VANs or private networks, it is very expensive; however, the Extranet enables smaller companies to take advantage of Inter-Organizational Systems. An Extranet using the Internet infrastructure has a potentially broad reach and fulfills the same goals as EDI.

Extranets lend very specific benefits to inter-organizational links as opposed to traditional proprietary EDI (Angeles, 2001; Aventail, 1999):

- *ubiquity of access*: there is no need to have the same operating system, database, or Web browser to ensure that all Extranet participants can communicate with each other;
- *open standards*: hardware compatibility is not an issue with Extranets;
- *cost savings*: firms may leverage their investments in their intranets and in Internet technology to exchange information with their strategic partners.

More in depth, concerning costs, Web-Portals require lower investments and operations costs given that they do not need complex technological infrastructures and offer higher flexibility related to the format of exchanged data.

An evidence of it is provided by Watson and McKeown (1999) which identified Extranets costs:

- Communication costs are significantly less with an extranet than with traditional EDI. Accessing the Internet through an Internet service provider (ISP) cost less than the one of using a VAN;
- The software operation costs associated with an Extranet are minimal, since it requires only a Web Browser;
- Learning costs are likely to be lower with Extranets than with EDI because the Web browser has a commonly used interface;
- Hardware costs associated with using Extranets are quite low because all that is required is a low-end personal computer system and a modem.

### 1.5.2 Processes supported

The Extranet is an ICT solution which potentially can support whatever B2b relationship and whatever Supply Chain process. Indeed, as already said before, Extranets could manage both transactional and non-transactional activities including the procurement, transportation scheduling, inventory management, Order processing, vehicle tracking, customer service, production scheduling and supplier relationship management areas (Lancioni et al., 2004).

More in depth, as explained in the previous chapters, the transactional process is composed of three processes: pre-Transactional, Transactional and post-Transactional. In particular, the transactional one is the so called “Order - Payment cycle” and will be the focus of the following analysis.

The Order - Payment cycle is a “unique process; this concept is proved by the fact that clients looks for overall performances such as accuracy, timeliness, efficiency and these strictly derive from the effectiveness by which the Order - Payment cycle phases are integrated each other and not only from the internal performance of each single phase (Bertelé et al., 2009).

The Extranet is a tool which allows the electronic management of the Order cycle and not only to manage documents electronically: indeed, through the automation of workflows, it is possible to coordinate, track and supervise intra-company and inter-company flows, thus guaranteeing high level of accuracy, timeliness and efficiency (Perego et al., 2009).

Alongside the Order - Payment cycle management, through Extranets (exploiting Web pages) it is possible to publish informative contents (e.g. technical documents) which facilitate and improve - or enable as well - collaborative relationships between two actor of the Supply Chain.

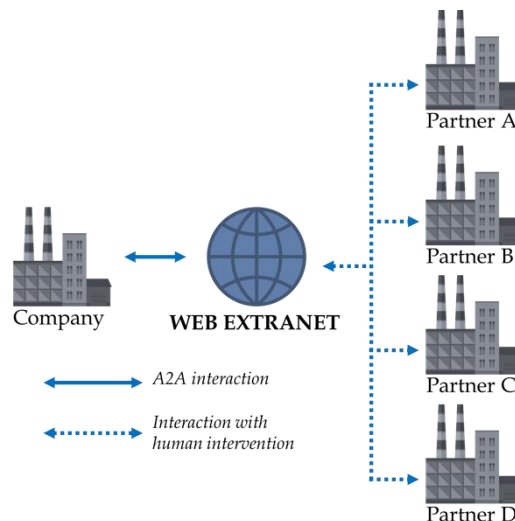


Figure 31: Integration model based on Extranet (Osservatorio Fatturazione Elettronica e Dematerializzazione, 2009)

From an operational point of view, the Extranets that support the exchange of documents enable a “one-to-many” model with different automation levels: indeed, when there is an electronic exchange of documents among parties, they are similar to EDI non-standard networks; on the other cases, the automation could be complete only toward the company which owns the Web Portal, while very limited for the other actors that, for example, input Invoices manually (Perego et al., 2009).

### 1.5.3 Classification models

The focus of this chapter, is to deeper analyze Extranets explaining which are all the classification models in literature; in particular, the analysis will be accomplished looking at different dimensions for the classification such as the supported processes, the actors of the Supply Chain considering both the ones to whom it is addressed and the ones who have implemented the solution, as well as the implementation mode, the Extranet function compared to other channels and the used network.

As far as the first axes of analysis is concerned – the supported process – Balocco and Rangone (2002) provided an Extranets classification based on two macro-families: Transactional Web Portals and non-Transactional ones. More in depth, the former aims at supporting both the purchase of products and services from suppliers (eProcurement) and the sale to other companies (eSelling). Within this category, there are all the Web Portal which manages the Order - Payment cycle. The latter, instead, aims at supporting the Supply Chain Management (SCM) processes, the new product development (or complex projects management) and the Customer Relationship Management (CRM). From this perspective, the Extranets focus on foster the information sharing, the communication, the collaboration and the enabling of pre/post- selling services.

Going further, another interesting dimension of classification, focus on the actor of the Supply Chain. In particular, it is possible to create two macro-categories: the first related to the actor to whom it is addressed the Web Portal while the second related to the actor who have implemented the solution. As far as the first meaning is concerned, it is possible to find out two categories of Extranets: the eSelling/eDistribution ones, exploited when the Web Portal is addressed downstream in the Supply Chain (hence to clients), and the upstream ones for the management of suppliers (Bertelé et al., 2004). More in depth the eSelling/eDistribution Extranets aims at managing the majority of the Order cycle phases, including pre/post sale. On the contrary, the Extranets for the suppliers management are generally implemented by companies which have outsourced a significant part of their production processes, and thus they need a powerful and flexible application for the interaction with suppliers (Bertelé et al., 2004).

As far as the second meaning is concerned, that is the actor who implemented the Web Portal, Rangone et al., (2004), identified two categories of Extranets: in particular, if the interaction occurs in the solution implemented by the supplier to manage clients, the Extranet could be defined as *Seller Centric*, otherwise if the interaction take place on the client Web Portal – who exploit the solution to manage suppliers – it could be called *Buyer Centric*.

More in depth the Seller Centric Extranet makes available the catalogue of products, pre-sale supporting information and tools for better create and customize the Order. Moreover, through this kind of Web Portal, are managed the main process phases (Order issuing, Order tracking, etc.) with workflows predefined by the supplier. On the other hand, through the Buyer Centric Extranets, the client makes available information about the Orders purchase and suppliers are required to input the main documents supporting the Order cycle (Order tracking, Delivery Note, Invoices, etc.) (Rangone et al., 2004).

Furthermore, according to Bertelé et al. (2004) it is possible to classify Extranets depending on the integration level with back-end management information systems. Therefore, Web Portals are *stand-alone* when they are not embedded with the information system of the company, on the contrary they are called *integrated*.

The implementation mode of an Extranet, offer another interesting point of view for their classification. Although, the implementation depends on several aspects (the cash availability, the skills and competences within the company as well as the firm's strategy, the desired customization level, etc.), it is possible to find out some Web Portal categories which summarize all the factors that could influence companies' decisions (Nelli, 2004; Bracchi et al., 2009).

- *In house*: the solution is developed internally to better cover specific functionalities;



- Out of house: the solution, as well as the implementation services, is purchased from a third company. Within the category there are *ad-hoc mode* (when an external supplier develops and customize the solution), *one stop shopping* (if the company purchase the Extranet solution from a single provider), and *best of breed* (if the purchase of the Extranet involves multiple providers, each of which offer a specific feature of the solution);
- Supply Chain: the company join a Supply Chain project. The Extranet is developed by a consortium of companies which would define a unique standard to communicate within the industry;
- Application Service Provider (ASP): the application software is developed and provided by the ASP which are paid depending on the consumption. This way is similar to the *pay-per-use* mode.

Going forward, the classification proposed by Bort (1998) identifies four kind of Extranets depending on the security level and utilization field (Angeles 2001; Yen and Chou, 2000; Bort, 1998):

- Secured intranet access model: it is the most complex one, allowing strategic partners or employees direct entry into the firm's intranet through the Internet. Setting it up could involve the use of a virtual private network (VPN), which creates an encrypted tunnel between a client and server over the public network such as the Internet;
- The electronic commerce model: it uses security and network architectures specifically for B2b commerce transactions. Two types of firms are more likely to use this model. The first type involves small to medium-sized companies that do not have electronic data interchange (EDI) capabilities, but would like to avail of the benefits of electronic commerce through such functionalities, as Ordering and Invoicing electronically and linking online transactions with the back-office accounting and purchasing systems. The second type involves companies that already use EDI but would like to exploit Web-based commerce with trading partners that are too small to afford EDI technology;
- The specialized application model: it poses the least risk to the firm and requires minimal security planning since access from the application to the intranet is minimal. Simple applications include those, for instance, that allow the firm to communicate with its service contract customers or dealers. The minimal security provisions involve the use of Secure Sockets Layer (SSL) and basic authentication or the use of unencrypted passwords and IDs;
- The simple password-protected site: it is easiest to build but it has the weakest security provision.



Another dimension of analysis through which it is possible to classify Extranets, is its function when they are used beside A2A systems. According to Laukkanen et al. (2007), Extranet are an extension of the EDI technology thus, it is possible to link them with two roles: *Partner Extending* and *Information Extending* (Laukkanen et al., 2007). Going deeper, the former role is when companies use Extranet Portals beside A2A links to increase the number of Supply Chain partners with whom information is electronically shared. While companies may require the use of A2A links from some of their partners, they may at the same time employ an Extranet Portal to facilitate information sharing with Supply Chain partners with whom it is not feasible or possible to implement A2A links. On the contrary, Extranets have the latter role when they are used to complement the types of data exchanged via A2A links and, thus, to increase the scope of information shared with Supply Chain partners. This may include, for example, the sharing of data such as technical drawings and blueprints, different types of reports, or other less structured data not so well suited for A2A links. Extranet portals may also complement the functionalities provided by A2A links, hence facilitating deeper electronic collaboration among the Supply Chain partners.

Furthermore, the communication channel could be used as further classification axes: according to Hannon (1998) there are three ways of enabling business extranets:

- *Secure private networks*: extending intranets using private leased telephone lines, allows unlimited and very secure access to the business of strategic partners at a high cost of monthly leased line charges. Growth is significantly costly because a separate leased line is needed for every new business partner added to the network;
- *Public networks*: they offer the highest level of accessibility at the lowest cost but at the same time poses the greatest security risks. A solution to solve the security problem, is to build extranets as separate systems, placing them in a “demilitarized zone” (DMZ) between two firewalls (Cameron, 1998). The extranet server in the DMZ contains mirrored data from internal firm ERP that sit behind the firewalls.
- *Virtual private network*: the newest and most robust infrastructure for supporting the extranet which uses the public network to transmit firm information using standard Internet protocols together with special protocols that put into effect a secure “tunnel” across the public network only for the duration of the transaction exchange (Angeles, 2001; Hannon, 1998; Bitan, 1998). Although VPNs provide a secure and robust service, there are a number of concerns about their performance. Since VPNs rely on the public network or Internet, there is concern for reliability of performance. Also, the more

stringent the encryption techniques used to ensure security of the data, the more computing power is needed to process the data (Angeles, 2001).

Finally, Morgan (2004) offer a classification based on the deployment of an Extranet:

- Bilateral point-to-point connections: typically leased lines that do not traverse the Internet. As such the communications channel itself can be considered to be secure and the communication channels will probably not use transport level security such as IPSec;
- Overlay: using a public network such as the Internet, upon which secure tunnels are created between the respective Extranet partners, typically through the use of IPSec or a similar VPN technology;
- Shared: the use of a third party to supply a private network between the Extranet partners, where typically there is no transport level security between the Intranet partners.

## 1.5.4 Drivers and barriers

Extranet development in a company is fostered by some driver as well as be affected by some barriers which could influence the success of the implementation. Although Extranets use established Internet-based technologies, the implementation process is far from simple and success is not always guaranteed.

### 1.5.4.1 Drivers

Vlosky and Kallioranta, (2004) identified four internal (organizational) and three external (environmental) factors that affect Extranet implementation success. In particular, internal drivers are:

- Corporate culture: it often presents challenges in sharing knowledge with business partners (Anandarajan et al., 1998), as well as in the organization. Thus, to be successful, Extranets may require a change of business culture (Vlosky et al., 2000). Moreover, Harper and Utley (2001) suggest that organizational culture should adequately address appropriate human behavioral elements in order to successfully implement IT systems;
- Corporate structure: consensus of the goals inside the organization is highly important. General objectives and values should be set forth, agreed on, and the information should be shared throughout the organization (Harper and Utley, 2001). Senior managers have a critical role in developing integrated approach to organizational and technical change management (Clegg et al., 1997);

- Corporate strategy: The decision to implement an extranet should derive from integrating extranet into existing business strategies. Extranet adoption can contribute to achieve Porter's (1985) strategies of cost leadership and differentiation;
- Information/technical resources: information resources refer to the nature and amount of information possessed by the firm about individual customers (Varadarajan and Yadav, 2002). Moreover, technical skills and competences are essential in IT application implementation.

Going forward, external drivers are:

- The environment: The macro environment includes legal, political, regulatory, social, cultural, economic, and technological factors (Varadarajan and Yadav, 2002). In order for a company to implement an extranet with its business partners, the macro environment needs to support electronic communication;
- Competitors: Extranets should not be implemented just because competitors are doing it (Chan and Davis, 2000). Nevertheless, Extranet adoption should not be ignored if competitors are using extranets to collaborate with their exchange partners (Vlosky and Kallioranta, 2004).
- Exchange partners: Companies need to identify potential partners with whom extranet connections would be beneficial and profitable. Business partners can be classified based on their importance to the company according to the following classification which identify: *Strategic partners* are crucial to the company's success; *major partners* are important but less critical; *minor partners* are not critical.

#### 1.5.4.2 Barriers

Concerning the barriers which could affect the success of the Extranet implementation – and more in general the collaboration among companies – it is interesting the classification proposed by Park and Ungson (2001) who identified two categories:

- Interfirm rivalry: these barriers derive from a misalignment of goals and behavior among partners. Indeed, companies among the Supply Chain, tend to compete instead to collaborate; such competitive alliances tend to fail because individual partner goals become misaligned with collective goals. Competition will motivate partners to pursue individual interests at the expense of the other partner. Furthermore, collective benefits from an alliance are typically long-term oriented and uncertain, while opportunistic behavior brings immediate realization of individual goals without facing the uncertainty of long-term returns. Strategic relationships also fail because of economic and strategic

incompatibility as well as because of difficulties in implementing the collaborative efforts and integrating them with strategic objectives. Finally, coordination problems within the relationship derive from the lack of information that parties need to have in order to coordinate their activities. (Park and Ungson, 2001).

- *Managerial complexity*: they include information system and technological incompatibility, inadequate measurement systems, and conflicting organizational structures and culture. Because many firms are comfortable using their systems for only their own tasks, it is not surprising to see inconsistent information and technology systems as a barrier. People are change averse and unwilling to share information for fear of exposing their weakness and secrets to others (Fawcett, 2008). Only with an adequate support to *change management* and a clear *vision* definition, it is possible to drive the company toward a consistent and fully accepted change. The lack of these two elements, could lead to the failure of the innovation project of a company.

### 1.5.5 Benefits and criticalities

In the following paragraph will be described and classified some benefits and criticalities which occurs in the implementation of Extranets.

#### 1.5.5.1 Benefits

To acquire and maintain competitive advantage, firms are increasingly turning towards extranets that extend inter-organizational systems to key partnerships which enables them to increase efficiency and effectiveness (Spralls et al., 2011; Watson and McKeown 1999). Hence keeping in mind that Extranets have been used by companies to communicate with customers, suppliers, trading partners, and numerous other audiences (Anandarajan, et al., 1998), it is possible to identify several benefits.

According to Lancioni et al. (2000), Internet-related technologies could bring to many significant opportunities for cost reduction and service improvements (Lancioni et al., 2000). These benefits are summarized in the following table.

1	On-line vendor catalogs from which buyers can find, select, and Order items directly from suppliers without any human contact.
2	The ability to track shipments using a wide variety of modes including truck, rail, and air transport.
3	The ability to contact vendors or buyers regarding customer service problems from late deliveries, stock-outs, alterations in scheduled shipment dates, late arrivals, and a wide variety of other service issues.
4	The ability to reserve space in public warehouses for anticipated deliveries to market locations.

5	The ability to schedule outbound shipments from private and public distribution centers on a 24-hour basis.
6	The ability to provide 7-day/24-hour worldwide customer service.
7	The ability to receive Orders from international customers.
8	The ability to check the status of Orders placed with vendors.
9	The ability to place bids on projects issued by government and industry buyers.
10	The ability to notify vendors of changes in configurations in products that are produced to Order.
11	The ability to pay Invoices electronically and to check outstanding debt balances.
12	The ability to track equipment locations including rail cars, trucks, and material handling equipment.
13	The ability to directly communicate with vendors, customers, etc. regarding supply issues on a 7-day/24-hour basis via E-mail.
14	The ability to schedule pickups and deliveries.
15	The ability to be more responsive to customer service problems.
16	The ability to reduce service costs and response time.

Table 8: Extranets' benefits (Lancioni et al., 2000)

Furthermore, another interesting point of view is given by Anandarajan et al. (1998) who classify benefits of Extranet implementation in three categories: *strategic*, *operational*, and *tactical*. This classification enables exploring the effects of Extranet implementation in strategic level, tying it into Porter's strategy types (1985), on the operational level, tying it into the value chain activities, and on tactical level by its potential as a tool for gaining competitive advantage.

As far as the *strategic* level is concerned, Vlosky and Kallioranta (2004) identified Extranet benefits related to Porter's (1985) generic strategy types. These are summarized in the following table.

Strategy type	Extranet contributions
Cost leadership	<ul style="list-style-type: none"> <li>• Efficient operations</li> <li>• Reduced transaction costs</li> <li>• Standardized and efficient customer service</li> </ul>
Differentiation	<ul style="list-style-type: none"> <li>• Value added services</li> <li>• Differentiated exchange experience</li> <li>• Tailored solutions</li> <li>• Mass customization</li> </ul>
Focus	<ul style="list-style-type: none"> <li>• Improved relationships</li> <li>• Offered to selected customers</li> </ul>
Broad scope	<ul style="list-style-type: none"> <li>• Cost effective to offer to a broad scope of partners</li> </ul>
"Stuck-in-the-middle"	<ul style="list-style-type: none"> <li>• Repeat off-line business processes</li> <li>• Imitate competitors</li> <li>• Serve everybody with generic solution</li> </ul>

Table 9: Extranets' strategic benefits (Vlosky and Kallioranta, 2004)

On the other hand, the *operational* benefits from Extranet implementation include reduced costs and improved cash flow (Anandarajan et al., 1998). More in depth, Vlosky and Kallioranta (2004) identified Extranet benefits related to Porter's (1985) value chain framework, which are summarized in the following table.

Value chain activities	Impact of Extranets
Inbound logistics and Procurement	<ul style="list-style-type: none"> <li>• Increased collaboration</li> <li>• Reduced Order cycle</li> <li>• Reduced search cost</li> <li>• Enables JIT and CRP without EDI</li> <li>• More responsive supply</li> <li>• Small and frequent purchases</li> </ul>
Production and Operations	<ul style="list-style-type: none"> <li>• Sharing supply and demand information</li> <li>• Integration of timely and accurate data into planning</li> <li>• Better demand forecast</li> <li>• Reduced bullwhip effect</li> <li>• Reduced inventory</li> </ul>
Outbound logistics and Distribution	<ul style="list-style-type: none"> <li>• Elimination of intermediaries</li> <li>• Electronic delivery</li> <li>• Accurate shipment</li> <li>• Improved availability of tracking information</li> </ul>
Marketing and Sales	<ul style="list-style-type: none"> <li>• Improved market and customer information</li> <li>• Faster documentation process</li> <li>• Faster payment cycle</li> <li>• Lower communication costs</li> <li>• Improved relationship</li> </ul>
Service (during and after)	<ul style="list-style-type: none"> <li>• 24/7 information access</li> <li>• Faster response</li> <li>• Customized service at low cost</li> </ul>

Table 10: Extranets' operational benefits (Vlosky and Kallioranta, 2004)

Finally, an Extranet could lead to *tactical* benefits deepening business partnerships and collaboration (Anandarajan et al., 1998). Extranets are a great platform for offering value-added services, such as inventory visibility, reporting tools, up-to-date forecasts, on-line chats, delivery tracking, and customized user interfaces (Vlosky and Kallioranta, 2004). Furthermore, sales representatives are able to move from routine work to establishing a close customer relationship (Vlosky et al., 2000). Anandarajan et al. (1998) argue that having an extranet may also lead directly or indirectly to an enhanced corporate image.

### 1.5.5.2 Criticalities

After the benefits analysis, it is possible to identify some criticalities related to Extranets implementation:

- Data security: data security represents a major concern to companies which directly connect the corporate network and the Internet (Yen and Chou, 2000). By placing strategic data, such as financial reports and manufacturing schedules, online, companies open themselves to potentially damaging security breaches (Soliman and Janz 2003). An Extranet should allow for the secure collaboration and communication between producers, suppliers, distributors, and customers (Foster, 2007; Dubas and Brennan, 2002) linking up the computer systems within the organization boundaries and outside the boundaries but at the same time prevent illegal access (Tan, Shaw and Fulkerson, 2000);
- Network reliability and bandwidth: today, business communication requires increased bandwidth to accommodate the transfer of large multimedia files such as video and audio files. Accordingly, bandwidth, or more generally reliability, becomes a concern to many organizations – especially with the current communications conditions inherent with the Internet (Soliman and Janz 2003);
- Availability: Extranets must be available to customers and suppliers at all times because a tremendous amount of potential business rests on them. Backups must be maintained and kept safe (Yen and Chou, 2000);
- Cultural aspects: top management support is fundamental for a successful implementation and to manage the change; nevertheless, sometimes could be difficult to persuade senior managers in the organization to adopt a new technology. Time and money must be spent to increase awareness within the corporation (Yen and Chou, 2000);
- Trust among partners: a trusting relationship is a critical factor for the success. Given its importance, the lack of trust among partners could become a dangerous threat for the implementation (Soliman and Janz 2003).



## Chapter 2: Methodology

In the following chapter, will be described the objectives and the methodological approach adopted to carry out this empirical research work.

### 2.1 Objectives

This graduate work took place as part of the research of "Osservatorio Fatturazione Elettronica e Dematerializzazione" a research group that operates within the School of Management at Politecnico di Milano and its goals are:

- To collect and analyze data about key Extranet projects in our country, mapping them according to different parameters, and filling out a census, with particular reference to those which support eSupply Chain Execution functionalities (Transactional Extranet) however, at the same time, analyzing eProcurement solutions as well;
- To estimate the level of adoption and the current status of Extranet solutions on the Italian territory;
- To identify and in-depth analyze some key Italian Extranet considered representative for the market, in order to estimate their maturity degree as well as penetration level and process coverage;
- To identify the main drivers, benefits and criticalities behind Web-based Portal solutions.

### 2.2 The research methodology

From a methodological point of view this work is articulated in three macro phases as shown in the following figure:

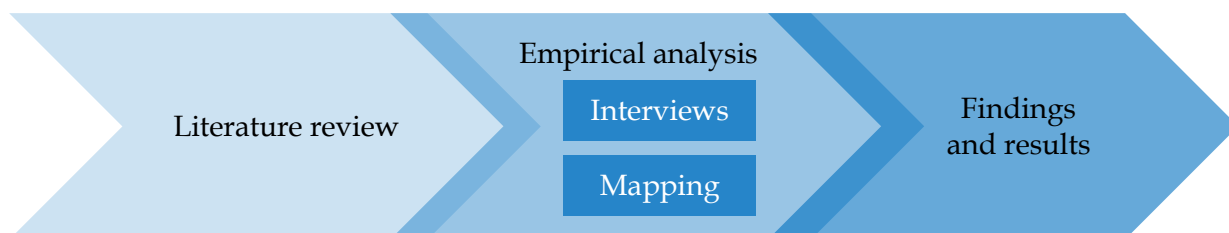


Figure 32: Main methodology steps (Personal processing)

#### 2.2.1 Literature review

The starting point of this work has been the literature review. It has been adopted a top-down approach, aiming at getting a proper contextualization of the phenomena. First, it has been analyzed the Supply Chain Management and the ways in which ICT (Information and Communication Technologies) can support the Supply Chain processes (eSupply Chain



Management, which has been divided in eSupply Chain Execution and eSupply Chain Collaboration) as well as the Procurement processes (eProcurement, then divided in eSourcing and eCatalog). Second, the ICT solutions have been analyzed, with focus on the Extranet topic, which could be considered an evolution or an extension of EDI and which can provide great advantages since it is very flexible and can be adapted for each kind of relationship.

The set of resources consulted for this review is constituted by:

- Academic publications and articles, with focus on the most important management and information technology editors such as *“Journal of Business Logistics”*, *“Supply Chain Management”*, *“Journal of Operations Management”*, *“International Journal of Physical Distribution and Logistics”*, *“International Journal of Production Economics”*, *“Management Science”*, *“Journal of Operations Management”*, *“Technovation”*, *“Information & Management”* and more;
- Non-academic publications (press releases, case studies, newspaper articles, a consulting firm report);
- Resources made available by the Osservatorio Fatturazione Elettronica e Dematerializzazione.

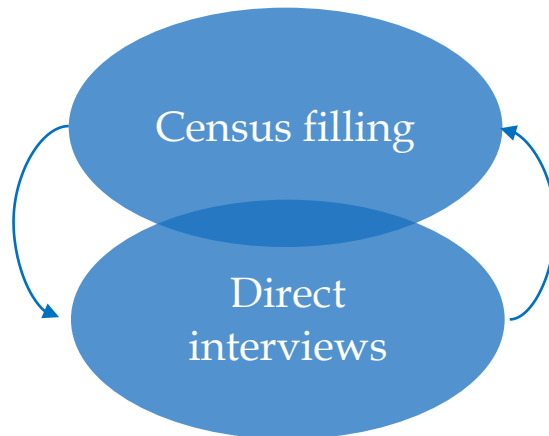
The resources have been identified through the usage of electronic tools such as Websites, institutional archives, bibliographic databases and search engines such as Google Scholar, Scopus, Emerald, etc.

## **2.2.2 The empirical analysis**

In order to meet the objectives of the research, two different approaches have been used.

- Census filling: so as to map key Extranet projects in Italy as well as fill the census, an analysis from secondary sourced did take place;
- Direct interviews: to deeply understand the role, status and maturity of Extranet solutions in the relationships among Supply Chain partners, as well as estimate Web-based solutions' benefits, criticalities and drivers, direct interviews have been made and out of them some case studies have been created. In particular, this approach allows to really conduct an exploratory analysis. This is essential if, as in our case, the investigated phenomenon is constantly evolving and is therefore difficult to establish a priori a well-defined set of variables to consider. A case study allows to study a phenomenon in its real context, as well as to fully understand the cause effect relation that led to the current situation. This methodology, makes therefore research activity, comprehensive and full of innovative features.

Nevertheless, the two approaches are not to be intended as separated, but rather as two processes which complete each other.



*Figure 33: Census and Interviews interaction (Personal processing)*

In particular, from the census it was possible to identify and select the more interesting cases as well as the ones to be deepened; thereafter, direct interviews were fundamental to gather detailed information, allowing to continuously update the census.

### **2.2.3 Census: mapping and filling**

In order to identify the main Extranet project on the national territory, information have been collected from secondary sources, such as:

- Internet researches;
- Previous census;
- Articles in trade magazines;
- Case history analyzed in old thesis or papers;
- Case history published on specialized websites;
- Websites and documents of ITC solutions' providers;
- Results of the surveys conducted by the Osservatorio Fatturazione Elettronica e Dematerializzazione.

For each of the identified solutions, we tried to indirectly obtain as much information as possible about (not for all solution we have been able to collect all the following data):

- Data and characteristics about the corresponding company (sector, turnover, employees etc.);
- Nationality of the solution (national or offshore);
- Nature of the solution (upstream or downstream);
- If the company that own the solution is private or public;

- Classification and functionalities of the solution (eExecution, eCollaboration, eProcurement, eSourcing, etc.);
- Type and number of players involved (customers and suppliers);
- Type and volume of exchanged documents (Order, Order confirmation, Delivery Notes, Invoices etc.);
- Entity of the impact on company business (percentage of Orders that transit on the platform, etc.);
- Name and provider of the tool;
- Other data such as year of creation, description, link etc.;
- Source and date of the information;

The following table shows the census structure used to collect and analyze data.

COMPANY		Name
		Sector
		Turnover
		Payable Invoices
		Receivable Invoices
NATIONALITY		Offshore (y/n)
EXTRANET CHARACTERISTIC	DOWNSTREAM/UPSTREAM RELATINSHIP	Upstram (only eProcurement)
		Upstream (eProcurement & eSourcing)
		Upstream (Execution)
		Downstream
	TIPOLOGY	eProcurement
		eSourcing
		eExecution
		eCollaboration
		Other
		Description (other)
INVOLVED CUSTOMERS	SUPPLIERS	Involved suppliers
		Suppliers estimation
		Tot suppliers
	CUSTOMERS	Involved customers
		Customers estimation
		Tot Customers
TRANSACTIONAL EXTRANET	SUPPORTED DOCUMENTS	Order
		Delivery
		Invoice
		Payment
	EXTRANET IMPACT	Notes
		Exchanged Orders (%)
		Exchange Order estimate
		Total exchanged Orders
		Traded Orders (€)
		Traded Orders estimate
Total traded Orders		

		Exchanged Invoices
		Invoices estimate
		Tot Invoices
GENERAL INFORMATION	EXTRANET PROVIDER	Extranet name/provider
		Provider notes
	EXTRANET INFORMATION	Link
		Description
		Type
		Public
		Private
		Activation year
		Notes
SOURCE DATA	INTERVIEWED	Person
		Job position
	DATA INFORMATION	Data date
		Data breadth
		Why did we choose it?
		Source
	CLASS	Class
	WARNING	Warning
	CASE HISTORY AND NOTES	Case history and notes

Table 11: Census structure

During the census mapping and filling, more than 750 Extranets has been identified, and out of them, so as to implement further analysis, we have selected (according to work goals) about 400 solutions, classified as “Transactional Extranet” since they enable the exchange of at least one document related to the Order - Delivery - Invoicing - Payment cycle.

## 2.2.4 Interviews

As far as the case histories is concerned, the following activities have been carried out:



Figure 34: Interviews phases

### 2.2.4.1 Definition of selecting criteria

In order to identify the company on which create the case history, a set of selecting criteria has been pointed out:

- Priority to (big) companies with important Extranet projects;
- Priority to companies of which we have not enough information in the census;
- Priority to Extranets which have several and well- integrated functionalities and allow the exchange of many documents;

- Priority to companies analyzed in previous case studies, which did show the intention of changing in future and with the possibility to trace a historical evolution;
- Will of covering as much sectors as possible;
- Priority to companies who gave their willingness to be contacted after the participation to an online survey conducted by the Osservatorio Fatturazione Elettronica e Dematerializzazione.

According to the listed criteria, 32 cases have been identified of companies that have implemented Extranet and Web Portals to support upstream or downstream relationships.

Company	Business sector	Position in the Supply Chain
1 Aeroporti di Roma (ADR)	Passengers transport	Provider
2 Artsana	Sanitary	Producer
3 Autogrill	Food distributor	Distributor
4 Bayer	Pharmaceutical	Producer
5 BCUBE	Logistics	Handler-Provider
6 Bionike	Pharmaceutical	Producer
7 Bolton Group	Consumer goods	Producer
8 BTicino	Electrical equipment	Producer
9 Chiesi Farmaceutici	Pharmaceutical	Producer
10 Costa Crociere	Tourism	Provider
11 Dolce & Gabbana	Fashion & Clothing	Producer
12 ENI	Utility	Generator-Provider
13 Ermenegildo Zegna	Fashion & Clothing	Producer-Distributor
14 Esprinet	Information Technology	Distributor-Wholesaler
15 GoodYear Dunlop	Automotive	Producer
16 Gruppo PAM	Retailing	Distributor
17 Hera	Utility	Provider
18 Hilti	Building utensil	Producer
19 Intersport-Cisalfa	Sport & Clothing	Distributor
20 Italtel	Telecommunication	Provider
21 Leitner	Transport (ropeway technology)	Producer
22 Liu Jo	Fashion & Clothing	Producer-Distributor
23 Maire Tecnimont	Engineering	Producer
24 Matalistem Sardegna	Services-commercial spaces' equipment	Provider-Distributor
25 Moncler	Fashion & Clothing	Producer-Distributor
26 OTB	Fashion & Clothing	Producer-Distributor
27 Patrizia Pepe	Fashion & Clothing	Producer
28 Rhiag	Automotive	Distributor

29 S.A.C.B.O.	Passengers transport	Provider
30 Sky	Television-Services	Provider
31 Tod's	Fashion & Clothing	Producer
32 Unico	Pharmaceutical	Producer

Table 12: Case histories

### 2.2.4.2 Definition of the question structure

In order to better conduct the interviews and follow a guideline, a set list of questions have been redacted. This list can be divided into 4 macro-phases:

- General information about company and Supply Chain description;
- Description of the implemented Extranet projects;
- Description of other implemented digital projects;
- Identification of benefits and criticalities for each project.

#### 2.2.4.2.1 General information and Supply Chain description

This section of the questionnaire aims at obtaining contextual information about the company at the overall level, trying to understand dimensional, structural and market's aspects. In particular, contextual corporate information as well as Supply Chain description are useful to gather necessary data in order to classify companies and made further investigations. Specifically, this information refers to: turnover, number of employees, type of products manufactured, sector, corporate structure, number and type of suppliers, number and type of customers, position in the Supply Chain, number of point of sale, etc. Furthermore, some information about the interviewed have been acquired such as job title, functional department to which he/she belongs, willingness to participate to future interviews or surveys, etc.

#### 2.2.4.2.2 Description of the implemented Extranet projects;

This is the core part of the interview, and it aims at analyzing in detail the Extranets projects, supporting the relationship with Supply Chain partners. In particular, we have investigated:

- The objective of the platform: downstream or upstream integration, and by which business units it is used;
- The reason behind the adoption of a web-based solution;
- Year of activation;
- How the platform has been developed: in house or by a provider;
- What is the level of integration with company's systems (for example if it is integrated with the company's ERP);
- The nature and numbers of Supply Chain partners involved;

- The nature of the solution: Procurement, Sourcing, Execution or Collaboration;
- The supported features such as vendor rating, supplier list management, visibility of stocks or sellout, documents' sharing, information' sharing, etc.;
- The exchanged documents and information, such as Orders, Orders' confirmation, Invoices, production plan, demand forecasting, etc.;
- The integration mode with partners, that could be U2A, A2A or both;
- The impact on corporate business such as the percentage of Orders received through the platform related to the totality of Orders, or the percentage of revenues realized through the solution, etc.;
- The evolution of the solution, from the beginning till now;
- Future developments.

#### 2.2.4.2.3 Description of other implemented digital projects

During the interviews we have deepened also other ICT projects implemented by companies. In particular, they have been examined separately the solutions supporting the relations with Supply Chain partners such as EDI, Web EDI or electronic Invoicing - distinguishing between upstream and downstream solutions - and the dematerialization projects supporting internal processes such as work flow systems, Digital Archiving and documents management systems. They were discussed mainly the eSupply Chain Execution solutions but also others projects were discussed. The objective is to highlight not only the consolidated solutions, but also the recent activation or project in the definition phase, so as to understand the evolution of such solutions. For each project we have gathered information about:

- *"Type" of solution*: questions related to the type of solution allows us to gather some basic information about the project implemented such as: name, the impacted processes, the enabling information technology, the category of users involved, the percentage of users out of the total number of users to which the project is designed, the types of documents exchanged and the features of the solution;
- *Future evolution*: another key issue to be explored is the life cycle of the project, to do this they have been gathered information about the needs that drive the introduction of the project, the date of launch and the evolution steps that have occurred from the application till now.

#### 2.2.4.2.4 Identification of benefits and criticalities

In order to fully understand the impacts of the projects, it is fundamental to assess what benefits and criticalities it lead to the company. This step is also useful to create business example, break down barriers and facilitate these solutions spread. In fact, once companies really understand the

potential of a solution and identifies its criticalities (and the why to face them) they will be more inclined toward implementation. As regards the benefits, they have been highlighted the different types of performance impacted by the solution as well as the performances' differential (negative or positive) that the solutions allow to reach. As regard criticalities, we have investigated any problems that emerged during solutions' introduction, and the ones still existing: they can be technological or, as happens more frequently, related to the involvement of partners and to overcome the resistance expressed by staff within the organization. Another key aspect is to understand the impact that the project has had on the organization's structure and on the its relations with the external environment, identifying, where possible, the solutions adopted to cope with the difficulties encountered.

#### *2.2.4.3 Interviews' arranging*

In order to arrange the interviews, we have contacted the selected company and person by mail or by phone asking for a free moment in their agenda. The contacts have been found out thanks to the "Osservatorio Fatturazione Elettronica e Dematerializzazione" database of c-level contacts, but also thanks to personal searching online and offline.

#### *2.2.4.4 Interviews' conducting*

Overall, interviews, lasting between 30 and 60 minutes, took all place by telephone and usually have involved one or more people working in the "Osservatorio Fatturazione Elettronica e Dematerializzazione" and at least one manager of the contacted company. In some cases, it has been necessary to interview more people within the same company in order to have a comprehensive view.

The company managers involved in the interviews were mainly responsible for Information Technology and Supply Chain functions. Indeed, they turned out to be the best people in order to deepen the topics linked to this work, thanks to their background and overview on business digitization and Supply Chain relationship. Not always has been possible to interview these figure and sometime we have contacted Purchasing and Logistics managers.

The interviews have always had a strong discursive nature, so as to allow the interlocutor to freely express, taking all the advantage of an exploratory research. The questionnaire above has been mainly used to give guidelines, not as a rigid scheme.

#### *2.2.4.5 Case history writing*

Once each interview had been conducted, it was formalized what was learned through the writing of a case study. Each case study was structured according to a predefined standard, in line with the questionnaire, so that it was more efficient and effective the comparison between



the different cases analyzed. In particular, each case, according to the gathered information (not for all case history we had all the information), was structured in the following way:

- General information;
  - Summary table;
  - Company overview;
- Supply Chain Structure;
- Extranet projects;
- EDI projects;
- Others projects;
- Benefits;
- Criticalities;
- Future development.

During this structure drafting it has been chosen to highlight also EDI projects, because Extranets could be considered their extension.

## **2.2.5 Findings and results**

Once all the empirical data has been collected through the two previously disclosed research methodologies - case history drafting and census filling - we proceeded with the in-depth analysis of the gathered information, aimed at identifying the needed elements so as to respond to the work objectives.

## Chapter 3: Empirical analysis

### 3.1 Census

During the census mapping and filling, more than 750 Extranets has been identified, and the census has been filled with all the previously described information (table 11) for each solution (where possible). Out of these Web Portals, so as to implement further analysis, we have selected (according to work goals) about 400 solutions, classified as “Transactional Extranet” since they enable the exchange of at least one document related to the Order - Delivery - Invoicing - Payment cycle.

In particular, considering the 400 Transactional Extranet, they are generally implemented by chain leader, and they involve about 100,000 companies also small and medium ones. Out of these Web Portals, 57% are upstream oriented and 43% downstream.

### 3.2 Case histories

#### 3.2.1 Aeroporti di Roma case

##### General information

Company	Aeroporti di Roma S.p.A.
Address	Via dell' Aeroporto di Fiumicino 320, 00054 Fiumicino (RM)
Company Web address	<a href="http://www.adr.it/fiumicino">http://www.adr.it/fiumicino</a>
Extranet Web address	<a href="http://www.adr.it/web/aeroporti-di-roma-en-/bsn-purchasing-portal">http://www.adr.it/web/aeroporti-di-roma-en-/bsn-purchasing-portal</a>
Business sector	Passengers transport
Turnover	€ 900 million
Number of Employees	3,000
Position in the Supply Chain	Service provider
Type of suppliers	Indirect material suppliers, Service provider
Type of Customers	Air carriers, passengers
Contact	Guido Massimo Mannella-Tenders, Purchases and ICT Executive Vice President

Table 13: Aeroporti di Roma's general information

Aeroporti di Roma (ADR) was born in 1974 as the exclusive authority for managing the Rome airport system. It belongs to the Atlantia group (originally called Società Concessioni e Costruzioni Autostrade p.A.) which is a big holding that manage public infrastructures (e.g.

highway) and whose revenues account for more than 4 billion. ADR core business consists in the development and management of the airport infrastructure “Giovan Battista Pastine” of Ciampino and “Leonardo da Vinci” of Fiumicino. In particular, the latter, is the biggest Italian airport, which together with Milano Malpensa and Venice compose the three intercontinental airports of the Italian country. The company, thanks to 45,000 passengers every year (40,000 Fiumicino and 5,000 Ciampino) achieved more than 900 million € turnover.

**Supply Chain Structure**



*Figure 35: Aeroporti di Roma’s Supply Chain*

Upstream, ADR deal with almost 900 active suppliers, that can be divided into indirect materials suppliers and services providers; the latter account for the majority. The services purchased can be further divided into three distinct categories. First of all, infrastructural purchases, including all the call for tender related to the development of new part of the airport. The second one is represented by all purchases related to ordinary and extraordinary maintenance. The last category is composed by purchases linked to others business areas such as marketing services. A peculiarity of ADR purchasing process is that, since it is a monopolistic authority on the territory, it has to follow the legislative decree 163/2006: all the purchases that overcome a determined threshold (50,000 €) must be done through a call for tender, supported by an appropriate technology in order to respect certain fairness and transparency standards. As far as the account receivable is concerned, there are two types of customers; the air carriers that rely on the airport infrastructure in order to provide their service and the passengers who benefit from airport services.

**Extranet project**

Since 2012, ADR exploit an Extranet, according to the previous quoted “Codice Unico degli Appalti” (L. decree 163/2006) that actualize the 2004/17/CE and 2004/18/CE guidelines. The Platform supports the principal phases of the pre-purchasing process, firstly managing the suppliers’ certification; thereafter it supports all the instruction in order to take part in the call for tender and finally the practical execution of the telematics tender. In the initial phase of the process the system organizes a supplier register – designed by product categories – which include

all the pre-qualified suppliers. In order to enter the register a company must follow the on-line instructions and provide all the documents required. Afterwards, when ADR need to organize a call for tender, the system evaluates the registered members through a vendor rating process and send the contest's invitations. Finally, the Extranet manages the envelope "opening" and the eventual negotiation phase.

### **Other projects**

Following the need of reducing, or at least eliminating, the paper volumes and obtaining a better traceability of purchasing processes – thus knowing relative KPIs, such as Order' through put time – the company has digitalized different internal procedures. In particular, all the process from the purchasing and investment request, to the Order emission, passing through the Approval Workflow have been digitalized. Moreover, different document such as technical specifications of the products are digitally attached when a new purchasing request is created, in order to keep trace not only of the economic value of purchases but also of the way moneys are invested.

In order to coherently complete a well-structured digital project, Aeroporti di Roma – supported by an external partner - has implemented the Digital Archiving on the account receivable Invoices.

### **Benefits**

The eProcurement Web Portal implemented by Aeroporti di Roma guarantees a better management of the relationship with suppliers, and a higher control on the purchasing process; this aspect has a relevant importance due to the high volume of purchases (1,500/2,000 per year). The Extranet brings advantages not only to ADR, which now respects the "Codice Unico degli Appalti" and achieve higher efficiency in the process, but also to suppliers; their benefits lie on three levels:

- Higher transparency and guarantee of equal opportunity related to the possibility of winning the tender. All the invited actors now share the same information and rules; they know that they will be evaluated by a vendor rating process on the basis of declared KPIs;
- Time reduction for the dispatching and preparation of offers: now intuitive interfaces drive the process;
- Increase in efficiency, thanks to a standardize protocol of communication that streamline the processes.

At the same time the digitalization of the Approval Workflow, allows the company to obtain a higher control on the internal activities, increasing the traceability as well as the efficiency and reducing the paper volume.

### Criticalities

The main criticalities of the company come from supplier relationships: more in depth, the difficulties derive from the quantification of work progress status, especially about services. Nowadays, after the receiving of purchase Invoices from suppliers there are several expensive controls aimed to check whether the Invoices' value fit the work status.

### Future development

In order to overcome the aforementioned criticalities, the future implementation of the company is that ADR will issue a purchase Invoice proposal directly on the Web Portal, so that the interested suppliers would check its value and decide either to accept it or not.

## 3.2.2 Artsana case

### General information

Company	Artsana S.p.A.
Address	Via Saldarini Catelli 1, 22070 Grandate (CO)
Company Web address	<a href="http://www.artsana.com/">http://www.artsana.com/</a>
Extranet Web address	<a href="http://www.artsana.com/PORTALEFORNITORI/tabid/71/language/it-IT/Default.aspx">http://www.artsana.com/PORTALEFORNITORI/tabid/71/language/it-IT/Default.aspx</a>
Business sector	Sanitary ware, baby care, cosmetics
Turnover	€ 1.22 billion
Number of Employees	6,436
Position in the Supply Chain	Producer
Type of suppliers	Services providers, logistics providers, components suppliers, raw material suppliers, finished goods suppliers, carriers
Type of Customers	Public Administration, pharmacies, large-scale retail trade, owned retailers, retailers, final customers (e-commerce)
Contact	Luigi Binelli - Head of Planning and CRM

*Table 14: Artsana's general information*

Artsana is an Italian manufacturing company, founded in 1946 and having its headquarter in Como. The company designs, produces and commercializes products related to two business areas:

- Health & beauty: it further dividend in three business units (sanitary, cosmetics and condoms);
- Baby care: composed by five business units (shoes, baby clothing, toys, hard goods, sippy cups).

Moreover, the company owns different leader brands such Chicco, Prénatal (baby care), Pic (sanitary), Lycia (cosmetics) and Control (condoms).

### Supply Chain Structure

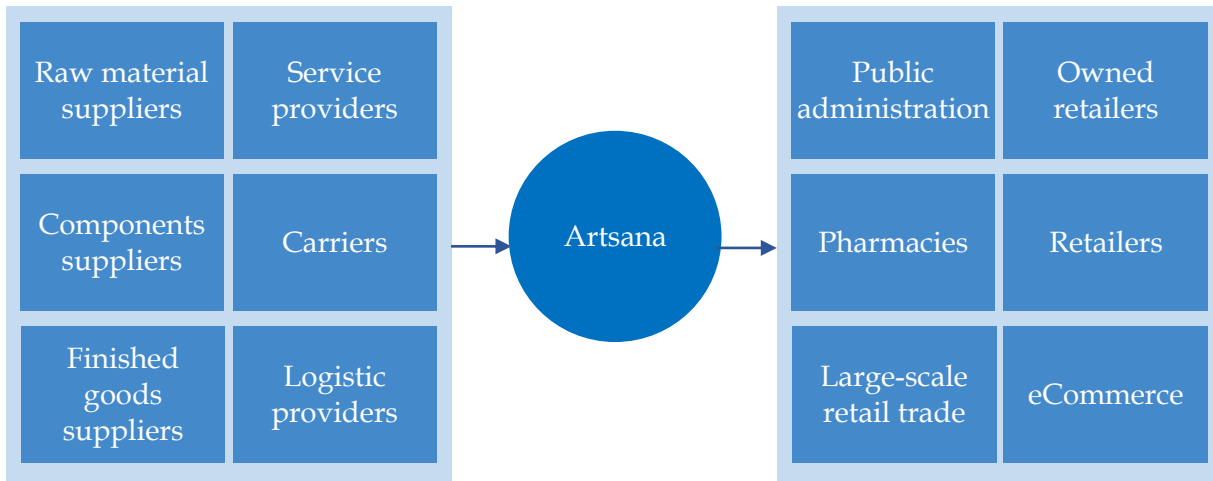


Figure 36: Artsana's Supply Chain

As far as the account payable is concerned, Artsana deal with different kinds of suppliers, of which the most important are finished goods ones. Indeed, Artsana produce only 40% of the total sales and the remaining part are directly acquired by suppliers. Concerning internally manufactured products, the company relies on a network of components and raw material suppliers, that are managed differently: the former - as well as finished goods suppliers - are managed by the corresponding business units while the latter - as well as services providers - are centrally managed by an Extranet. Once the goods are ready to be sold, they are stocked in Artsana warehouses which could be directly managed by the company or by logistics providers. The lasts upstream actors are carriers which are usually big international company, chosen periodically after a tender. On the other hand, as far as the account receivable is concerned, every Business Units is linked to different customers. The healthcare Business Unit serves the Public Administration, (mainly hospitals and ASLs), privates and pharmacies; the latter purchase products by the cosmetics and condoms Business Unit as well, which also serve the large-scale retail trade. Finally, the five baby care Business Units own several exclusive retail brand such as Chicco or Prénatal but sell products also to independent baby shops (big and small), Large-scale retail trade and pharmacies.

### **Extranet project**

The company has implemented a Web Portal to better manage the relationships with suppliers. More in depth, Artsana exploit an Extranet to support the eSourcing process, which allows candidates to register themselves and to provide the documents required – subsequently validated by the company – in order to be included in Artsana’s supplier register. Suppliers are validated by the company in different ways, depending on the category they belong; for example, some “less influent” suppliers are validated by the purchase department, while suppliers which sell products or components, are managed by the quality department.

Furthermore, the solution supports the management of the overall set of calls for tender phases, from the invitations of candidates to the contract procurement, passing through the envelope “opening”. The Web Portal is mainly used by the company to manage raw material and services suppliers, while for component and finished goods there is a direct negotiation.

### **EDI project**

Artsana has implemented an EDI connection with big retailers and the large-scale retail trade, which ensure the exchange of the Order cycle documents; these document are Orders, Orders confirmations, Delivery Notes and Invoices. The usage of this solution is limited to Execution and does not include a collaborative approach such as replenishment plans. Despite involved customers are few in numbers, they account for a considerable part of Artsana business (the real percentage is variable depending to BU and country). Moreover, the main need that push toward EDI derive from these big customers, that well know the technology thus, prefer to communicate according to their standard.

Artsana relies on EDI solution also to deal with carriers, with whom are exchanged digitally the Delivery Note as well as packing lists and other packages information.

### **Other projects**

Artsana has implemented an application, integrated with the ERP system used for its own retail shops; the technology is able to keep track of sales (thanks to receipts registration) and so to have in place daily sellouts. In this case the ERP module organizes automatic replenishments to each shop by computing products stocks and demand trend.

Concerning non-owned retailers not enough structured to sustain a EDI relationship, Artsana makes use of it salesforce. Sales agents visit directly the customers and collect Orders which are afterwards uploaded into an application integrated with the ERP system that process them. Finally, it could rarely happen that this application is available directly to retailers, without passing through the salesforce.

As far as the internal digitalization is concerned, Artsana exploit a Documents Management System (DMS), integrated with the company's ERP, which allows the operative digitalization of all documents, as well as the management of a double Approval Workflow; the first for upstream Orders and the second for the downstream ones. More in depth, when new purchasing requests are generated, they pass through an approval path and, the more the relative amount of money increase, the more they require higher hierarchical level consensus. Once the Order has been approved, it is sent to suppliers. Thereafter, when an Invoice comes back, it is automatically scanned and uploaded in the system. Finally, if the Invoice price correspond with the Order price, Invoices are automatically approved; on the contrary, a new Approval Workflow starts. To complete a well- implemented digitalization project, the company has implemented the Digital Archiving for every fiscal document.

### **Benefits**

The digitals projects implemented by Artsana, has led to significant benefits that goes from a better service level – due to a higher readiness toward customers/suppliers – to a reduction of time dedicated to non-value added activities such as traditional Order receiving. Moreover, the company has eliminated the manual data entry activities, and the paper volumes, making easier operations and controls.

### **Criticalities**

The main internal problem found out during project implementation is linked to cultural barriers against digitalization, especially from sales agents whom have to work with the new solutions every day. However, in order to overcome these resistances, Artsana has created a Change Management team which has trained people and that nowadays is still organizing periodical update courses. Furthermore, another internal barrier (that could be perceived also by external actors), is related to the difficulties in adapting the application to the continuous upgrade of computers' operating system. On the other hand, the main external problems derive from suppliers' culture (in particular foreign countries, with no diffuse digital culture).

### **Future development**

Artsana would like to go further in the digitalization, currently working on a project aimed to improve the application dedicated to its salesforce and retailers. Nowadays this solution does not allow to have visibility on product stocks and real-time Order confirmations. Moreover, since the application is "heavy" (from the data computation capacity point of view), it requires a computer to properly work, thus, forcing sales agents to manage Orders manually, and uploading them as soon as they could use computer. Hence, the company is looking for a lighter solution, that could be available on tablet devices thus providing a better service in real-time.



### 3.2.3 Autogrill case

#### General information

Company	Autogrill S.p.A.
Address	Strada 5, Palazzo Z - 20089 Rozzano (MI)
Company Web address	<a href="http://www.autogrill.it">http://www.autogrill.it</a>
Extranet Web address	<a href="https://asupply.bravosolution.com/landing/landing.html">https://asupply.bravosolution.com/landing/landing.html</a>
Business sector	Food distributor
Turnover	€ 4.2 billion
Number of Employees	55,000
Position in the Supply Chain	Distributor
Type of suppliers	End product; Raw material; Engineering and construction
Type of Customers	Final customers
Contact	Marcello Chierici – Head of organization development

Table 15: Autogrill’s general information

Autogrill, is an Italian multinational that was born in 1947 with its first Autogrill store. Thanks to a continuous and exponential growth in the food service industry, the company nowadays manages more than 4,200 point of sales spread in approximately 1,000 locations in 31 countries in the world. Autogrill, which has been listed on the Italian stock exchange since 1997, could rely on a wide number of employees, more than 55,000, and on a portfolio of 250 brands; in this way it was able, in 2015, to achieve the considerable result of 4.2 billion € turnover, the 30% of which only in Italy.

The 90% of the business is based on concession contract, exploiting the toll roads, airports, railroad stations, shopping centers and cities channels, keeping the same business strategy for each country, but at the same time, shaping it depending on the different requirements, needs and habits. Finally, the company is structured in three different Business Units (Europe, Nord America, International).

#### Supply Chain Structure



Figure 37: Autogrill’s Supply Chain

As far as the account receivables is concerned, the company relate directly with its 900 million final customers, through the different channels spread worldwide.

The procurement process in Europe, is translated in the management of 5,000 items and 500 suppliers; the overall set of account payable actors refer to three categories:

- End product suppliers: final products mainly concerning the retail industry, such as toys, consumer electronics hygiene products or publishing products;
- Raw material suppliers: materials that Autogrill will directly handle as well as components already processed. Within this class, the company has started since almost two years, a transition project for the system of food product categories definition; food products are delivered to Autogrill either directly produced by suppliers or with a production process that continue in the point of sales;
- Engineering and construction: the planning and work management for the creation of new stores as well as stores layout and technical design, is directly monitored by the company; it represents a relevant aspect given the required management of provisions such as technical equipment or furniture. In this way Autogrill has a central unit to easily manage negotiation phases and agreements.

### **Extranet project**

Since 2013, Autogrill has started a new digitalization - on a European basis - project, thus involving the revising of processes. However, it is not a single step transition, but the company has shaped a clear strategy with a likely conclusion of the project by 2020.

The company, for years now, is using and improving step by step a very powerful solution to manage the account payable. Autogrill has initially implemented an Extranet to support the so called Procure-to-Pay cycle. More in depth, the technological solution adopted, allows firstly to efficiently manage the process starting from the scouting of suppliers and their qualification going further toward the negotiation and contract management and finally operative execution of eProcurement Orders through reverse auctions; all the phases are managed online by the Web Portal. Thanks to this technology, the company centralized purchases, exploiting new synergies on a significant part of the provision, leaving to local team the remaining part of products and services. Keeping the objective of continuous improving of the relationship with upstream actors, the new Vendor Management System, allows the company to establish a well-structured dialog with suppliers.

Finally, Autogrill has recently introduced a spending analysis system, with the aim of gaining a higher level of transparency and traceability of all the transactions. This new tool could quickly guarantee to the company higher service level and competitiveness.

## **EDI project**

Autogrill has implemented the EDI channel to manage different kind of documents and information with its suppliers, nearly to 70 in the Italian country; this technological solution is used firstly to exchange Invoices. In Italy almost the 60% of the overall purchase Invoice volumes are exchanged through EDI and are related the highest part of the food product categories. This percentage reach the 90% in Spain and 55% in France. Furthermore, concerning direct supplier deliveries (the ones that do not pass through a logistic operators) the company forward, through EDI, the purchase Orders and receive the goods pre-loading on point of sales. More in depth, it means that all the stores receive through EDI the documents and data related to Ordered quantities or items delivered by the supplier; moreover, the stores have the possibility to directly confirm or modify the quantity depending on the amount received. Finally, the company manage electronically the Delivery Note, receiving it through EDI channel.

## **Other projects**

The overall digitalization project of Autogrill, go beyond the relationship with the upstream actors and include also internal activities to achieve a better efficiency and effectiveness in the company processes. In particular, Autogrill digitally archive all the account payable Invoices (almost 300,000 per year) as well as the mandatory accounting ledgers such as the general journal. Furthermore, the company has introduced a Document Management System (DMS) for the administration of the Approval Workflows - with several internal authorization levels -related to the payment process. Moreover, the solution guarantees a more rapid and thorough research and consultation of the stored documents and data, such as the one related to the human resources.

## **Benefits**

Overall, the digitalization of the account payables, allows Autogrill to achieve a remarkable degree of efficiency, translated into the 20% decrease of G&A expenses. More in depth, the possibility to have Invoices directly visible on the ERP, guarantees the automatic and instant accounting record. Despite the possible mismatch (in quantity or price), there is the Approval Workflow system, which manage the latter, allowing the accounting record of Invoices at least in 10 days, against maximum 90 days required before the implementation of the solution. This benefit reflects the capability to better follow the contractual terms, thereby improving the relationships with the whole set of suppliers. Furthermore, the Extranet guarantees higher effectiveness and an enhanced service level in the eSourcing and eProcurement activities. Finally, the Digital Archiving and the Document Management System allow to improve the efficiency and reduce costs and time related to the internal processes and activities carried out by the company.

### Criticalities

Autogrill well managed all the possible criticalities and resistances; concerning internal processes and actors, the main problems are related to the change management, already solved by supporting all employees. On the other hand, some criticalities arisen on the account payable, since in the early stages of the technological solution implementation, both Autogrill and suppliers communicated through the companies' IT stuff. Thereafter, they realized the fundamental role of the purchase department (Autogrill) and sales department (supplier) in this process and results start to be achieved.

### Future development

Despite the accurate and complete digitalization project, the company has planned to go further with a step by step growing program. Indeed, Autogrill is working on the adoption of collaborative systems and processes with strategic suppliers, thus integrating a demand planning solution. Moreover, the company is continuously committed in increasing the EDI adoption among suppliers, going beyond the actual considerable level of 70%. Finally, Autogrill is working on the digitalization of both some "core" processes with high paper flow and different kind of documents data and information related to the human resource administration, thereby providing several benefits to all employees.

## 3.2.4 Bayer case

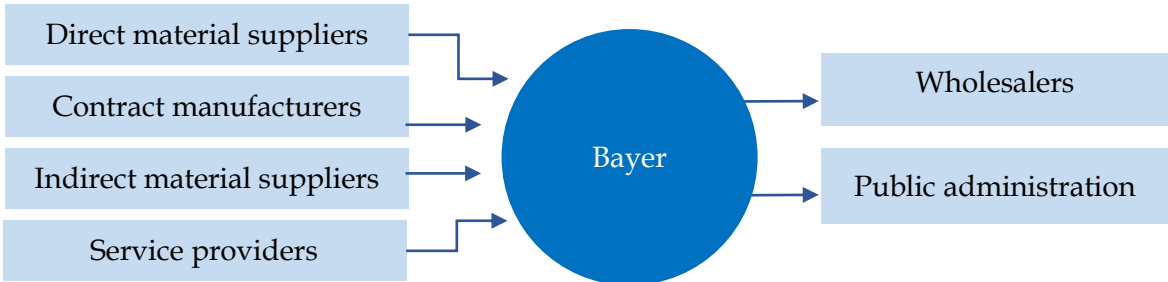
### General information

Company	Bayer Italia S.p.a.
Address	Viale Certosa 130, 20156 Milano (MI)
Company Web address	www.bayer.it
Extranet Web address	www.extranet.bayeradvanced.com/
Business sector	Pharmaceutical
Turnover	€ 1.2 billion
Number of Employees	2,300
Position in the Supply Chain	Producer
Type of suppliers	Direct material suppliers, indirect material suppliers, services providers, contract manufacturers
Type of Customers	Wholesalers, public administration
Contact	<ul style="list-style-type: none"><li>• Ottavio di Blasio - Head of Purchasing Platform</li><li>• Ezio Lamperti - Direct material purchase responsible</li><li>• Nicola Graifenberg - Head of Procurement</li></ul>

Table 16: Bayer's general information

Bayer is a chemical and pharmaceutical company founded in Germany in 1863 with headquarter in Leverkusen. The Italian division is one of the leading companies in the pharmaceutical industry of our country and is active in three business areas. First of all, the Pharmaceuticals Division which focuses on medicines subjected to medical prescription dealing with cardiology, oncology, gynecology, hematology and ophthalmology; secondly, the Consumer Health which offers some of the best-known drug products not subjected to medical prescription (over the counter drug), dietary supplements and other personal care products. Finally, Bayer CropScience operates in the agricultural sector, in particular crop protection, gardening, hygiene and environmental sanitation.

**Supply Chain Structure**



*Figure 38: Bayer's Supply Chain*

Upstream, Bayer deal with three main kind of suppliers: direct materials, indirect materials and finished items suppliers, for a total yearly expense of 130 million euro - net of intercompany operations - which correspond to about 70,000 Orders lines per year.

As far as the purchase volumes is concerned, about a third is related to direct material and finished products, while two-third refers to indirect materials.

In order to cover all the amount of purchases, Bayer relies on 1,200 suppliers out of which only 40 could be consider Pareto efficient (they account for the majority of purchase volume). In particular, considering direct material and finished goods - Bayer relates with contract manufacturers who produce finished products which are afterwards commercialized under the Bayer logo - they account for 55 million expense (12,000 Order lines) out of which 40 refers do direct material provided by 190 different suppliers and the remaining to finished items, provided by about 70 suppliers.

Focusing on direct materials they include providers of active substance, excipients and packaging. Furthermore, others upstream actors with which Bayer deal, are services providers managed following the same metrics applied to indirect material suppliers.

As far as the production is concerned, Bayer is active in three plants in our county: one in Garbagnate (MI) where solid tablets are manufactured, one in Segrate (MI) where semi solid items such as dermatological creams are produced, and the last in Filago (BG) where the company produces pesticides and other agricultural products for its CorpScience division.

Finally, downstream, Bayer sell directly to hospitals and other public entities as well as pharmaceutical wholesalers.

### **Extranet project**

In order to efficiently relate with the wide set of suppliers, Bayer has implemented an eProcurement portal, mainly used for the management of indirect materials purchases. The company uses a unique eProcurement platform, provided by an external provider, but managed internally and centralized, by Bayer itself. The platform is common to all Bayer divisions of various nations and the decision to adopt a single solution, internal and common, was taken at a global level in order to have higher control on the purchase processes. The Extranet allows the evaluation of suppliers according to a-priori set KPIs, as well as the management of RFX (RFI, RFQ, RFP) and electronic auctions. The latter could be managed in different ways, according to the price policy decided by the relative division: classical auctions, reverse auctions or Dutch auctions. Furthermore, the Web Portal is exploited for managing the services acquisition, changing some parameters.

Considering indirect suppliers register, it is managed locally using a Web base solution that does not communicate with the previous discussed platform. Nowadays it is not planned any project to create a global suppliers register because of the local peculiarity of each market, such as pharmaceutical quality requirements.

Concerning the relationships with direct material and finished good suppliers, the presence of pharmaceutical constraints due to ISO 9001 quality requirements makes the scouting a very structured and complex process. The Web Portal can be used as a first point of contact to gather information about the market through RFIs; thereafter, suppliers must be qualified by the plant of production which express the purchase need. Moreover, once certified, the drawing up of the contract takes place electronically and requires that the supplier put its digital signature on the document which is afterwards automatically uploaded in the ERP system. Finally, it is particularly interesting the way in which this SCM solution manage the direct material Orders: by default, yearly supply contracts are created, from which from time to time some Order coupon are removed, including, details about quantities and the relative delivery period. The 80% of the 12,000 direct material Order lines, are automatically managed in this way, while the remaining 20% through spot Orders.

### **Other projects**

Since 2014, Bayer with two direct materials suppliers - which use the same ERP - has started a pilot collaboration project: through a specific Supplier Network Communication (SNC) tool, the two ERP systems (the supplier one and Bayer one) could communicate exchanging a structured

data stream. In particular, Bayer can issue an Order, the supplier receives it and sends back a notice alongside then the Order Confirmation (in terms of quantity and delivery date); thereafter Bayer automatically receives them, the system update the data and allows to change them if necessary. Once the supplier carried out the production, it generates an advance notification about the shipmen contain information about quantity and batch of production. These data are afterwards automatically uploaded in ERP system of Bayer who, once received the material, it will just confirm that information.

Concerning the purchase to pay cycle and its digitalization, in Bayer do not exist a relative department but it is a shared responsibility process between the Procurement and Accounting departments. Pushed by the need to make more efficient the account payable cycle, Bayer in 2013 has started a worldwide project regarding eInvoicing and Digital Archiving of fiscal document such as payable Invoices. Considering eInvoicing, the company relies on two solutions, made available by two external providers: one for relating with big and structured partners while the other for relating with less structured actors. Both solutions receive structured data (not pdf files) and directly process and upload them into Bayer ERP system. Furthermore, the global project includes the Digital Archiving of such documents; nevertheless, currently it does not occur in Italy yet.

### **Benefits**

The adoption of digital solutions has allowed Bayer to increase the efficiency related to the relationship with suppliers, reducing the time and cost of scouting and qualification processes as well as interaction and negotiating time. Moreover, the digitalization has increased the transparency and traceability of purchases and consequently the control on expenditure.

### **Criticalities**

From the external point of view, Bayer did not face particular criticalities; indeed, its great bargaining power has allowed the company to manage business changes easily, efficiently and accurately. Indeed, suppliers who want work with Bayer, must adapt to the specifications and methods used by the company.

As far as the internal digitalization is concerned, Bayer has encountered some problems, due to the lack of a process ownership relative to the purchase to pay process. The process is handled by different business functions, resulting in the creation of internal conflicts produced by the most conservative divisions.

### **Future development**

Concerning the above discussed collaboration project, which allows the integration on Bayer and suppliers ERP, currently it is carried out only with two suppliers. Nevertheless, the future



intention of the company (starting from 2016) is to extend the adoption of this system to a greater number of suppliers.

In Italy, the global project concerning Digital Archiving, has not started yet because of legislative differences and problems compared to other nations. An example is the necessity, according to Italian law, to point out a Digital Archiving responsible; this procedure does not occur at European level. However, Bayer is implementing this project also in Italy during the first quarter of 2016.

### 3.2.5 BCUBE Air Cargo case

#### General information

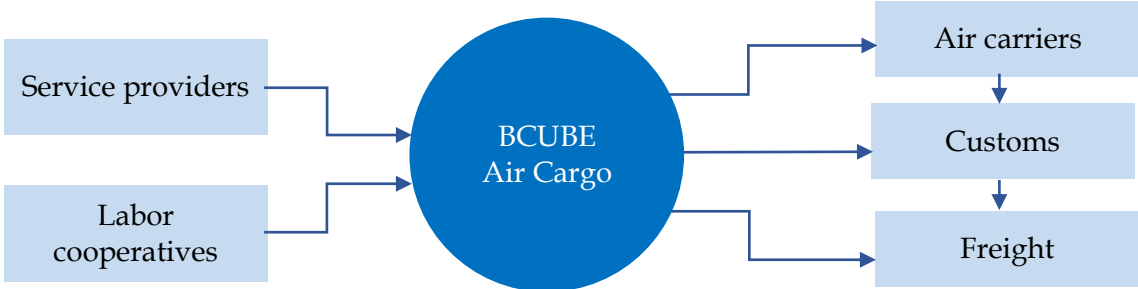
Company	BCUBE Air Cargo S.p.A.
Address	Piazza San Camillo de Lellis 1, 20124 Milano (MI)
Company Web address	<a href="http://www.bcube.net/it/">http://www.bcube.net/it/</a>
Extranet Web address	n.a.
Business sector	Logistic
Turnover	€ 266.5 million
Number of Employees	500
Position in the Supply Chain	Provider
Type of suppliers	Labor cooperatives, service providers
Type of Customers	Air carriers, freight forwarders
Contact	Roberto cogliati-ICT Manager

*Table 17: BCUBE Air Cargo's general information*

BCUBE Air Cargo belongs to the BCUBE holding that is an international company with competences in different business fields: automotive, energy, industrial, aerospace & defense, air cargo and fast moving consumer goods. In particular, BCUBE Air Cargo is an administrative company that manage two operative sub-holdings: Malpensa Logistic Europe (MLE), which operate on Malpensa and Linate airports, and Fiumicino Logistic Europe, which operate on the airport of Rome. The core business is the handling process of goods, doing the composition of air shipments for the export flow and disassembling the goods composed by a foreign agents and reassembling it according to the final customer requests in case of import flows.



**Supply Chain Structure**



*Figure 39: BCUBE Air Cargo’s Supply Chain*

The upstream relationships with service suppliers and labor cooperatives have not a strategic importance for BCUBE business, thus there are not structured digitalization projects toward them. On the contrary, concerning the downstream relationships, BCUBE Air Cargo deal with two kind of customers: firstly, there are air carriers while secondly freight forwarders. More in depth, for both these actors, the main flow of document exchanged are related to information about pallet composition and goods status notification; moreover, these are the most time consuming processes. Furthermore, air carriers are big international companies which usually have the competences to manage a digital relationship, while the freight forwarders are a heterogeneous set of small company that manage import/export customs clearance and have a low level of skills to deal with digitalization; with the latter, the integration is more difficult, especially considering the Execution. Another actor whom BCUBE Air Cargo deal with, is the customs, that give authorization every time the goods enter or exit the customs space (it is necessary for import/export operations).

**Extranet project**

Since 2006, BCUBE Air Cargo exploit a Web Portal, addressed to support the relationships with customers, whose principal objective is to allow the exchange of collaborative information. The project is continuously evolving and have a lots of future development. The need was born from a direct request of the operative department to the IT one, asking to find a way to make easier and more standardized the information flow coming from customers and in particular to provide quickly, real time information about goods status and handling processes. Initially, every phase of the handling process – form the picking notify to the good release and shipment notification – were managed traditionally and did consume a lot of working time. Afterwards, BCUBE has digitalized this process, creating the base of its Web Portal, thus, giving to customers the possibility to check the work progress status. In particular, this phase was characterized by a mono- directional flow of information, from BCUBE to customers. Thereafter, a bi-directional relation has been implemented, introducing new functionalities and asking customer to interact with the Platform and cooperate on not value- added activities (for BCUBE), which could be

provided directly on the Extranet using standard forms. Hence the company created the opportunity to work without the necessity to process again this information. A clear example are the pallet creation instructions.

### **Other projects**

Currently BCUBE Air Cargo is using a Document Management System (DMS) based on a client server structure. Nevertheless, the solution does not support electronic Approval Workflow management and documents cannot transit automatically, thus needing to be moved across folders using employees time.

### **Benefits**

Thanks to the implementation of the Web Portal, BCUBE has achieved a remarkable level of coordination among activities, particularly related to the collection and distribution of information from and toward customers. Furthermore, the reduction of non-value added activities brings to a paper volume reduction (e.g. flight instruction transit in an electronic format while before they were received in traditional ones such as PDF, email and PNG and afterwards printed).

### **Criticalities**

The main criticality of the company, lies in the fact that customers are not always well disposed to use the Extranet. Moreover, some air carrier companies have their legal headquarter in foreign countries and their way to work is strongly different compared to the Italian one especially for laws and regulations; if, according to laws, they have to archive a paper copy of the customs clearance documents they do not use the Extranet. Furthermore, the freight forwarders are small and owns poor technical skill, thus exploiting the Web Portal in a quite simple way (e.g. only checking work progress status), without giving back their flow of information and sending it in a traditional way.

### **Future development**

There are many projects related to the Extranet that will make it become the operative heart of BCUBE Air Cargo. One of these future development (which is in the testing phase), is the creation of an Application through which it will be possible to have visibility on the handling progress and the goods status even through mobile devices. Furthermore, a second development of the company will be the total automatization of the goods release process. In particular, it will allow customers to bypass the acceptance of goods packing list, and before that the truck arrive in the warehouse the operation will be done by an electronic flow of information through the Web Portal. Hence, the manual data entry (concerning BCUBE) and the waiting time (concerning customer) will be eliminated. Finally, the company is committed toward a project which will

allow the uploading of sales Invoices and statistics on the Web Portal, thus, customers will be able to consult every Invoice and build up their report without asking it to BCUBE. The Invoices uploading will be also the first step to launch the Digital Archiving of all account receivable documents.

### 3.2.6 BioNike case

#### General information

Company	BioNike s.r.l.
Address	Via Peloritana 28, 20024 Garbagnate Milanese (MI)
Company Web address	<a href="http://www.bionike.it/">http://www.bionike.it/</a>
Extranet Web address	<a href="http://www.bionike.it/#">http://www.bionike.it/#</a>
Business sector	Cosmetics
Turnover	€ 70 million
Number of Employees	210
Position in the Supply Chain	Manufacturer
Type of suppliers	Raw material suppliers, primary packaging suppliers, secondary packaging suppliers, contractors, logistics providers
Type of Customers	Public Administration, pharmacies, wholesalers, retailers
Contact	Giuseppe Marolla - AFC manager

Table 18: BioNike’s general information

Icim International is a pharmaceutical company, that was born in 1930 in Milano; afterwards, it created the BioNike brand in the 1960s which identified the Icim’s dermo-cosmetics product lines. All BioNike products are developed for subjects with sensitive, allergic and reactive skin and are based on an "allergen-free philosophy". The company nowadays is the Italian leader in dermo-cosmetics distribution to pharmacies with a market share of 6.5%.

#### Supply Chain Structure

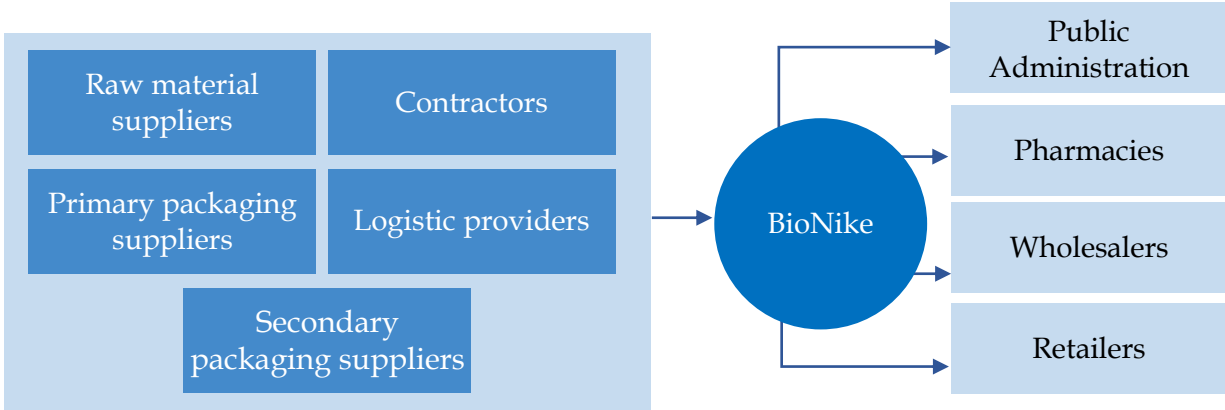


Figure 40: BioNike’s Supply Chain

As far as the account payable is concerned, BioNike has in its register a thousand of supplier, half of which are active. More in depth, the most important ones, from an economic impact on costs, are raw material suppliers that provide active substance, which are very expensive. Furthermore, there are providers of packaging that could be divided into primary packaging such as vials, pots and tubes and secondary packaging such as package leaflet and external casting. BioNike outsource some non-core or non-economic sustainable processes, to external manufacturers that represent another important upstream aspect. The last kind of supplier are logistics ones, that have the task to manage products stocks – usually three months' stocks are kept in warehouses – and deliveries. Downstream BioNike deal with 8,000 customers, divided in four categories; in particular, the ones that mostly impact on revenues are pharmacies. Currently in Italy there are 18,000 pharmacies, the 40% of which are served by the company and this makes BioNike the Italian leader with 6.5% of market share, but also gives an idea about the market fragmentation that affect this business sector. Furthermore, the others three kind of customers are wholesaler, retailers and the Public Administration entities such as hospitals.

### **Extranet project**

In order to deal with customers, BioNike relies on Web-based platform with the main purpose of digitalize the Order issuing process. This platform is used at the same time by internal and external users, in fact, sales agent together with customers, using mobile devices such as tablet (provided by BioNike), fill the Order and send it directly through the platform. Once the Order is received by BioNike, a series of automatic control start, in order to check if it is done respecting the actual promotion campaign and price policy. Furthermore, The Extranet has an administrative aim; it matches each single Order value with the accounting status of the relative customer and on the basis of some parameters - established a-priori – it decides if an Order could be fulfilled or not and in this last case it creates some administrative blocks of different entity. The blocked Order is afterwards manually controlled by accounting and finance personnel and, if the block is removed, the Order follow the automatic flow of the others ones. Thereafter, once the Order is fulfilled it is automatically send by the platform to the logistic partner through a telematics flow. The partner arranges the shipment, prepares the Delivery Notes, and send back to BioNike an electronic flow containing all the Delivery Notes so far created; in this way, BioNike could send Invoices, that are now managed in a traditional way.

Moreover, the Web Portal has some internal purposes, such as the sharing of quality documents and procedures. In particular, it has a reflection on suppliers as well; indeed, given that BioNike is certificated ISO 9000, there are a series of quality and accounting requirements that possible suppliers must respect in order to become partners of the company. Even though the process of

suppliers contacting and acquisition follows traditional steps, these documents uploaded on the Web platform are consulted by both parties, suppliers and purchasing department.

### **Other projects**

BioNike deal with customers belonging to the Public Administration, following the law normative; the company issues almost 1,200 Invoices every year in electronic format (eInvoicing). In particular, the company runs this process internally, relying on a Document Management System (DMS) which manage the interaction with the PA. This process is composed by different XML flows (outgoing and incoming) and for each one a mail notification is created.

### **Benefits**

The main benefits achieved by the company come from the implementation of the Web Portal; more in depth, BioNike is now able to better coordinate its sales and administration departments. Indeed, in the past there were problem linked to the financial exposure with some customers which has a lot of outstanding payments but sill continued to issue Orders. Thanks to the platform an Order is fulfilled only if the financial situation of the customer is good or if it can provide economic guarantees.

### **Criticalities**

Throughout the implementation of the platform BioNike has found out some internal criticalities, mainly due to the fact that different areas of the company, did not communicate in the right way while pursuing different objectives. A clear example is represented by sales force which has as a primary objective the volume of sales, and did not accept that the platform could block an Order until the administration check thus, deciding if accept it or not. In order to overcome these problems BioNike strongly pushed on communication and on the creation of a sense of belonging, through meeting and team activities.

### **Future development**

The Extranet will be the subject of different upgrades in the future. The first one will be related to the Invoice issuing that so far take place in a traditional way. In future, once the platform receives the Delivery Note from the logistics partner, it will create automatically an Invoice linked to the relative shipment that could be automatically sent by mail to the customer or consulted by the latter directly on the platform, logging in with personal credentials.

Another upgrade will allow customers to directly log in into the platform and make Orders without the presence of the sales agent. Once the customer will be provided with its personal credentials they could also access to the claim module of the platform and fill a form so as to inform BioNike about every problem emerged during the shipment. Furthermore, another possible future development is related to the Digital Archiving of all documents that transit on

the Web platform. Nowadays they are digitally stored only for operative purpose but in future, following what is already done for PA Invoices they will be digitally archived following all the low requirements. Upstream, there are no structured digital relations with suppliers and the company would like to implement some project in this way especially related to suppliers scouting but this is not a priority.

### 3.2.7 Bolton group case

#### General information

Company	Bolton Manitoba S.p.A.
Address	Via G. B. Pirelli 19, 20124 Milano (MI)
Company Web address	<a href="http://www.boltongroup.net/it-it/homepage">http://www.boltongroup.net/it-it/homepage</a>
Extranet Web address	n.a.
Business sector	Fast moving consumer goods
Turnover	€ 2 billion
Number of Employees	3,000
Position in the Supply Chain	Manufacturer
Type of suppliers	In-services specialized distributors, packaging material, raw material and services suppliers
Type of Customers	Large-scale retail trade, pharmacies, cosmetic & beauty products shops, specialized shops
Contact	Sandro Trevisanato - CIO

*Table 19: Bolton group's general information*

Bolton Group, was born in 1949 and have its headquarter in Milano; it is an Italian multinational, whose business it the design, production and distribution of five product categories: canned food, personal care, house cleaning, adhesives and cosmetics. Bolton Group owns more than 50 leader brand, serves 100 million families and is currently composed by 26 sub-holdings, operating in 13 plants spread in Europe. The company, has a turnover of almost 2 billion €.

**Supply Chain Structure**

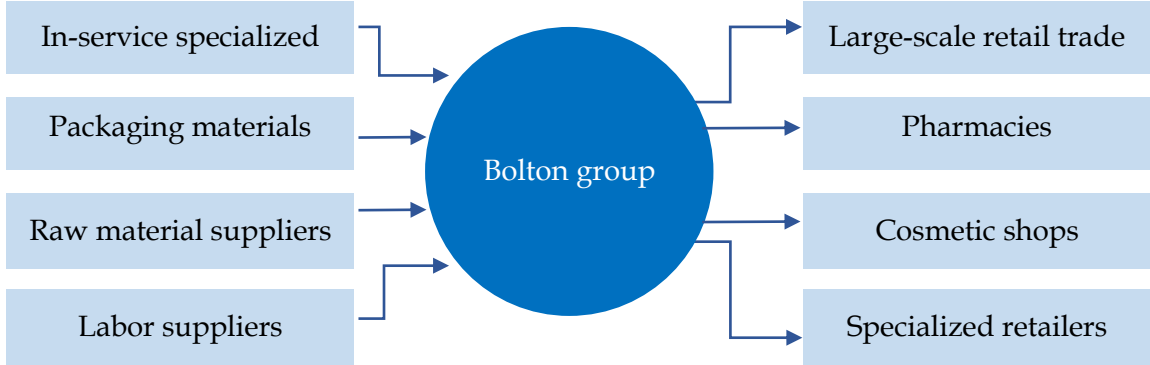


Figure 41: Bolton group's Supply Chain

Bolton Group, five products categories, above described, contribute to the total turnover in different ways: 49% related to canned food, 17% related to house cleaning, 16% related to personal care, 13% related to adhesives and 5% related to cosmetics. Its products reach 125 different countries, however the greatest part of its turnover comes from the European ones: 50% of revenues are from Italy, 16% are from France, 5% are from Germany, Spain, Benelux and Greece, and the remaining 14% comes from the not-European part the world. The main Bolton suppliers are the in-service specialized distributors whom take care of products' distribution, ensuring a dedicated service according to each product category. Furthermore, the raw material and packaging suppliers, provide very important components for final quality of goods. Finally, there are services providers, whose relationship is not strategic. The total number of active suppliers range between 500 and 1,000 and they generate 80,000 payable Invoices per year. Downstream the customers that impact more on turnover and generate the larger part of the 120,000 yearly receivable Invoices, are large-scale retailer, followed by pharmacies, specialized retailers and cosmetics shops.

**Extranet project**

Bolton group has implemented two Extranets to better manage the relationship upstream and downstream:

Upstream

The company relies on a first Extranet toward suppliers; this solution has not a financial or administrative mean but aims at satisfying certain quality, security and sustainability standard of Bolton Group products. More in depth, the first phase supported by the Web Portal is the eSourcing, which include the scouting of those suppliers who could guarantee the ISO quality standard of raw material. Thereafter, the following step is the vendor rating during which suppliers are evaluated and a supplier register is updated. Moreover, the Platform allows to share information about track and trace of materials especially food, managing digitally all Delivery



Notes and packing lists that travel beside the goods. All this information is updated directly by suppliers.

### Downstream

Since 2010, the company gives customers the possibility to register themselves and enter a Web Portal, where they can find and download several kind of financial and administrative documents of which the most important are Invoices. The Extranet was born from the need to integrate also actors who are not able to communicate through EDI and necessity a User-to-Application solution.

### **EDI project**

Bolton Group communicate through EDI with both sale and purchase side.

- Concerning customers, the more structured and digital skilled (usually they are Large-scale retail trade actors) communicate using EDI. Through this technology, it is possible to share documents about the Order cycle such as purchasing Orders, receivable Invoices and dispatch advices. Moreover, through EDI channels transit the 30% of the total 120,000 receivable Invoices;
- Concerning suppliers, EDI connections are activated to share quickly dispatch advices, especially with packaging material suppliers with whom the company work using a “Just-In-Time” approach.

### **Other projects**

Bolton Group, supported by an external provider, has stored all the receivable and payable Invoices (the latter only from 2015) as well as all financial documents with a Digital Archiving solution. Moreover, the company has the possibility to consult every document thanks to the integration between the external provider platform and the Bolton internal information management system.

Since 2014 the company has introduced a project which aims at digitalize purchase Invoices, with the support of an external provider that receives them in PDF format directly from Bolton suppliers. Afterwards, each document is scanned by an Optical Character Recognition (OCR) system and an electronic barcode is then attached. In this way every single Invoice is internally associated with its accounting entry.

### **Benefits**

The digitals projects implemented by the company enable the company to reach a better efficiency level, eliminating manual data entry and paper documents, thus reducing process time and addressing workforce toward more value-added activities.



## Criticalities

During the execution of digital projects Bolton Group did find some barriers, mainly related to the communication and sensibility toward digitalization and its benefits. In order to solve these difficulties, the company has suddenly involved all the stakeholders, explaining them the future plans, investments and benefits. Moreover, the independency of each sub-holding has created some difficulties that has been overcome by huge investment in coordination, providing all the involved actors with the appropriate control tools, needed to reach the company's goals.

## Future development

During the current year (2016) Bolton has started a project aiming at adding a new ERP module: the Vendor Invoice Management (VIM). This module will allow the payable Invoices to transit in the ERP system and follow an automatic Approval Work Flow. This process will save workforce time that could be re-allocated in other activities.

### 3.2.8 BTicino case

#### General information

Company	BTicino S.p.A.
Address	Viale Luigi Borri, 231, 21100 Varese (VA)
Company Web address	<a href="http://www.bticino.it/home">http://www.bticino.it/home</a>
Extranet Web address	n.a.
Business sector	Electrical equipment
Turnover	€ 4.5billion
Number of Employees	3,000
Position in the Supply Chain	Manufacturer
Type of suppliers	Raw material supplier, direct material supplier, indirect material supplier, end products suppliers, services provider, carriers
Type of Customers	Large-scale retail trade, wholesaler, Public Administration, big purchasing groups
Contact	Giovanni Rosina - ICT director

Table 20: BTicino's general information

BTicino is an Italian company with headquarters in Varese, which works in the electrical equipment industry. The company was born in 1936 by Bassani brothers and the name was Ticino Interruttori Elettrici - it was changed into BTicino in 1989 when it became part of the French industrial group Legrand. In Italy, about 3,000 people between labor and employees are currently working for BTicino and in 2012, the company had a turnover of 4.5 billion €.

## Supply Chain Structure

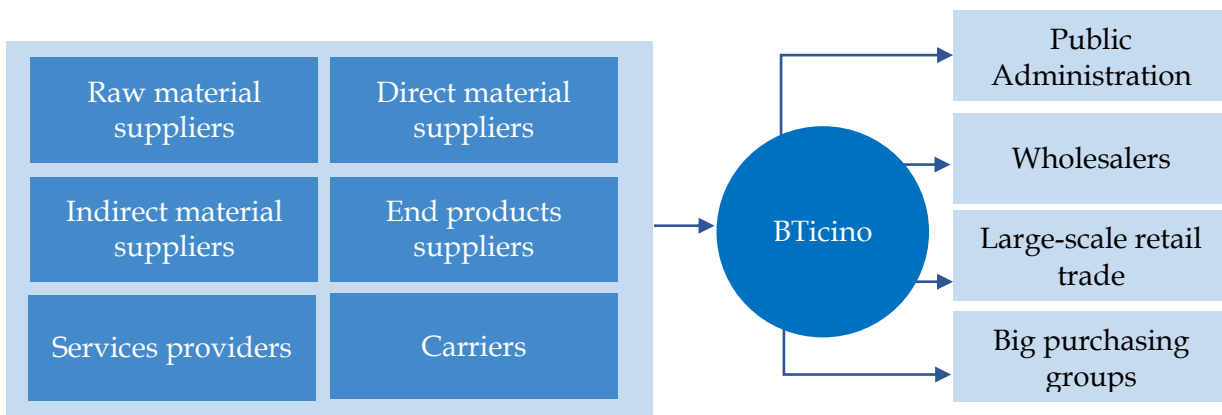


Figure 42: BTicino's Supply Chain

Upstream, BTicino deal with raw material, end products suppliers and direct material. It is a purchase amount close to 300 million € which can be divided in the following way: 25% are for raw material, 40% for direct material and components, and 35% for end products. Moreover, there are other relationships with smaller suppliers that provide indirect material and services as well as some manufacturing processes “not core” for BTicino business. Others key upstream actors are the carriers that can be further divided into big carriers, with strong digital skills, and small ones, with poor digital structure. Downstream the main Supply Chain actors are wholesalers, that serve installers and small-medium companies, and represent the 90% referring to the total Order volume and 80% referring to the total revenues. The second downstream actor is Large-scale retail trade, whose purchases account for 10% of the total revenues with a slightly increasing trend. The remaining percentage of turnover is covered by Public Administration and big purchasing group.

### Extranet project

BTicino has implemented in 2003 a Web-Based Platform to be used for the relationships with suppliers of raw and direct materials, as well as finished goods. The Platform is now used by about 50 suppliers which account for the 80% expenses and issue about 70,000 Invoices per year. Thanks to the Platform, the company is able to digitize the transaction cycle and all the documents related to it: Orders, Delivery Notes and Invoices, these ones, are afterwards than digitally archived. Moving from the Execution toward Collaboration the Extranet allows to share demand forecasting and purchasing plans. The most interesting function is however the management of rescheduling. The Platform host an Available-To-Promise algorithm (ATP), integrated with the suppliers’ management system, which makes it possible for BTicino to be promptly informed about delays or changes in dates or shipping volumes and re-schedule them optimally.

Furthermore, technical information about products (e.g. CAD drawings) and quality specifications can be shared in Order to respect the quality ISO 9001 standard.

### **EDI project**

As far as customer relationships is concerned, the company has been interfacing with major wholesalers through EDI connections exploiting METEL standard. BTicino directly took part in the creation of this standard, investing a lot in the project. Nowadays, wholesalers make up more than 80% of BTicino turnover, and through EDI flows, 65% of total Order line, as well as 80% of waybills, Order confirmations and outgoing Invoices can be managed. From a numerical point of view, it is evaluated that 600,000 Orders and Order confirmations as well as 500,000 Delivery Notes and Invoices pass through the EDI channel. Such documents are further stored in Digital Archiving

BTicino relies on another EDI connection for the relationships with the most important and structured carriers it deals with. In this way, BTicino can send Delivery Notes and waybills in electronic format, these ones later received by the carriers on their Platform.

### **Other projects**

Concerning minor and less structured carriers who cannot manage EDI flows, they were provided with smartphones that allow them to track deliveries, as well as to use an app that enables them to access and download documents shared by BTicino.

Moreover, with the use of this app carriers can manage on-the-spot problems, such as damaged packages, and share pictures of them as evidence.

Large-scale retail trade customers usually do not use METEL standard because they have a strong bargaining power and tend to impose their own standard or force suppliers to use their Portal. In order to manage such relationships, a semi-automatic system has been developed, which enables, for the ingoing flows, the manual downloading of incoming Orders from the customer Portal and the uploading in the system of BTicino, where they are afterwards automatically processed. For outgoing flows, BTicino relies on an external provider to map METEL standard and the one used by the customer.

According to the new regulations BTicino applies the Electronic Invoicing toward the Public Administration even though it represents only a residual percentage on the total number of Invoices (80-100 thousand) and Invoice lines (4 million)

To coherently conclude all the digital projects, BTicino has implemented the Digital Archiving on all the fiscal/financial documents while the operational ones transit electronically in the Document Management System (DMS).

## **Benefits**

As far as the Extranet of raw and direct materials suppliers is concerned, the most significant benefit is the managing of suppliers rescheduling on-the-spot. Indeed, every time BTicino issues an Order in case the supplier is not able to fulfill the delivery, thanks to the ATP (Available-To-Promise) function, the Order can be rescheduled. Hence, a new delivery date for the required quantity will be established, hopefully as soon as possible. Downstream, EDI flows allowed BTicino to entirely digitalize the operations with the wholesalers. It is an Application-to-Application solution that does not need any operator, thus reducing mistakes, saving resources and allowing to focus on other activities. Finally, the Digital Archiving complete a well-implemented digitization project. It makes possible to avoid printing documents that the company usually manages electronically.

## **Criticalities**

The main criticalities founded during the implementation of the project are external ones. In particular, the main difficulties are related to the Extranet and lies in the suppliers' competences: not all suppliers are able to face such structured project. This problem has been solved thanks to a strong commitment of BTicino that has organized some training sessions addressed to the first actors integrated and thanks to the help of the IT provider that has trained the remaining part of actors involved. Furthermore, another criticality was represented by the security of data shared. Technical data about products are sensitive information and an external divulgation could be very dangerous. This problem has been eliminated using firewalls and other software technologies and tools.

## **Future development**

BTicino's digitization projects is very well implemented and complete. However, the company is now committed to get as many professionals as possible involved in the EDI project according to METEL standard. Among future steps, there is the digitization of Delivery Notes; it is a project that is now to a standstill "due to discrepancies between the opportunities given by the Law and what required by the Public Administration".

### 3.2.9 Chiesi Farmaceutici case

#### General information

Company	Chiesi Farmaceutici S.p.A.
Address	Via Palermo 26, 43122 Parma (PR)
Company Web address	<a href="http://www.chiesigroup.com/">http://www.chiesigroup.com/</a>
Extranet Web address	n.a.
Business sector	Pharmaceutical
Turnover	€ 1.3 billion
Number of Employees	4,300
Position in the Supply Chain	Producer
Type of suppliers	Raw material & active principles suppliers, indirect materials suppliers, software & services suppliers, logistic providers
Type of Customers	Hospitals (PA), wholesalers, pharmacies
Contact	Umberto Stefani-CIO

Table 21: Chiesi Farmaceutici's general information

Chiesi Farmaceutici is a multinational pharmaceutical Italian company founded in 1935 and having its headquarter in Parma. The core business consists in drugs' development and commercialization in particular related to breathing & cardiovascular apparatus, for the neonatal care and rare diseases care. It operates in 26 different countries and its competitive advantage is the strong attitude toward research and development. The 70% of the 1.3 billion turnover is due to products coming from the internal R&D department and the 18% of the total revenues are re-invested in the internal laboratories. In Italy the company rely on 1,500 employees and generates 300 million of sales.

#### Supply Chain Structure

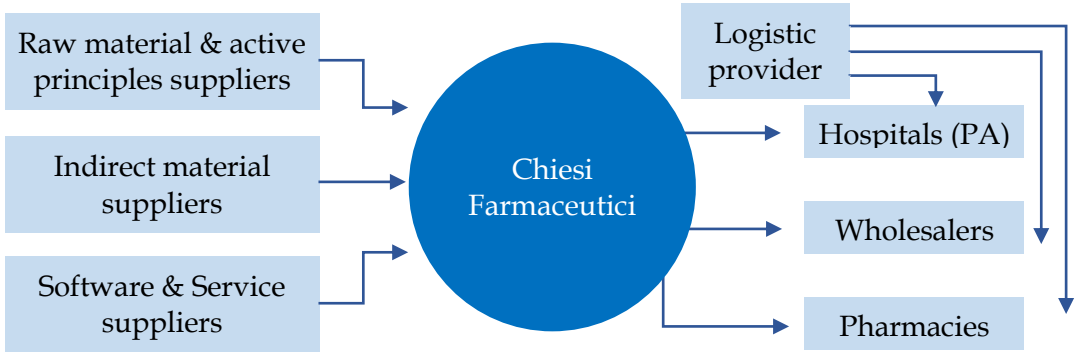


Figure 43: Chiesi Farmaceutici's Supply Chain

Upstream, Chiesi Farmaceutici deal with almost a thousand of suppliers that provide three different category of products: the raw material & active principles, that are requested for the

physical production of drugs, indirect material such as stationery materials and software/services. Downstream the main actors are hospitals (public administration), wholesalers and pharmacies, and their number and proportion drastically change according to the related country; if the company does not serve pharmacies, the number of customers in that country is low; on the contrary if pharmacies are served the number of customers easily overcome the thousand. A key actor for Chiesi' Supply Chain is the logistic provider, that represent a intermediary between Chiesi and its customers, having the responsibility of Order picking and shipping. Indeed, once an Order is received, the company check it, afterwards sending it to the logistic operator that process and ship the goods to the final customer. Moreover, there are some cases of direct shipping from Chiesi Farmaceutici hub; nevertheless, it represents a small percentage.

### **Extranet project**

Chiesi Farmaceutici has implemented two Web Portals to improve its processes as well as to better manage the relationship with both clients and suppliers; the Extranets are one upstream and another downstream.

#### Upstream

As far as the first web Portal is concerned, it is an eSourcing solution: suppliers can access the Extranet and through some questionnaires they provide all the information for their certification. If all the requirements are verified, suppliers will be recorded in the supplier register, which is consulted every time Chiesi activates the purchasing process.

#### Downstream

The downstream Extranet implemented, allows Chiesi to upload sales Invoices; in this way, registered customers - owning a user ID and password - can directly consult the web Portal and download their Invoice.

### **EDI project**

Since ten years, Chiesi Farmaceutici has completely digitalized its processes and reduced time consuming activities (manual data entry) as well as paper volumes. Nowadays the company receives Orders in EDI format, through the DAFNE (Distribuzione Aziende Farmaceutiche Network EDI) network and automatically upload them in its ERP system. Moreover, after the internal checking, Orders are sent in XML format to the logistic partner that process them and distribute goods to the final customer. Finally, Chiesi receives back data about goods shipped and automatically updates its system and start the Invoicing process.

## **Other projects**

Chiesi Farmaceutici, according to the Italian law, do the Electronic Invoicing toward hospitals (Public Administration). In order to do that the company relies on an external partner specialized in this field, that, since eight years now, supports the company also for the Digital Archiving of all the account receivable documents.

As far as account payables is concerned, the company has automatized all the process as much as possible, starting from the pre-transactional phase. Here, according to the purchasing proposal made by the suppliers, the company creates a purchase request, to which is also electronically attached the product technical documentation, and then it is automatically managed by the ERP system. Thereafter, every request is processed following a digital Approval Workflow, and once it has been approved it can be turned in a real Order, that is sent in a PDF format to the supplier. Finally, when Invoices are received, they are digitalized exploiting a OCR system that captures all the relevant information from the physical document and uploads them into the ERP system. Remaining on the payable side, concerning small purchases (from a volume point of view) with a high number of Order lines, Chiesi exploits the customized eCatalog services provided by its suppliers and once the Order is confirmed an electronic copy is created in the ERP system.

## **Benefits**

From the implementation of digital solutions supporting account payable and receivable the company has improved its relationships with suppliers and customers from both efficiency (time-consuming actions reduction) and effectiveness (best overall service) point of view. Moreover, the ERP and the Approval Workflow system have reduced the paper volumes of more than 30% only in the first day of utilization as well as the internal time for transaction Approval.

## **Criticalities**

During the implementation phase the company did not face any criticality, thanks to the bilateral strong and effective commitment of both parties: Chiesi Farmaceutici and partners.

## **Future development**

Chiesi Farmaceutici is developing a new solution that will be implemented within ten months. Considering the account payable, one key element is the purchasing requests Approval, and this project aims at bringing this Workflow - supported by a ERP cloud solution - also on mobile devices, developing an app that could be installed on smartphone or tablets.

### 3.2.10 Costa Crociere case

#### General information

Company	Costa Crociere S.p.A.
Address	Piazza Piccapietra 48, 16121 Genova
Company Web address	<a href="http://www.costacrociere.it/B2C/I/Pages/default.aspx">http://www.costacrociere.it/B2C/I/Pages/default.aspx</a>
Extranet Web address	<a href="https://point.costa.it/client/index.cfm">https://point.costa.it/client/index.cfm</a>
Business sector	Tourism
Turnover	€ 3,28 billion
Number of Employees	20,000
Position in the Supply Chain	Service provider
Type of suppliers	Travel agencies
Type of Customers	Food & Beverage; Technical sector; IT sector
Contact	Sara Paganella - Senior project manager; Alessandro Monteverde - Supply Chain Systems Project & Delivery Manager

Table 22: Costa Crociere's general information

Costa Crociere S.p.A is the largest entity in the Italian tourism industry. The company was born in 1854 and is now controlled by the Carnival Corporation & plc and includes the brands Costa Crociere, AIDA Cruises and Costa Asia. Overall, the company manages 15 cruise ships and thanks to a staff of nearly 20,000 employees - 19,000 ground crew and Approximately 1,000 cabin crew - it achieved in 2015, more than 3 billion € turnover.

#### Supply Chain Structure

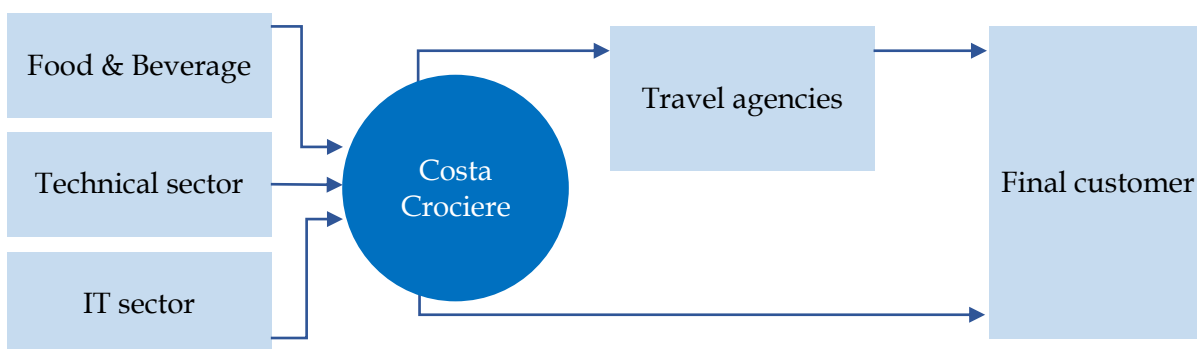


Figure 44: Costa Crociere's Supply Chain

On the account payable, Costa Crociere deals with three main actors. Within the Food & Beverage area fall all the catering provision, and the item sold into the cruise stores, that born directly from the ships. Moreover, there is the technical sector, including:

- Materials and components for the cruise ships maintenance;



- Hotel area, related to ships furniture and lighting system as well;
- Engines spare parts and ship technical systems.

Finally, the IT sector deals with telecommunications and technological aspects.

On the other hand, as far as the account receivable is concerned, the company deals only with travel agencies and final consumers.

### **Extranet project**

Since 2011, the company has implemented a Web Portal for a better and more integrated management of the Food & Beverage suppliers for both Costa Crociere and AIDA Cruises. The solution supports the Orders, that reflects an on-board ship request. Since 2013, the Web Portal support the Orders and RFQ (request for quotation) as well, for the technical sector. Nowadays all the company suppliers - approximately 6,000 - are managed through this solution.

Moreover, the company has added a module that allow suppliers to upload all the Invoices on the Web Portal. Each Invoice is then automatically labeled with a barcode, that includes information - such as typology and country - which help, at accounting level, for example, a correct application of the tax environment (if the automatic identification of the supplier fail, there is the possibility to manually add this kind of information by the accounting area). Although, the Invoice is a pdf file, it must have some characteristics; suppliers have to send an encrypted document, with a predefined layout in order to be easily and fully recognized by the downstream OCR (Optical character recognition) system.

Finally, the solution included a qualification process for new suppliers alongside the possibility to gather and store all their information into a supplier register. Despite the Web Portal support the Orders of both the Food & Beverage and Technical sector, it manages them in different way; the former area is composed by supplier with a contract based on volumes forecast, thus, with an already negotiated and quoted price. This is translated into a more rapid management of the whole provision process. The latter area - technical sector - need a more complex management; due to the intrinsic characteristics of the products and components - that usually require to be specifically built - the process must necessary involve the RFQ (supported by the Web Portal) and a negotiation phase.

### **Other projects**

Since the Web Portal support the supplier upload of the Invoices, the company has implemented a OCR (Optical character recognition) system, that automatically recognize and extract the main accounting information and data within the documents. Finally, the overall flow of Invoices is transferred into the Document Management System (DMS), where several rules were implemented in order to understand whether Invoices could be registered into the accounting

system or not. However, in order to approve the payment of Invoices there is the Approval Workflow with different internal authorization levels; in particular, the Workflow system is able to manage the possible anomalies, sending an email to the right responsible. Once solved the problems, the system applies again all the rules and authorize Invoices to be registered into the accounting system and paid.

Finally, to complete a well implemented digitalization project, the company has activated the Digital Archiving for the account payable Invoices.

### **Benefits**

The whole set of technological implementations for the account payable has been crucial for the company's aim to achieve an overall decrease of process costs as well as a better management of the relationship with suppliers. The Extranet guarantees a strong integration with suppliers along the Supply Chain and a complete elimination of the internal paper flows, with the help of the Digital Archiving of the account payable. Moreover - thanks to the improved process of Invoices management - the purchase department could exploit a new powerful leverage in the negotiation phase with suppliers, due to the reduced payment time.

Finally, the Document management system alongside the Approval Workflows allow Costa Crociere to better manage inconsistencies and anomalies achieving more efficiency among internal activities; indeed, now there is the possibility to track and monitor all the processes.

### **Criticalities**

Costa Crociere has well managed its very complex Supply process, composed by different item, components and product, fundamental for both the company and the cruise ships. Nevertheless, there were some internal resistance - related to the change management - that required a careful and thorough commitment. In order to deal with the latter difficulties in the most effective way, the company supported constantly and carefully all its employees and actors involved in the digitalization project.

### **Future development**

Costa Crociere has already thought to the next step to improve the digitalization process. The company would enhance its service level and achieving higher efficiency through the introduction of an EDI channel that will better manage the relationship with suppliers. The new technological solution - well integrated with the Web Portal - will support all the suppliers' Invoices, allowing Costa Crociere to completely avoid the OCR step. Moreover, the company will enhance the Extranet e-Sourcing functionalities implementing new scouting tools, alongside the already existing qualification phase and RFQ management.

### 3.2.11 Dolce & Gabbana case

#### General information

Company	Dolce & Gabbana S.p.A.
Address	Via Goldoni, 10 20129 MILANO (MI)
Company Web address	http://www.dolcegabbana.it
Extranet Web address	n.a.
Business sector	Fashion & Clothing
Turnover	€ 812 million
Number of Employees	2,369
Position in the Supply Chain	Producer (fashion house)
Type of suppliers	Raw materials suppliers, labour suppliers
Type of Customers	Final consumers, wholesalers, retailers
Contact	Riccardo Rizzo -ICT Manager Oscar Grignolio - Group CIO

Table 23: Dolce & Gabbana's general information

Dolce & Gabbana is a luxury Italian fashion house founded in 1985 in Legnano by Italian designers: Domenico Dolce and Stefano Gabbana, that presented their first women's collection in Milan; a year later their store would open its doors. Nowadays Dolce & Gabbana is one of the most recognizable brand in its field and distributes its product in more than 40 countries all around the world. The core business is to design, produce and distribute clothing, leather fashion goods and footwear, in addition the company outsources the production and distribution of various accessories, watches and sunglasses.

#### Supply Chain Structure

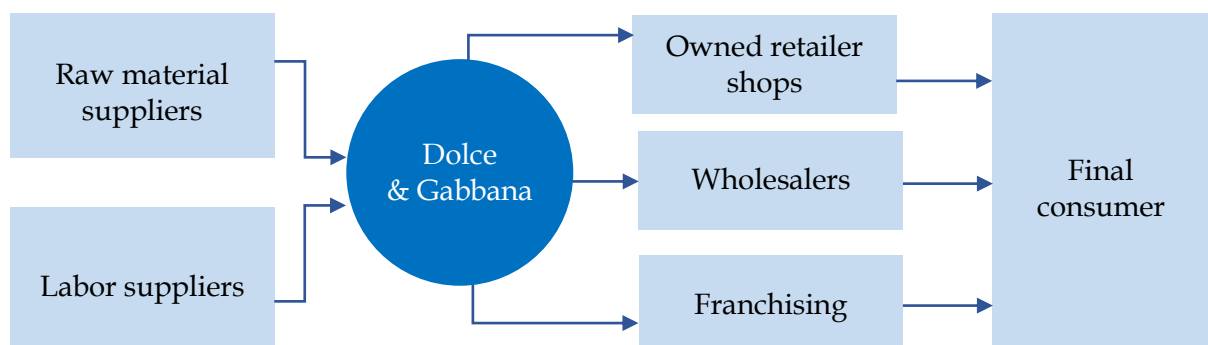


Figure 45: Dolce & Gabbana's Supply Chain

Dolce & Gabbana on the account payable deals with two main kind of partners: the raw material suppliers and the labor suppliers. The relation with both is very important because of the high quality of D&G product that must respect the customers' expectations. In particular, with raw

materials suppliers there are strong synergies and the goods must respect strict quality controls and protocols: for example, tissues must transit with some information such as the position of possible defects, so that during the cutting phase those parts are eliminated. Considering the labor suppliers (about 200 actors), they cover an important role in the physical production of goods, in fact, until three years ago (moment in when D&G start to produce in house), they were the only real producer of D&G items. As far as the account receivable is concerned, the company has two type of customers: retailers and wholesalers that account for the same value in the total business revenues (50% - 50%), with an increasing trend for retailers on which the company is investing, and a negative one for wholesalers. The retailers are present with about 250 mono-brand shops all around the World, and can be divided in owned flagship stores (200) and franchising stores (50). The wholesalers' channel is represented by a decreasing numbers of players, in the Order of few hundreds.

### **Extranet project**

Dolce & Gabbana has implemented two Web-based Portals to manage the relationship with own retailer shops and with labor suppliers.

#### Upstream

As far as the labor suppliers is concerned, they have heterogeneous dimension and digital skills. Furthermore, the relation with D&G is not always at the same level; there are actors with whom there is a strong and stable relation, due to the high purchases volume and others with whom the relation is not so strong. Definitely only 30 of the 200 suppliers are integrated within the Extranet, with the remaining part the relation is managed traditionally.

This solution does not cover the Order-Payment cycle, and in general the Execution processes, but is used in a more collaborative way: D&G provides all the technical documents about design, drawings and BOM of products, and on the other side, suppliers upload on the platform information about the progress of the lots. Moreover, the Extranet allows the exchange of electronic Delivery Notes, that make the handling and picking of goods automatic.

#### Downstream

The Extranet addressed the company's own retailer shops, has the collaborative objective of managing the information regarding sales and goods status of every shops. Exploiting this Web Portal, the company is able to track every transaction, from sales to returns and claims making them visible to the central D&G department in order to have under control the inventory level of each shops and the relative sellout. All this information is useful to make demand forecasts, assortment plans and reallocation of goods across the shops. In parallel with the collaborative

function the Web Portal allows the interchange and collection of sales receipts and helps the financial department.

### **Other projects**

Since five years Dolce & Gabbana uses a Document Management System (DMS) that aims at digitalizing both the account payable and receivable from an internal point of view. The system has been developed in outsourcing and has been strongly customized in order to perfectly fit the applicative system already present in D&G. Furthermore, one of the most useful function allows to consult in a PDF format whatever document present in the system. Thanks to this Platform, currently D&G manage almost 91,000 sales documents and 87,000 purchase ones. Finally, in the last year (2015) has been implemented a new functionality that aims at managing the Approval Workflow about account payable Invoices.

### **Benefits**

The two Web Portals implemented by the company have improved the relation with the involved actor both on the purchase and sales side, in term of effectiveness. Considering the labor supplier, sharing information about technical documents (drawings and Delivery Notes) produce a better output and receiving the work progress allow to better plan actions. Taking into account the shops integration reflects in a more punctual control on each POS.

### **Criticalities**

Dolce & Gabbana has not been able to implement solution that support the execution of the Order-Payment cycle, especially on the account payable. These difficulties are related to the small and craft nature of suppliers.

### **Future development**

A future goal of the company is to apply the Digital Archiving to all the legal and financial documentation, starting from the purchase side. According to this purpose, D&G is putting effort in recovering all the documents of the past five years, with the help of an external company. Once this project will be completed and active, the entire paper volume related to the purchase side will be eliminated.

### 3.2.12 ENI case

#### General information

Company	ENI S.p.A.
Address	Piazzale Enrico Mattei 1, 00144 Roma (RM)
Company Web address	<a href="http://www.eni.com/it_IT/home.html">http://www.eni.com/it_IT/home.html</a>
Extranet Web address	<a href="https://eprocurement.eni.it/ext_ita/Fornitori">https://eprocurement.eni.it/ext_ita/Fornitori</a>
Business sector	Utility
Turnover	€ 110.9 billion
Number of Employees	84,000
Position in the Supply Chain	Generator and provider
Type of suppliers	Raw materials suppliers, service providers, products suppliers
Type of Customers	Public Administration, business actors, consumers
Contact	Lorenzo DeFilippi - ICT Manager

Table 24: ENI's general information

ENI was born in 1953 as a public company under the name of Ente Nazionale Idrocarburi. The process that led to its privatization began in 1992. Currently, with a turnover of more than 110 billion euros a year, and about 84,000 employees, ENI is the most important Italian company and according to Fortune 500 the 22nd globally speaking. ENI is listed on the New York Stock Exchange and FTSE MIB (Milan stock exchange), it works in more than 90 countries and its core businesses are oil & gas, petrochemical and power generation sectors.

#### Supply Chain Structure

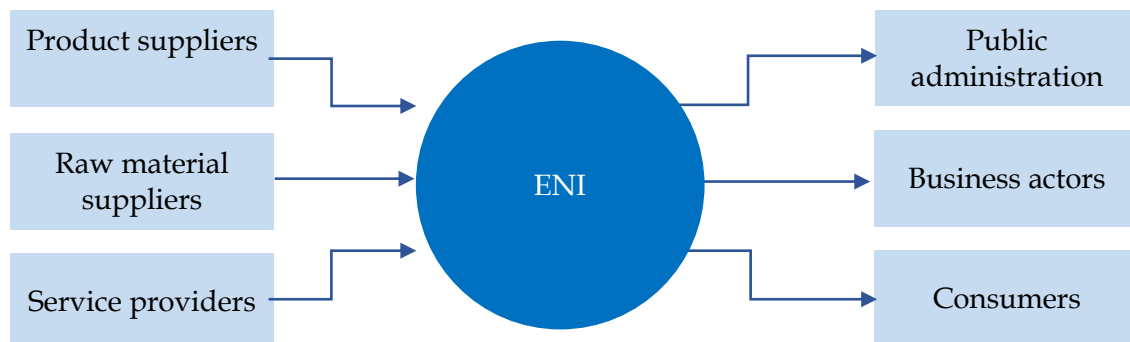


Figure 46: ENI's Supply Chain

Upstream, Eni is divided in different business quarters, each one corresponding to a precise business area and having a support business unit. Despite every quarter has different needs concerning material and services, the whole purchasing process is centralized in a unique department that manage more than 40,000 suppliers, except for the "core" ones, such as raw

material suppliers that are few and directly managed by each business quarter. Turning to the downstream side, the relationship with customers – which could be B2b or B2c – is managed directly by the respective business unit considering the service required. In this case also into a business quarter, different communication channels could be used according to the structure and skills of customers, that could be big companies, well skilled or small ones with no digital competences or even final consumers. Another downstream actor is the Public Administration that accounts for less than 10% of ENI business volume and with whom the company communicate with protocols defined by law.

### **Extranet project**

As far as upstream business relationships are concerned, ENI has implemented, an eSourcing Web Platform, focused on the pre-transactional phase, which enables the vendor management to qualify the suppliers, as well as to create a vendor list. In particular, at the receipt of a purchasing enquiry, this is electronically sent from the business areas to the supply management department, which, on the base of the type of goods, selects those suppliers who could take part in the tender notice, through the use of the system on which the supplier is qualified. This qualification is carried out by the suppliers themselves, who can thus directly upload the required documents on the platform. Once the documents are approved, they become part of ENI supplier register. Moreover, through these vendor lists, the invitations to the tender notice are sent. The platform also supports the management of the digital negotiation process and of the acquisition of contracts. Once the suppliers of the vendor list accept the invitation to the tender notice and register on the system, the tender notice begins, with the platform managing its activities; the “opening” of the envelopes and the acquisition of the contract. This wide and complete solution was firstly adopted in 2000 with some suppliers, then it evolved becoming more mature and since 2008 it involved the whole set of non-core suppliers.

There are also some tailored solutions for haulers, which were created “ad-hoc” by different business units of the company and are not centralized. More in depth, depending on the business peculiarities involved, Web Portals for the exchange of Delivery Notes with haulers are created.

### **EDI project**

Since ten years, ENI has implemented with some core suppliers an EDI connection, aimed at exchanging the main documents related to Order cycle: Orders, Orders confirmation, Delivery Note and Invoices. Since the latter phases are already in an electronic format, they are directly digitally archived.

## **Other projects**

Since 2009 ENI has been working on a more internal-oriented digitalization including the Digital Archiving of fiscal documents both public and administrative: such documents are account payable and receivable Invoices, single employment ledgers, VAT registrations, journals, depreciable assets registers and bank statements of financial movements. Furthermore, this project not only allows ENI to be more efficient at an internal level, but also to significantly reduce the amount of paper used. Indeed, before the project such amount exceeded four million pages per year.

## **Benefits**

The Digital Archiving has allowed the company to make internal activities more efficient, as well as to reduce the use of paper. By digitalizing the upstream relationships, it has been possible to create homogeneity in a too much heterogeneous context, thus creating a faster and more accurate procurement system.

## **Criticalities**

The main company's criticalities have been found out internally, during the implementation of the supplier Extranet. In particular, some employees in the purchasing department were skeptical about the digitalization of their activities, but thanks to a top-down commitment, everyone understood the benefits coming from this solution and this little barrier has been overtaken.

## **Future development**

The company has recently started a pilot project, which is ending in June 2016, on the creation of a Web-based Portal for suppliers, aimed at managing both the receiving and the automated accounting of payable Invoices. This project aims at "exploiting" the legal obligation to send Electronic Invoices to Public Administration in a structured format such as the "Fattura PA" protocol. In this way, the suppliers will be able to send ENI Electronic Invoices in a structured format using the same standard requested by the Public Administration, even though with some minor changes. Most of ENI upstream actors are indeed suppliers of the Italian Public Administration too, for this reason they are already used to managing relationships with their own "public customers". The aim of the project is to maximize the number of Invoices in a structured format received by ENI.



### 3.2.13 Ermenegildo Zegna case

#### General information

Company	Ermenegildo Zegna Holditalia S.p.A.
Address	Via Roma 99/100, 13835 Trivero (BI)
Company Web address	<a href="http://www.zegna.com/it/home.html#">http://www.zegna.com/it/home.html#</a>
Extranet Web address	n.a.
Business sector	Fashion & Clothing
Turnover	€ 1.2 billion
Number of Employees	7,000
Position in the Supply Chain	Producer
Type of suppliers	Raw material suppliers, accessories suppliers, processing under contract, finished clothing products' suppliers
Type of Customers	Wholesaler, retailers, final consumer (e-commerce)
Contact	Roberto Cappa - IT and Supply Chain Manager

Table 25: Ermenegildo Zegna's general information

Ermenegildo Zegna is an Italian company, leader in menswear design and production and represent one of the main entrepreneurial business of our country. It was born in 1910 when, the namesake founder created the Lanificio Zegna brand. Since then the company has grown a lot and nowadays it is present in more than 100 countries with a distribution network of 540 point of sale, of which 300 are directly managed.

#### Supply Chain Structure

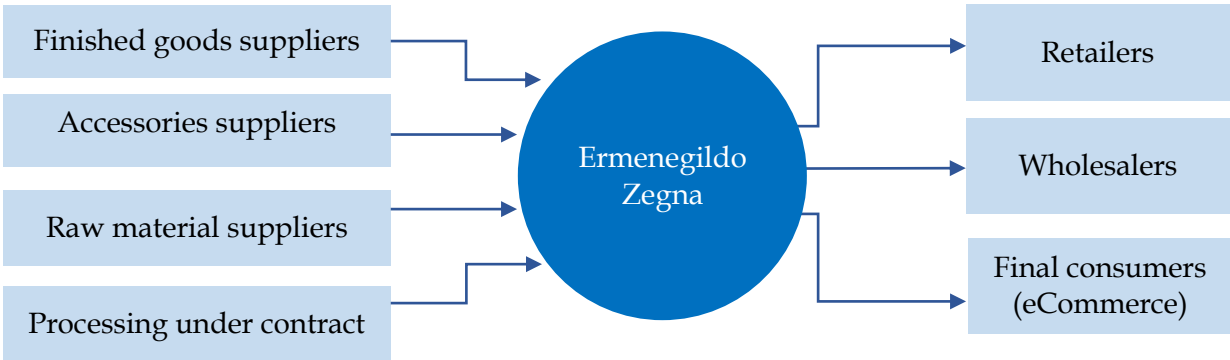


Figure 47: Ermenegildo Zegna's Supply Chain

One of the most important downstream process for Ermenegildo Zegna is purchasing of material that is divided into “noble” raw material such as tissue, yarn and leather, and accessories materials such as jacket’s buttons, shirt’s chimes and internal pocket parts. The suppliers of these two kinds of material are totally different: the “noble” material suppliers are quite big company well digitally structured and 20-30 of them (out of 150) account for 80% of the total purchasing

volume. There are several accessories material suppliers which manage very heterogeneous types of goods; their digital competences are very different, including some of them well skilled. Furthermore, Ermenegildo Zegna outsources some processes of its manufacturer cycle as well as the complete production of some garments. As far as the downstream side is concerned Zegna relies on a network of 540 retailing shops of which 300 are directly managed by the company. Moreover, another important category of customers are wholesalers, that usually are big international actors that communicate through strict standard. Ermenegildo Zegna also exploit of an eCommerce channel for the direct sale to final consumers.

### **Extranet project**

Zegna has implemented a Web Portal addressed to raw material suppliers, which is based on the Moda-ML standard (today also called E-bitz). In particular, Ermenegildo Zegna was one of the actors that developed this standard at the beginning of 2000 and invested a lot of resources. Through this machine-to-machine platform the company integrate 30 out of the 150 suppliers that account for 80% of purchasing volume. Thanks to this solution the company could exchange Executional and Collaborative documents such as Orders, Orders confirmations, shipment planning and re-scheduling, goods progress and Invoices.

However, the most important functionality is the “reverse purchasing Orders”. In some cases, when Ermenegildo Zegna has no time to manually introduce and plan the Orders (e.g. unannounced seasonal requests), they can be directly uploaded by suppliers that are already working on the needed materials.

Moreover, the application allows to check every message that transit and to create customized control scheme. Ermenegildo Zegna has created in 2008 a similar platform also for accessories material supplier, integrating the actors which account for the majority of purchasing volume. The main difference is that, in order to guarantee as much suppliers involved as possible, this solution has two operating modes: direct Machine-to-Machine integration and manual data entry of data (which are than translate in a XML file and are updated in Zegna system).

### **EDI project**

Zegna was forced to use EDI channels in order to communicates with wholesaler, which have a strong bargaining power and impose their strict (Edicom) standard; hence it has digitalized the Order cycle: Order, Order confirmation and Invoice. Later Zegna deeply understood the benefits coming from such integration and decide to adopt it to communicate with suppliers that either work on a phase of the manufacturing cycle or produce the whole garment. This integration is not purely Executional but has a Collaborative mean. Furthermore, it is possible for Zegna to share batches Orders and specify which manufacturing step is required; on the other hand,

suppliers must update the processing status of goods thus, allowing Zegna to monitor the whole process.

### **Other projects**

Since five years, Zegna has adopted the Digital Archiving of all Invoices and fiscal documents, pushed by the need of rationalizing working space, of making more efficient the checking process of payable/receivable Invoices and of making easier the fiscal inspection. The process is completely managed internally, however with the support of external consultants for normative and legal aspects.

### **Benefits**

Thanks to Digital Archiving the company has obtained great benefits in term of working space and efficiency in managing documents. At the same time the exchange of structured data flows with suppliers and customers has allowed to save time related to the elimination of manual data entry. Moreover, the responsiveness to market has increased, since now information transit faster or new approaches has been used such as the “reverse purchasing Orders”.

### **Criticalities**

Thanks to the strong commitment and coordination of all actors involved, the company did not face any internal particular criticality. On the contrary, externally the main criticality was related to suppliers, which did not understand the benefits coming from digitalization; nevertheless, Ermenegildo Zegna purchasing office did spend time and resources explaining them the advantage and convincing them to turn to digital.

### **Future development**

Given the great success of “reverse purchasing Orders” with raw material supplier, the company would like to implement it also with finished goods and under contract suppliers, to better benefits of all the advantages.

### 3.2.14 Esprinet case

#### General information

Company	Esprinet S.p.A.
Address	Via Energy Park, 20 20871 VIMERCATE (MB)
Company Web address	https://www.esprinet.com/public/index.asp
Extranet Web address	http://www.esprinet.com/public/register.asp
Business sector	Information Technology
Turnover	€ 2.6 billion
Number of Employees	1,016
Position in the Supply Chain	B2B distributor
Type of suppliers	Producers of technological devices and software
Type of Customers	Large-scale retail trade, small retail shops
Contact	Cesare Pedrazzini - CIO

Table 26: Esprinet's general information

Esprinet is an Italian company, active in the B2b distribution of technological products (consumer electronic devices, software, telephony) in Italy and Spain. The company was born in 2000 after the merger of Comprel, Celo and Micromax, and from the beginning it stands out because of its technological attitude. Nowadays Esprinet owns two logistic hubs in Italy, (where it leads the IT B2b distribution market) and one logistic pole in Spain (where it is the third national distributor) near Zaragoza.

#### Supply Chain Structure

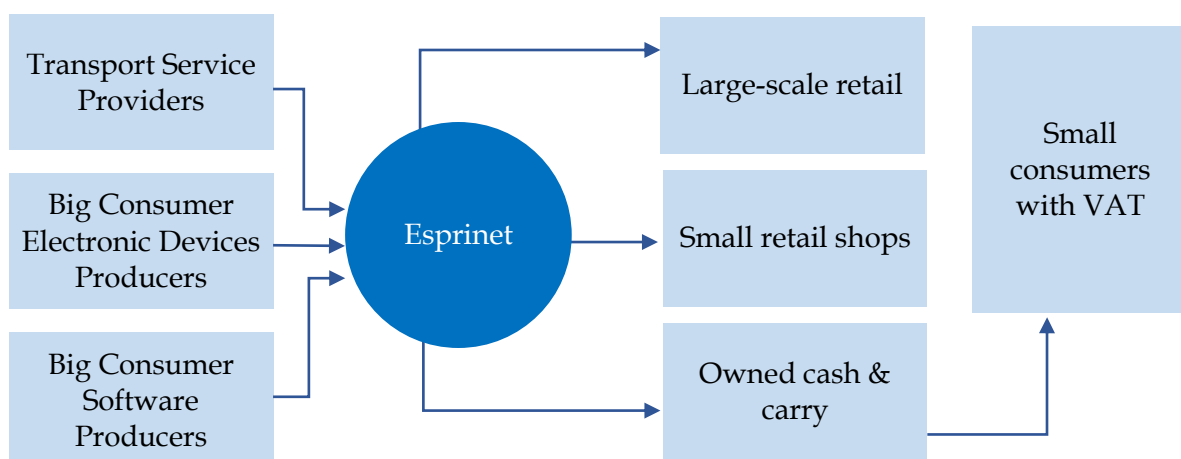


Figure 48: Esprinet's Supply Chain

Esprinet on the account payable deals with the main producers of consumer electronic devices and the main software developers. The relationship with these few but huge actors is unbalanced against Esprinet, due to their bargaining power (they have a turnover a lot higher than the

Esprinet one). Given this aspect, they tend to impose their communication standards. On the account receivable the company deals with a great and heterogeneous set of customers that goes from the big player of the Large-scale retail trade to the small retail shop, passing through the medium retailer. The relation with customers is more balanced than the one with suppliers and the communication standard changes according to the considered actor. Finally, Esprinet owns 17 cash & carry in Italy and two in Spain, for the direct sales of IT product to small customers with VAT number.

### **Extranet project**

Esprinet was born with a strong technological attitude and since the beginning its business has been supported by its own Web Portal toward clients. The platform was developed internally and reflects the clear vision of the top managerial class: to create a competitive advantage, based on the digitalization of the relationships with customers, especially the ones with no digital skills (this is possible thanks to the User-to-Application nature of the solution). Nowadays the Extranet is used to relate with all customers except for the Large-scale retail trade actors; moreover, more than the 50% of the 2.6 billion € turnover – which correspond to the 70% of the Orders volume – are obtained by the Web Portal sales. The platform is very complete and it offers different functionalities which allow the eSupply Chain Execution and Collaboration. As far as the Execution is concerned, the Extranet supports all the Order-Payment cycle documents exchange, in particular the sales Order, the Order confirmation, the Invoice and the Delivery Note. Considering the Collaboration, the Web Portal offers a lot of functionalities such as: delivery tracking, visibility of goods status, visibility on all products master data, visibility on all products availability, sharing of purchasing plan and management of claims and returns. One of the most singular and distinctive trait of the Extranet is the “showcase for third parties” functionality. Esprinet’s customers can use the Web Portal – modifying and customizing it according to design, contents and prices - addressing directly to their final customers. In order to complete this function there is also the possibility to deliver the goods directly to the final consumer from Esprinet warehouses using a “customized Delivery Note” service, thus the Esprinet customers do not need a logistic hub.

### **EDI project**

Remaining on the sales side, in parallel with the Web Portal – used for the connection with small and medium customers – Esprinet has implemented the EDI with Large-scale retail trade customers, who are more structured and own better technological skills, in order to exchange the Order-Payment cycle documents: Order, Order confirmation, Invoice and Delivery Note.

As far as the purchasing side is concerned, the relation with suppliers is forced to be on EDI, according to the different standards that the supplier, with more bargaining power, imposes. The EDI flow covers all the Order-Payment cycle steps and goes beyond the pure Execution, toward some Collaboration functionalities. In particular, Esprinet receives from some suppliers the pre-Delivery Note (which represents an anticipation on the future delivery) and the credit notes (that are the percentage of income the vendor recognizes in face of future sales). Moreover, there is also the possibility to manage the special price campaign; a supplier, who recognizes a special price to a final customer, delegates to Esprinet the customer master data and its management at customized price. Finally, Esprinet shares with all the suppliers, data about the stock level and the sellout.

### **Other projects**

Coherently with its technological projects, Esprinet implements the Digital Archiving on all the financial (account payable and receivable) documents, while the operational ones are uploaded on the document management system that is integrated with the ERP and allows the management of the Approval Workflows.

Concerning the relationship with the Transport Service Provider, it is managed through FTP folders. FTP (File Transfer Protocol) is a standard network protocol used to transfer computer files between a client and server on a computer network after the authentication of each actor (username and password). Esprinet shares through FTP folder the Delivery Notes and the Transport Service Providers update in real time data about the delivery status.

### **Benefits**

Esprinet has always considered of fundamental importance, the ability to align with the needs and standards imposed by Large scale retail trade suppliers, due to their bargaining power achieved with their higher turnover. This objective has been reached thanks to the EDI adoption that allows to respect the requested standards and to reach a great degree of efficiency, since it is an Application to Application solution that reduces drastically the number of errors, the time consumption and the respective costs. On the customer side, the advanced Extranet of Esprinet has created a strong competitive advantage and a deep integration with some customers that have based their logistic structure on it (thus increasing their loyalty), such as in the case of “showcase for third parties” and “customized Delivery Note”. Finally, the Digital Archiving of documents completes coherently all the digital projects, allowing not to print information already present in a digitalized format, and to reduce paper volumes and their maintenance costs.

## Criticalities

Since the company grounds its vision on digitalization as well as on the strong commitment that the top managerial pursues push ahead with every decision, Esprinet found very few difficulty during the implementation of the digital projects. The main criticalities are emerging nowadays and are related to the maintenance and upgrade of the Extranet infrastructure due to the technological innovation speed. Nowadays, mobile represents one of the main trend and being present on mobile devices, such as smartphone and tablet with optimized content, is one of the main challenge for the company.

## Future development

Since all the relationships on both the sales and purchasing side are already supported by digital solutions, Esprinet cannot implement a complete new project, and the objective will be to improve and upgrade the current solutions. In particular, the company will focus on two aspects; firstly, Esprinet will try to involve as much actors as possible, while secondly, it will optimize its Extranet, adapting it to mobile devices.

## 3.2.15 GoodYear Dunlop case

### General information

Company	GoodYear Dunlop Europa
Address	Strada 4, Palazzo A10, 20090 Assago (MI)
Company Web address	<a href="https://www.goodyear.eu/it_it/consumer.html#/">https://www.goodyear.eu/it_it/consumer.html#/</a>
Extranet Web address	<a href="http://apsalesportal.goodyear.com/Logon/logonpage.do">http://apsalesportal.goodyear.com/Logon/logonpage.do</a>
Business sector	Automotive
Turnover	More than 6 billion €
Number of Employees	More than 5,000
Position in the Supply Chain	Producer
Type of suppliers	Raw material suppliers, services suppliers
Type of Customers	Carmakers, Aftermarket
Contact	Walter Falavigna-Distribution Operations Manager

Table 27: GoodYear Dunlop's general information

GoodYear Dunlop is the European sub-holding of GoodYear Tire & Rubber, an American multinational tire manufacturing company founded in 1898 by Frank Seiberling, based in Akron, Ohio that gives its name to Charles Goodyear, inventor of vulcanized rubber. The core business of the Goodyear is the production and selling of tires for automobiles, commercial trucks, motorcycles, race cars, airplanes, farm equipment and heavy earth-mover machinery. The



company is a world leader with a turnover higher than 16 billion €, more than 80,000 employees, and 80 plant in 28 countries. Talking about GoodYear Europe it contributes for one third of the total turnover, selling more than 40 million tires per year, and is present with its factories in Germany, Slovenia, Turkey and Poland.

### Supply Chain Structure

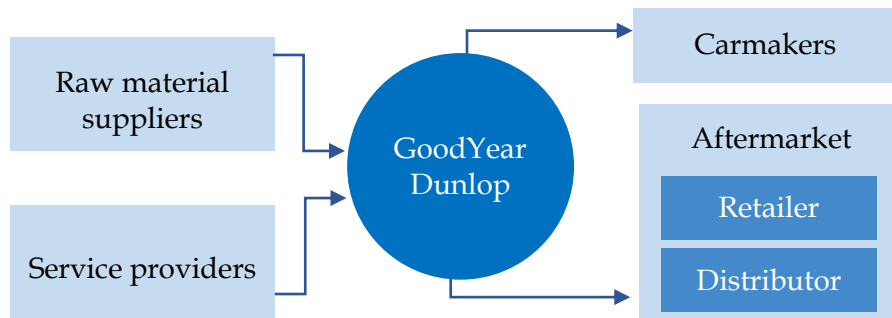


Figure 49: GoodYear Dunlop's Supply Chain

Upstream, GoodYear Europe deal with two kind of suppliers, raw material and services suppliers. as far as the raw material suppliers is concerned the main ingredient of tires is the natural rubber, then there are chemical additives and carbon black. The latter are purchased from few big companies while natural rubber, generally cultivated in the Asian south-east, is purchased following speculative criteria at the Singapore stock market. Considering the services providers, GoodYear interact with almost 50 actors, and with the exception logistic provider (which account for about 65% of the service expense), the relations are spot ones and is not worth having a strong integration, so the information exchange happens in a traditional way. On the sales side GoodYear sell its products to two customer categories: the “original equipment”, including the main carmakers, and the aftermarket. The carmakers, that account for about 30% of revenues, are about 50 big companies, well-structured on a digital point of view and with them it is possible to communicate using EDI. The aftermarket is divided in two different categories: distributors and retailers. The impact on sales volume of these two kind of customers varies according to the country, but globally the distributors account for 20% of the volume while retailers for the rest. Retailers are furthermore divided into dependent retailers (franchising) and independent ones.

### Extranet project

Since 2005, Goodyear Dunlop has implemented a Web Portal, which is aimed at supporting the retailers' relationship with the objective of improving standardization, readiness of client supply, reduction of non-value added activities and the service overall. The platform initially was a source of differentiation but as time passed, also competitors did adopt a similar solution. Nevertheless, this Extranet has evolved over time becoming more and more complete, and now



have different features, both regarding the Execution and Collaboration. The first one, also in a chronological order of introduction, is the possibility to place clients' Orders directly through the filling of Web-forms, thus standardizing and gathering the entry data and further simplifying the back-office processing. Nowadays the whole Orders volume by retailers, transits on the Extranet. Moreover, a second feature allows to check products availability and their stock level. A third module makes available sales Invoices with no need to receive them by post or email. Clients can directly access them through the company's platform providing their credentials and thus creating their own report. A further function, strategic for GoodYear and its customers is the traceability of the single shipping and also of the single package and item that compose the lot. It assumes a relevant role because an Order can completely feature different goods as far as performance and value is concerned, so every item has different importance and priorities too. In this way carriers' partnership play a key role. Carriers, also receive automatically and periodically from GoodYear' system a series of Delivery Notes on the base of different settings, which are internally established. These Delivery Notes include information about quantity, type of goods, time and place of delivery. The last functionality that has been introduced allows complaints management; clients accessing the section and following instructions are directly suggested by the Web Portal; making it possible to standardize a process that has always been heterogeneous and time consuming. Moreover, the Extranet is integrated with the ERP system that allows the collection of data about stocks and warehouses, thus creating KPIs suitable for monitoring GoodYear performances towards its clients, such as the time between the receipt of the Order and its processing or the turnover of certain stock products.

### **EDI project**

GoodYear has implemented an EDI channel to interact with the 50 carmaker customers, since they are well structured from digital point of view and have enough competence. Through this channel demand forecasting plan and documents related to the full Order cycle (Order, Order confirmation, Delivery Notes and Invoice) are exchanged.

### **Benefits**

The implementation of the Extranet has been significantly successful for the company. Indeed, the company has automated and digitally managed the whole process of Orders receiving and complaints; moreover, it has increased the standardization, and at the same time it has substantially decreased the non-value added activities of its employees (e.g. receiving and managing phone calls from customers and manual data entry of Orders). This allowed the staff relocation to higher professional, value-added activities. Furthermore, the service level has noticeably increased. Now the clients can place Orders at any moment without downtime.

Finally, all these changes have been positively welcomed by both clients, who acknowledged the value of the new solutions, and staff, who can now work in a more gratifying way.

### Criticalities

The main criticality found by the company during implementation lies in the mindset change of both employees and customers, that now cannot manage freely the Order process and must follow a series of standardized steps.

## 3.2.16 Gruppo PAM case

### General information

Company	Gruppo PAM S.p.A.
Address	Via del Commercio, 27 - 30038 Spinea (VE)
Company Web address	<a href="http://www.gruppopam.it">http://www.gruppopam.it</a>
Extranet Web address	<a href="https://pam.bravosolution.com/web/login.html">https://pam.bravosolution.com/web/login.html</a> <a href="https://gedweb.gruppopam.it">https://gedweb.gruppopam.it</a>
Business sector	Large-scale retail trade
Turnover	€ 2.4 billion
Number of Employees	10,000
Position in the Supply Chain	Retailer
Type of suppliers	Grocery goods manufacturer, good/service provider
Type of Customers	Affiliates, final customers
Contact	Sandro Trevisanato - CIO

*Table 28: Gruppo PAM's general information*

Gruppo PAM is an Italian company, operating in the large-scale retail distribution industry; it was born in 1958, opening its first retail store in Padova. Thanks to a continuous growth and development in the years, nowadays the company own and manage four brands:

- PAM Panorama, which manage the supermarket channel;
- PAM Franchising, which manage the affiliated stores channel as well as the proprietary shops, even if the latter are a very small percentage;
- IN's Mercato, which cover the discount channel, with more or less 400 point of sales;
- PAM Local, which manage all the convenient stores in the city centers.

Overall, the company manages 647 point of sales and thanks to a staff of nearly 10,000 employees, it achieved in 2015, 2.4 billion € of turnover.

## Supply Chain Structure

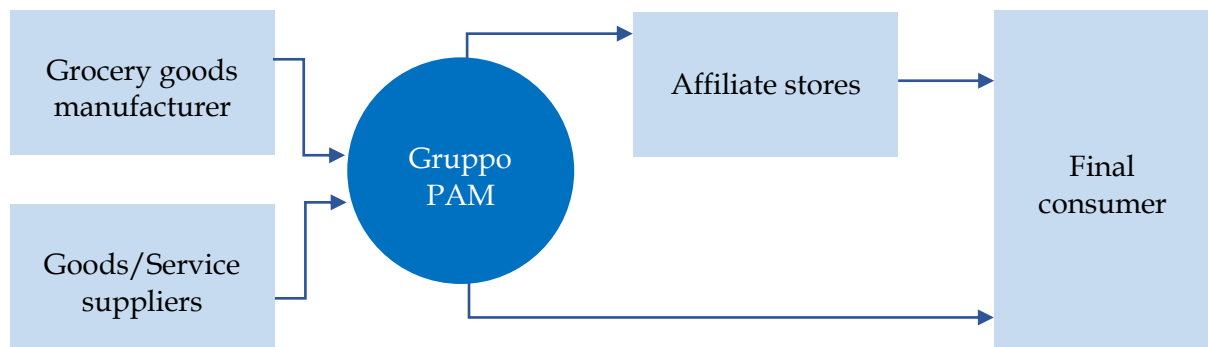


Figure 50: Gruppo PAM's Supply Chain

On the account payable, Gruppo PAM deals with service and maintenance suppliers, but above all with all the grocery goods manufacturers. For this reason, the company has continuously to manage a wide set of suppliers, divided by the goods categories and brands. Gruppo PAM, thus, has a very high bargaining power, that reflects in the opportunity, for the company, to impose its standards and communication technologies. This particular situation is typical in the Italian large-scale retail distribution industry, where large-scale retailers have high bargaining power. As far as the account receivable is concerned, the company has to establish relationships only with its PAM Franchising affiliates. Gruppo PAM has more or less 120 points of sale within its franchising brand, spread in the whole country. Although it is a B2C market, the company must relate with its final customers through all the PAM brands.

## Extranet project

### Upstream

Gruppo PAM has implemented two Web Portals aimed at supporting the relationships with the huge number of suppliers. It is exactly from this wide set of actors that was born the urgent need of digital tools to achieve a better efficiency. More in depth, the first is well integrated with the company EDI solution, thereby managing the possible inconsistency of the Purchase Orders, or not successful transactions. It, thus, allows the company, and suppliers, to share the necessary documents through the solution, in order to efficiently solve the occurred mistakes.

On the other hand, the second Web Portal helps Gruppo PAM to better select its suppliers thereby working on the pre-transactional phase. The solution was built to be used for the technical sector which includes the provision of goods and services. After an initial phase - where possible new suppliers upload all the necessary documents and information - starts the qualification process carried out by Gruppo PAM. The company could, thus, carefully understand whether to introduce the supplier into its supplier register.

### Downstream

Although for the company – but more in general for the industry – the account payables are much greater than the account receivables, Gruppo PAM has implemented five years ago – in collaboration with a service provider - a Web Portal aimed at supporting the relationship with its affiliates. The solution, in particular, reflects the need of a more efficient and effective management with the company's unique B2B clients. Through this new technological mean, the company could easily manage all the account receivable Invoices, allowing the affiliates to receive them only in digital way.

### **EDI project**

Gruppo PAM is using, since more than ten years, the EDI channel to exchange documents with its heterogeneous set of suppliers. Considering the huge number of actors, the company is nowadays rewarded by really admirable results; Gruppo PAM indeed, is working with 3,500 active suppliers, and nearly 80% of the 2.5 million documents per year are exchanged through EDI. Despite the great results, the company must deal with a few very small suppliers, definitely not enough structured to use this technological channel. However, driven by a strong internal commitment, the company is putting a lot of effort in convincing the whole set of suppliers to use EDI; it started firstly from the biggest and better structured, going toward the smaller afterwards. Through this solution Gruppo PAM exchange mostly Invoices with its suppliers; however, in some cases the company cover the full Order-Payment cycle achieving in this way, a considerable level of efficiency and effectiveness as well.

### **Other projects**

The digitization project of the company includes also the internal processes. Thanks to the Digital Archiving, Gruppo PAM store all the fiscal data and documents – such as all the account receivable and payable Invoices or accounting ledgers - making them available electronically, for an overall number of 3.5 million documents per year.

Coherently, all the operational data are uploaded and stored into the Document Management System (DMS), supported by Approval Workflows with different internal authorization levels. The Document Management System could administer the stores layout or all the licenses and documents linked to the opening of new shops as well as the Invoices received by PEC system for all the suppliers that must deal with the article 62 about the supply of food and agricultural products.

### **Benefits**

The overall digitization project allows the company to achieve a better management of the supplier relationship. It represents a relevant aspect, given the wide set of actors composing the

account payables. The two Web Portal implemented by the company guarantees an excellent rapidity in qualifying and evaluating the suppliers as well as an optimal management of inconsistency of the Orders. In the same way, the EDI channel guarantees better efficiency and effectiveness, alongside an overall reduction of paper flow. Similarly, the Web Portal solution addressed to the clients, guarantees a significantly higher level of integration and collaboration with affiliates.

Finally, the Digital Archiving, the Document Management System alongside the Approval Workflows allow Gruppo PAM to have a greater rapidity to retrieve data and information, as well as a more efficient management of internal activities.

**Criticalities**

Since the company has well implemented a complete dematerialization project, putting continuously a strong commitment, there are not important criticalities. Although the utilization rate of the solution is nearly 80% of the active suppliers, Gruppo PAM could have some difficulties in managing the small suppliers, not enough structured to support an EDI channel. For this reason, it would be one of the most important challenges for the company.

**Future development**

Despite the thorough dematerialization project, the company would like to go further. The company indeed, is planning to improve the level of digitalization of its activities, starting to transfer the Delivery Note - nowadays in paper form together with the goods - electronically.

**3.2.17Hera group case**

**General information**

Company	Hera S.p.A.
Address	Viale Carlo Berti Pichat, 2/4 - 40127 Bologna
Company Web address	<a href="http://www.gruppohera.it">http://www.gruppohera.it</a>
Extranet Web address	<a href="https://portal.gruppohera.it/irj/portal">https://portal.gruppohera.it/irj/portal</a>
Business sector	Public services
Turnover	€ 4.2 billion
Number of Employees	8,500
Position in the Supply Chain	Service provider
Type of suppliers	Energy suppliers, Services suppliers, Products suppliers, Labor suppliers
Type of Customers	Public and Private market
Contact	Marcello Guerrini - IT and Services Director

*Table 29: Hera's group general information*

Hera, was born in 2002 in Bologna as the first national experience of aggregation of municipalities' organizations, thanks to which it has become a unique multi-utility, hence offering several kind of public services. Through a constant growth over the years, the company has been able to include in its business other public organization in neighborhood territories operating in Pesaro, Urbino and in the North-East of Italy (Padova, Trieste, Udine). Hera offers services within three sectors:

- Environment sector: concerning the waste collection, treatment and disposal;
- Energy sector: concerning the distribution and sale of electricity and gas;
- Water sector: concerning aqueducts and sewage system management and purification.

The company rely on approximately 8,500 employees, achieving in 2015 4.2 billion € turnover.

### Supply Chain Structure

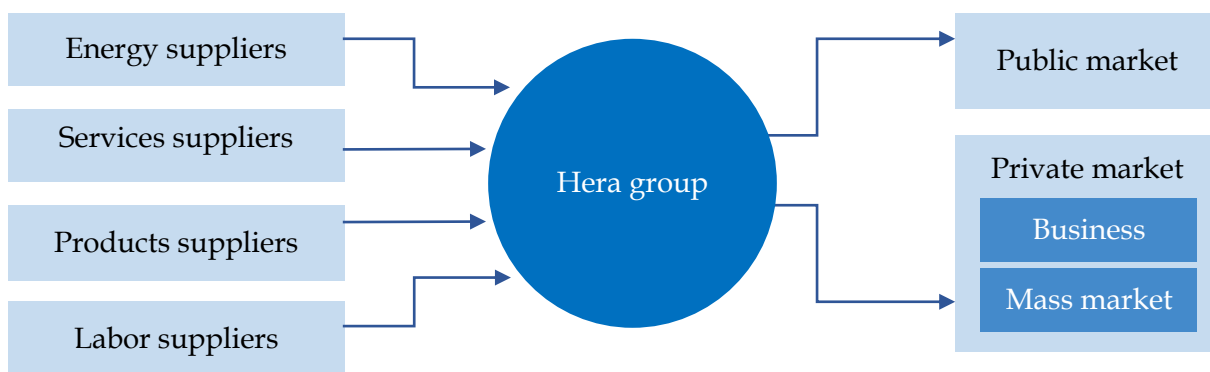


Figure 51: Hera group's Supply Chain

As far as the account payable is concerned, the company deals with some categories of suppliers; more in depth there are firstly energy suppliers who are big actors that require a different management against the other. Indeed, they have a specific contract which are not administered by the purchase department. On the other hand, the purchase department directly manage the remaining three categories of suppliers which include:

- Service suppliers: it includes collection, treatment and disposal of waste and cleaning services;
- Product suppliers: it includes chemical products for waste treatment and cleaning services as well as products for the company's departments;
- Labor suppliers: it includes tenders concerning public sector.

Within the last three categories, the company deals with almost 5,200 suppliers, reflecting in 500/600 million € per year purchases.

On the other hand, concerning the account receivable, Hera deals with two different market; approximately, half of the downstream business is toward the public market while the second

half toward the private one. Moreover, the private market is further divided into business and mass market, thus differentiating the B2b from the B2c.

### **Extranet project**

Since 5 years, the company is exploiting an SRM platform (Suppliers relationship Management) to better and more efficiently deal with its wide set of supplier almost composed by 5,200 actors, the 98% of whom interact with Hera through the above solution. The company, thanks to the Extranet, manage the supplier register - which could be updated directly by suppliers - or pre-qualification forms, to accomplish the scouting phase. Afterwards, once qualified, upstream actors could check calls for tender as well as both product and service requests.

Furthermore, suppliers must provide the required documentation related to each offer only through the Web Portal. In this way, the company can rapidly analyze offers in a detailed way. In particular, the documents required, are related to administrative, technical and economic tender. Moreover, the system includes a dead-line for offers upload. Hence, the company firstly analyze the administrative tender, thereafter the technical one and only after the technical selection, Hera could move on the economic one.

The platform could guarantee the same functionalities nowadays included in the traditional process, thus allowing the company to accomplish all the previous activities with a remarkable efficiency, but also providing a high service level to suppliers.

Finally, since two years the company has introduced Electronic Catalogues with some suppliers for stocked products, with the recent plan to expand the portfolio of actors managed in this way.

### **Other projects**

The overall digitalization project of Hera includes also internal activities to achieve a better efficiency and effectiveness in the company processes. In particular, all the data related to the Order cycle, but also concerning projects and quality documents are stored in a Document Management system (DMS) and thus, could be retrieved and analyzed rapidly, therefore, saving time and money.

Furthermore, since 2007, Hera has implemented the Digital Archiving of all account receivable Invoices and administrative clients' documents. On the other hand, account payable Invoices are managed in the traditional paper way.

Finally, in 2015 - according to deadlines and legal obligation - the company has introduced an Electronic Invoicing System toward the Italian Public Administration for the sales Invoicing forwarding through the Exchange System (ES).

## **Benefits**

Overall, the digitalization project of Hera has allowed the company to achieve a remarkable degree of efficiency and effectiveness, both concerning internal activities and the Extranet toward suppliers. More in depth, the SRM solution guarantees Hera the capability to accomplish the same activities in a digital and more structured way, saving money and time, moreover ensuring higher service level to suppliers. Furthermore, the latter are well integrated within the company through the supplier register - directly editable by them. Coherently, the Electronic Invoicing System toward the Public Administration, has shortened payment period and has reduced the paper volumes as well. Concerning internal processes, the Document Management System (DMS) and the Digital Archiving, has allowed the company to save time and money in retrieving and analyzing documents, but also reducing paper volumes.

## **Criticalities**

The main criticalities faced by the company, are related to the implementation of some digital solutions; in particular - although Hera has achieved the 95% of adoption rate among suppliers - it has been difficult to increase the number of upstream actors that exploit the SRM platform. Moreover, some problems occurred in the earlier stages of the Electronic Invoicing implementation, mainly related to some reference codes identification.

## **Future development**

Alongside the implementation of the Electronic Invoicing system toward the Public Administration, the company has planned to introduce the Invoices forwarding in electronic-structured format, also for B2b clients. In this way Hera will improve all the considerable benefits already achieved with the Public Administration.



### 3.2.18 Hilti case

#### General information

Company	Hilti Italia S.p.A.
Address	Piazza Indro Montanelli 20, Sesto San Giovanni (MI)
Company Web address	www.hilti.it
Extranet Web address	n.a.
Business sector	Building utensil
Turnover	€ 250 million
Number of Employees	1,100
Position in the Supply Chain	Producer
Type of suppliers	Raw material suppliers; carriers
Type of Customers	Construction and mining industry; Energy & Industry
Contact	Andrea Ferrero – South Europe Logistic responsible

Table 30: Hilti’s general information

Hilti was founded in 1941 with headquarter in Liechtenstein becoming over the years a multinational corporation, that develops, manufactures, and markets products for the construction, building maintenance, and mining industries, primarily to the professional end-user. The company directly manages owned plants worldwide alongside marketing and sales activities in 120 countries.

Hilti operates in Italy through its historic branch since 1952, managing 1,100 employees and achieving in 2015 almost 250 million € turnover. Moreover, in Milan there is a logistic plant where are administered 13 country of south-east Europe.

#### Supply Chain Structure

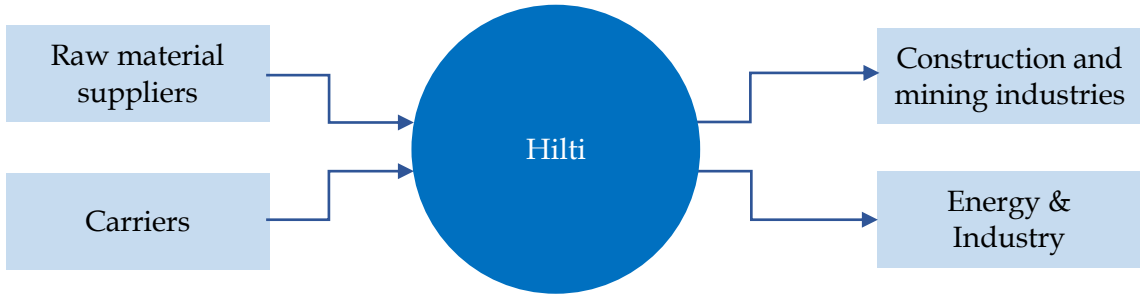


Figure 52: Hilti’s Supply Chain

Upstream, Hilti deals with two categories of suppliers. Firstly, since the company directly develop and produce its products, raw materials suppliers are fundamental and directly managed by Hilti. Nevertheless, the highest percentage of the company purchases are composed by carriers. Indeed, the research and development department in the headquarter, develops all

the products set, afterwards dispatched from manufacturing plants toward warehouses and distribution centers. After this first logistic step, all products are finally shipped to stores.

Downstream, Hilti deals with construction and mining industries clients, as well as actors that fall in the “Energy & Industry” category, which is related to the building maintenance area.

As far as the Italian market is concerned, overall the company manages 110,000 active clients and 170,000 point of sales. More in depth all clients interact with the company through four channels: the customer service, the point of sales network, the Website and consultants.

### **Extranet project**

#### Upstream

As far as the relationship with suppliers is concerned, carriers’ transportation services represent the highest part of the company’s purchases, both toward Hilti’s warehouses and directly toward clients who has bought through the Website. The company has significantly revised – exploiting digital solutions - the way it interacts and relate with carriers. In particular, with some of these actors, the company is deeply integrated being able to send them several information about the delivery, including the Delivery Note. In order to accomplish such exchange of documents, Hilti exploit a Web Portal from an external provider.

Furthermore, through the Web platform, the company have the visibility on the delivery progress status. Such information is directly available in the company’s ERP – well integrated with the Web Portal – linked to several labels indicating some relevant steps about the delivery. Overall, the company has such visibility on the 93% of all the deliveries.

#### Downstream

The company has implemented a Web Portal toward clients, to improve the service level offered and accomplish the relationship activities more efficiently. In particular, the platform is addressed to medium-size companies, aimed at simplifying the exchange of sales Orders. More in depth, the client, through the platform, could decide to send Orders either in a PDF format, or in an electronic-structured format. The latter, expects that the Order is generated by the companies’ ERP, thereafter automatically uploaded on the Web Portal. However, the platform is mainly used for recurring Orders; hence clients, depending on their periodic needs and consumption, forward an Order for a digital re-purchase. Overall, the Web Portal supports the 10% of clients’ transactions.

Finally, the Web platform make available to clients the tracking information, thus letting them follow the progress status of the dispatch until the final Proof of Delivery (POD). The Delivery Note and Invoices are available as well.

## **Other projects**

Hilti has introduced a further digital solution to interact with clients exchanging Orders. Such integration is addressed to few big clients concerning both the construction industry and the “Energy & Industry” category - for manufacturing plants which require maintenance. More in depth, the company has implemented a direct integration of its own ERP system and those of clients, which are now able to automatically interconnect and exchange documents and information. This Machine to Machine (M2M) interface is exploited to manage the relationship with almost 15 clients and has been developed by the IT department of Hilti together with those of its clients.

Through the solution, the company exchange sales Orders; nevertheless, the remaining Order cycle documentation is provided through Hilti’s Website, afterwards clients authentication.

Furthermore, for those products which require the direct interaction with clients, sales Orders are managed by consultants, who have access to the ERP system and the clients’ offer is automatically translated into an Order.

## **Benefits**

Hilti has well implemented a digitalization project that guarantees the company several benefits; indeed, the implementation of the Extranet addressed to clients, allows Hilti to enhance the efficiency and effectiveness in the Sales Orders management (currently received seven days a week). Furthermore, the Orders acquisition process has been considerable simplified and thanks to the Web platform, now clients are more loyal. In the same way, the Web Portal addressed to carriers, has improved the efficiency of the company, which now benefits from the availability of transportation documents directly in its ERP while having visibility on the progress status of deliveries.

## **Criticalities**

The main criticality of the company is related to consultants which do not yet understand the advantages of the integration with clients; indeed, some consultants see in this integration the loss of direct interaction with clients. On the contrary hand other more “smart” consultants see the opportunity to employ their time in other activities.

Another difficulty faced by Hilti is related to both the dispatching of more technical information and the interaction with some carriers not enough developed from a technological point of view.

### 3.2.19 Intersport Italia case

#### General information

Company	Intersport Cisalfa S.p.A.
Address	Via del Tuscolano 17/2, 40128 Bologna (BO)
Company Web address	<a href="http://www.intersport.it/">http://www.intersport.it/</a>
Extranet Web address	<a href="http://weborder.intersport.it/(S(uzdp1z45frtqhl3pyejbn4ru))/Default.aspx">http://weborder.intersport.it/(S(uzdp1z45frtqhl3pyejbn4ru))/Default.aspx</a>
Business sector	Sport & Clothing
Turnover	€ 650 million
Number of Employees	2,200
Position in the Supply Chain	Wholesalers
Type of suppliers	Sportswear manufacturers
Type of Customers	Affiliate retailer, Cisalfa Sport, Cisalfa's Franchising
Contact	Riccardo Boccalero - CIO

Table 31: Intersport Italia's general information

Intersport Italia is the Italian sub-holding of The Intersport Group, an international company founded in 1968 and having its headquarter in Bern, Switzerland. The company represent the main Italian actor in sportswear distribution with more than 400 affiliates shops. In Italy the company core business is the wholesaling and there are not owned shops, thus, it has a key partnership with Cisalfa that is one of the Italian leader in sportswear retailing with more than 150 owned shops and 20 franchising on the country territory.

#### Supply Chain Structure

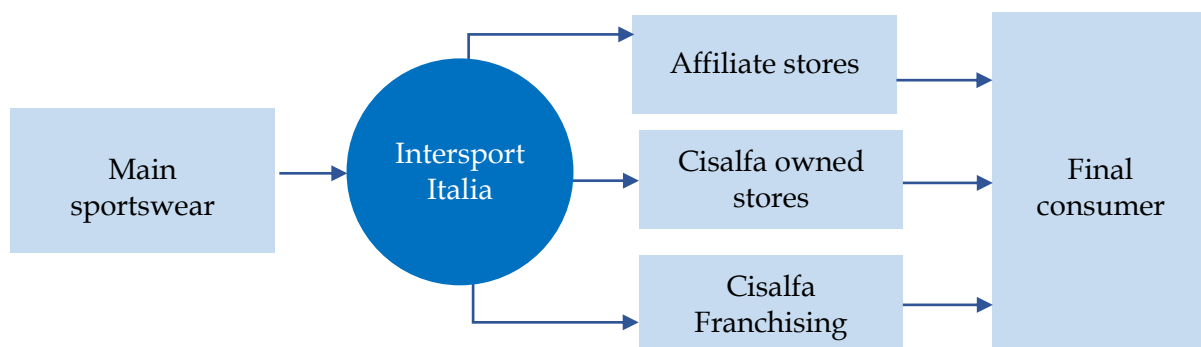


Figure 53: Intersport Italia's Supply Chain

Intersport Italia in its particular business model plays the role of central buying office: it stipulates contracts with main sportswear manufacturers at convenient conditions - exploiting its bargaining power due to the widespread diffusion, on different national territories, of its affiliate stores - and collect Orders from its affiliates stores to which it re-Invoices the goods purchased according to its convenient contracts. While the purchase side of the Supply Chain, seems very

simple and the main partners are big sportswear manufacturers, the downstream side is quite fragmented and require digital solution to be efficiently managed. Hence, downstream Intersport has three types of partner categories:

- 60 affiliate retailers with more than 400 stores. Each retailer has an independent VAT number and they allow a capillary diffusion on the territory;
- Cisalfa, a sportswear specialized retailer with about 150 owned stores and more than 3,5 million customers;
- 20 Cisalfa franchising stores, that under Cisalfa brand represent independent actors.

Moreover, the partnership with Cisalfa goes beyond the simply supplier-buyer relationship: Intersport Italia outsource the management of its IT system to Cisalfa that centralized it (managing both one's IT system and Intersport one) in its headquarter (Bergamo).

### **Extranet project**

The Order cycle that involves Intersport and its customers is quite fragmented: for the majority of Orders, customers issue them directly to Intersport suppliers that ships the physical goods to customers but sends the Invoices to Intersport who re-Invoice them to its customers applying a mark-up. In order to do this re-Invoicing cycle, the company relies on a Web Portal that allows Intersport to automatically upload Invoices; hence, customers can download them accessing the Extranet using their ID and password. Moreover, the Web Portal makes available other type of documents to customers: communicational documents, commercials and products' pictures. The latter are very important because help customers to build up their own catalog. Another interesting functionality lie in the possibility to manage special campaign, organized five/six times per year by Intersport. In this case affiliates, using mobile devices made available by Intersport can look at the promotional eCatalog and issue the Order directly to the Intersport through the Web Portal. Concerning the small part of Orders not issued by affiliates to manufacturers, the Extranet allows a so called "direct triangulation". Hence customers use the Extranet to issue the Order to Intersport, that automatically re-directs them to suppliers and receives the relative Invoices which are afterwards made available on the Web Portal as stand above.

### **EDI project**

Intersport receive 150,000 Invoices every year from its suppliers, one for each Order issued by its affiliates. This high number of documents require a digital solution to be managed efficiently and Intersport relies on an EDI channel provided by an external VAN. Moreover, in parallel with this solution there is also the possibility to communicate with Intersport using its XML proprietary standard.

## Other projects

Intersport with its main suppliers manage digitally Delivery Notes. Moreover, eInvoicing and a eCatalog are two further solutions that allows the company a quicker and more efficient management of the Supply Chain. In order to coherently close up a well balance digital project, for ten years Intersport has implemented the Digital Archiving (through on an outsourcing service) of all legal and fiscal document: Invoices (receivable and payable), journal and consolidated employment ledger.

## Benefits

The implementation of all the digital solution so far described (digital Delivery Note, eInvoicing, Extranet, EDI and Digital Archiving) has guaranteed an overall increase of efficiency and effectiveness of processes alongside a better allocation of workforce in more valuable activities and finally a cost reduction for the single Order cycle.

## Future development

The international supplier request, has brought to a different logistic strategy. Intersport has started a centralization project that will allow affiliates to directly issue Orders to Intersport in an electronic format. Thereafter, these Order will be re-directed to suppliers that will ship goods to a new Intersport central logistic hub (using digital Delivery Note). Hence, the described process will be more structured and efficient.

## 3.2.20 Italtel case

### General information

Company	Italtel S.p.A.
Address	Via Reiss Romoli - 20019 Settimo Milanese (MI)
Company Web address	<a href="http://www.italtel.com">http://www.italtel.com</a>
Extranet Web address	<a href="https://latam.italtel.com">https://latam.italtel.com</a>
Business sector	Telecommunication
Turnover	€ 450 million
Number of Employees	1,500
Position in the Supply Chain	Service provider
Type of suppliers	Sub-suppliers
Type of Customers	Telco operator, large enterprise, public sector
Contact	Sergio Giuseppe Lazzaroni- CIO

Table 32: Italtel's general information

Italtel is an Italian corporation focused in the telecommunication industry. It was born in Milan in 1921 - the corporate headquarters - and nowadays includes also 2 branches in Roma and Palermo. The company mainly operates in the EMEA markets and Latin America, designing, developing and implementing products and solutions for networks and next-generation communications services based on IP protocol. Italtel can rely on an overall set of 1,500 employees, 1,200 of whom are in the Italian offices, while the remaining part is spread in the foreign ones. In 2015, the company was able to achieve 450 million € of turnover, 60% of which generated from the Italian market.

**Supply Chain Structure**

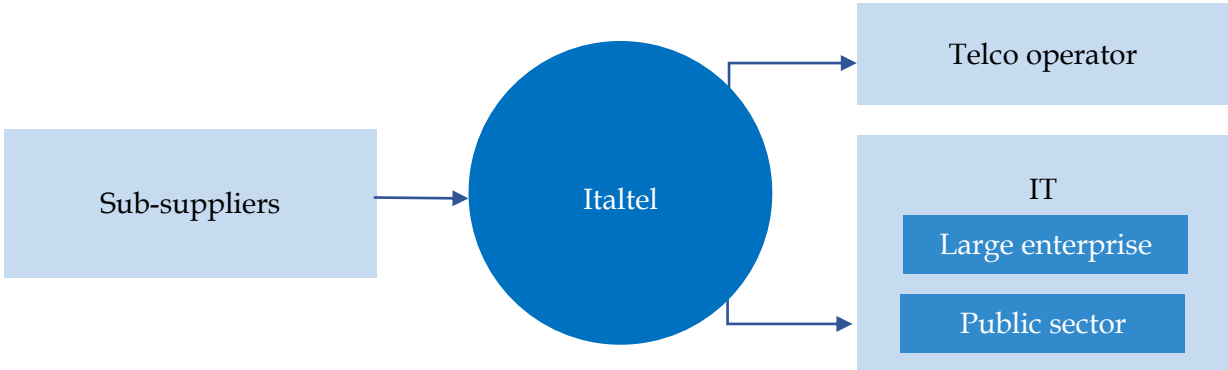


Figure 54: Italtel's Supply Chain

Since the company has only three Italian offices, it is not able to easily and rapidly provide its products and services in the whole country. For this reason - concerning the account payable - Italtel relies on a set of sub-suppliers that help the company to better reach every part of the Italian territory.

On the other side of the Supply Chain, the company offers some solutions to its clients related to the Telco and IT categories: within the former, the main Telco operator worldwide is included; the latter, instead, is divided into two further categories which are the large enterprise and the public sector.

**Extranet project**

Upstream

As far as the account payable is concerned, Italtel has implemented an Extranet which helps the company deal with its sub-suppliers. More in depth, this Web Portal supports the exchange of work Orders. The latter are taken on the responsibility of the sub-suppliers that, in turn, once performed all the activities, upload on the Web Portal the documents and data related to each tasks, thus allowing Italtel to start the payment process. This powerful relationship between the company and suppliers gave the possibility to achieve a very high level of efficiency and integration among the actors.

### Downstream

Furthermore, Italtel has introduced a second Extranet which is addressed to the relationship with its downstream actors, allowing the company to achieve a higher service level. The solution aims at processing the technical assistance activities that clients will require. In particular, it supports the exchange of all the documents and information – such as a simple screenshot or an error report – that are essential to diagnose and solve specific problems that could occur during the business operations.

### **Other projects**

The digitalization project of Italtel goes further and includes other technological solutions aimed at letting the company's operations to be more efficient and effective. Since ten years indeed, Italtel has managed digitally the Delivery Note for the largest and more structured suppliers, that compose a high part of both the turnover and purchases.

Moreover, Italtel has implemented the Electronic Invoicing; the process involves not only the new Italian Public Administration guidelines, but also the Electronic Invoicing is addressed to nearly the total of account payables and account receivables.

Furthermore, concerning the remaining part of Invoices, received in a paper format, the company relies on an OCR (optical character recognition) system, through which Italtel is able to scan the Invoices and extract relevant information, from an accounting point of view. Thereafter, the digital document is automatically linked to the Order number, within the company's ERP, letting the Approval Workflow start for the final payment.

Finally, the company archive digitally both normal and fiscal documents.

### **Benefits**

The introduction of the Web Portals has definitely brought benefits to Italtel as well as to both clients and suppliers who, right from the beginning, understood the strong opportunity they could benefit from a “digital” relationship. The company is now able to manage efficiently the documents flow coming from the actors of the Supply Chain, providing at the same time a higher service level with a considerable level of time saving.

Coherently, the OCR system, the Delivery Note digital management, alongside the Approval Workflow and the Digital Archiving guarantee an excellent level of efficiency and effectiveness of both external processes and internal activities, thereby reducing paper flows and their related cost.

### **Criticalities**

The digitalization of processes, activities and relationships, generated different kind of resistances and problems for Italtel, both internally and externally. Nevertheless, the strong



commitment the company dedicated to the project helped to deal with the internal criticalities; indeed, it well supported its employees to better understand the overall advantages and benefits coming from the digital solutions. Although internally all the major problems are solved, externally there is a low percentage of little clients or suppliers that are not strongly digital minded and it is required more effort from the company.

**Future development**

The company is planning to review, in a digital way, its Procurement and Sourcing processes; Italtel would like to find a solution to better manage the selection and qualification of suppliers, achieving thereby better efficiency and effectiveness in performing these activities. Nowadays the company relies on a supplier register, but it is managed in a paper format.

**3.2.21 Leitner case**

**General information**

Company	Leitner S.p.A.
Address	Via Brennero 34 I, 39049 Vipiteno (BZ)
Company Web address	<a href="https://www.leitner-ropeways.com/it/">https://www.leitner-ropeways.com/it/</a>
Extranet Web address	n.a.
Business sector	Transport (ropeway technology)
Turnover	€ 700 million
Number of Employees	3,000
Position in the Supply Chain	Producer
Type of suppliers	Direct material suppliers, indirect material suppliers, services providers, logistics providers
Type of Customers	Companies which manage tourist facilities, urban transport, and material transport
Contact	Massimo Fornalé – Material manager / AG

*Table 33: Leitner’s general information*

Leitner, founded in 1888, is an Italian company, with its headquarter in Vipiteno and operating in the transport equipment business. Specialized in the production of ropeway technologies, it has quickly become a multinational group, made up of different brands: Leitner and Poma (ropeway technologies), DemacLenko (plants producing artificial snow), Prinoth (snow groomers and tracked vehicles), Leitwind (wind plants) and Minimetro (urban transports). The company owns 70 international subsidiaries as well as 127 point of sales & service and 8 production plants.

## Supply Chain Structure

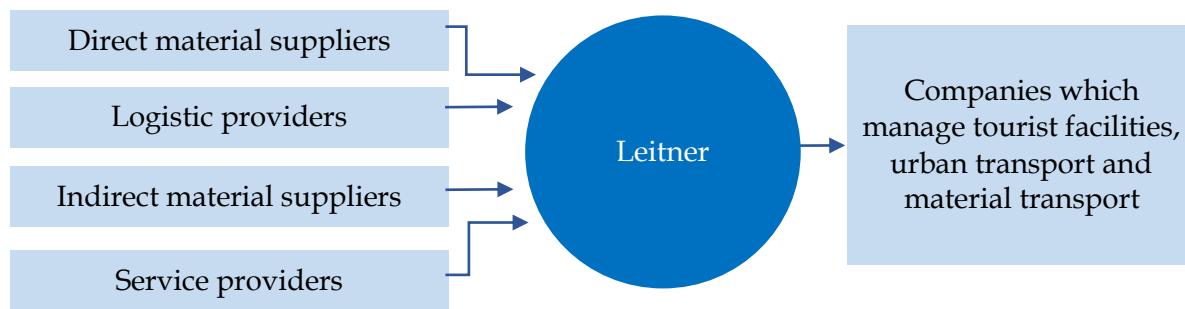


Figure 55: Leitner's Supply Chain

Upstream, Leitner deal with one thousands of suppliers which account for 200 million € expenses every year and about 100 thousands of Order lines. Among these suppliers the majority is represented by direct material suppliers, followed by indirect material suppliers and services providers. The company manages the most important purchases (in term of value) in three different purchase centers; Prinoth, Pome and Leitner, while all the minor purchases are managed directly by small department of the respective area. Furthermore, other actors, which are considered strategic are the carriers (almost 110), which support the inbound and outbound logistic of Leitner. Downstream, customers are represented by big companies or authorities who manage tourist facilities (such as ski resorts), urban and material transport. Finally, Leitner has strengthened partnerships with big innovative companies in the automotive and sport field.

### Extranet project

Leitner has started in 2014, a Supply Chain Management (SCM) project, based on a Web Portal that support the relationship with almost one thousand suppliers, from which the company buys both direct materials and indirect materials, for a total amount of 100,000 Order lines. The need behind this choice was to rationalize and optimize the purchasing process. At the beginning only the most important suppliers in term of Order lines were involved (15 suppliers account for more than 50% of the total Order lines), then the solution has spread, including the majority of the partners. The Extranet is able to manage a double-way flow of documents, that can be uploaded and downloaded by both Leitner and its partners. More in depth, the Extranet allows to exchange purchase Orders, Order confirmations and changes, goods return requests, as well as BOMs, technical specifications and CAD drawings. This solution is currently used in a User-to-Application way, but ideally, it could be integrated with suppliers' ERP and work in Application-to-Application mode.

Furthermore, Leitner has implemented a Web-based portal – integrated with the company's ERP – supporting the relationship with carriers for the management of inbound and outbound logistics. The main need that pushed toward this solution in 2008, comes from the willingness to

rationalize a plurality of 18,500 takeovers between 1,100 picking and 1,300 delivery points. Through this tool, each departments of the company can enter a transport request which, once processed by the logistics department, is turned into a transport Order. It is the portal itself that, according to the transport's Order, establish the price (based on the price lists shared by haulers and previously uploaded), as well as the saturation level of the truck. Moreover, the solution allows the reception of transport requests from suppliers. These request, depending on the case, could be directly processed or pass through the authorization flow of the purchase office. Thereafter, only once this phase is completed, the transport Order is sent to the carrier, generating automatically, a pre-Invoice and the Delivery Notes, available on the Web Portal. Finally - with only one of the carriers - there is the possibility to attach to the transport Order also the carrier's shipping label, which is pre-filled using a tool made available by the Extranet. In this case the carrier will generate a tracking number directly on the Web Portal.

### **EDI project**

In order to efficiently deal with its subsidiaries and - at the moment - one of the supplier, Leitner relies on EDI connections which eliminate the manual data entry thus saving time and avoiding errors. Through these channels the company does not exchange Invoices and fiscal documents but only operative ones, in particular Orders and Order requests.

### **Other projects**

The digitalization policy of Leitner is not limited to an improvement of relations and collaboration along the Supply Chain, but it also concerns the internal part of the company, making it significantly more efficient. In particular, it has been implemented a digital Approval Workflow system - structured on multiple level of authority - which allows the approval of purchase requests and payments. Moreover, the system manages the notification and approval of quality procedures.

Furthermore, to efficiently deal with internal operations, Leitner has implemented Document Management System (DMS), which allows to manage digitals documents and to reduce the paper volume. Finally, in order to coherently conclude its digital projects, the company has introduced an OCR (Optical Character Recognition) system for extracting structured data from Invoices received by Leitner through traditional channels and archive them digitally.

### **Benefits**

Overall, the above described digitization projects have brought considerable benefits to Leitner. Now the whole Supply Chain works with a higher level of traceability and transparency, and this leads to a substantial saving of time and thus greater optimization of available resources. This is reflected in a greater efficiency, effectiveness and at the same time a better quality of the activities.

More in depth, the supplier Web Portal has guaranteed a considerable saving in working time, as regards the management and modifications of Orders: Leitner has been able to optimize its resources, and thus has moved its employees to more valuable activities. Furthermore, concerning the Order confirmations, great improvements have been achieved, compared to the traditional system. The company passed from 50% to 95% of Orders confirmed directly into the corporate's ERP. An additional benefit is also represented by an increasing of partner's fidelity thanks to the double way interaction.

Coherently, the Extranet addressed to carriers has allowed to obtain benefits, in terms of greater efficiency, reducing costs and optimizing resources through a reduction of working time and manual data entry. In particular, speeding up the activities associated to transport request, and in general the logistics processes, it has been achieved a significant increase in efficiency and service level. Moreover, the transparency of operation has helped to create some key performance indicators (KPI) in order to objectively evaluate company performances.

### **Criticalities**

The main criticality which emerged out during the Extranet implementation is related to the relationship with suppliers; more in depth, Leitner works Application-to-Application thus, it gains the maximum advantage but on the other hand suppliers work User-to-Application and do not perceive all the possible advantage. Suppliers, indeed, claim that they have to do a double work; collect data from the Web Portal and afterwards manually input them in the ERP system since it is not integrated with the Extranet. Leitner has partially solved this problem explaining them how their involvement is fundamental and inviting them to visit Leitner offices in order to see directly how their information create a competitive advantage in term of transparency and efficiency, and how it is possible to integrate their ERP, drastically improving the overall performances. Thereafter, suppliers have appreciated this involvement and have understood the real benefits that a complete integration could bring to.

### **Future development**

Leitner has not planned particular improvement of the platform, but its aims at better involving suppliers making them conscious about the advantages of this solution and thus achieving a better level of collaboration along the Supply Chain.

### 3.2.22 Liu Jo case

#### General information

Company	Liu Jo S.p.A.
Address	Viale J. A. Fleming, 17 - 41012 Carpi (MO)
Company Web address	<a href="http://www.liujo.com/it">http://www.liujo.com/it</a>
Extranet Web address	<a href="http://portal.liujo.it">http://portal.liujo.it</a>
Business sector	Fashion industry
Turnover	€ 91 million
Number of Employees	174
Position in the Supply Chain	Manufacturer and sellers
Type of suppliers	Manufacturing suppliers
Type of Customers	Wholesalers and third parties stores; final customers
Contact	Andrea Veroni - CIO

Table 34: Liu Jo's general information

Liu Jo, is an Italian company with headquarter in Carpi which was born in 1995, specialized in the wool manufacturing. Thanks to a well-managed development and expansion, the company has rapidly grown, starting to operate in the apparel industry as well, selling man, woman and child prêt-à-porter, accessories and shoes.

Liu Jo built over the year, a powerful network of point of sales, including mono-brands boutiques (both directly managed and in franchising), multi-brand stores and outlets spread in Europe and Asia.

#### Supply Chain Structure

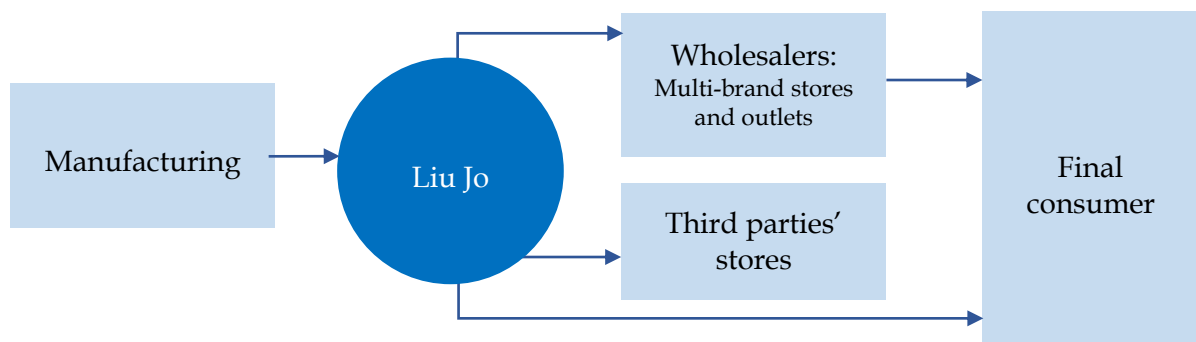


Figure 56: Liu Jo's Supply Chain

As far as the account payable is concerned, the company purchase only the final product, manufactured in outsourcing by several suppliers. Even though these actors are mainly in China (35%) they are decreasing in favor of Nord-African, European and Italian ones. Although the concrete creation of the final product is carried out in outsourcing, the company directly performs

the design phase and engineering in its headquarter but also all the communication activities such as marketing, identification of distribution channels and commercial management. Furthermore, the company carefully defines the standard of quality to be followed by suppliers as well as identifies the raw materials, outlining to suppliers where and how to buy them.

On the other hand, as far as the account receivable is concerned, Liu Jo relate with several clients to who afterward sell goods to final customers. These downstream actors are both wholesalers and mono-brand stores spread in Europe and Asia. While the latter are composed by multi-brand stores and outlets, the former includes 325 stores - both directly managed by the company and in franchising.

### **Extranet project**

#### Upstream

Liu Jo has implemented two Web Portal to better relate with both its suppliers and clients within the Supply Chain. More in depth, the first one, addressed to the relationship with its manufacturer suppliers, allows them to receive additional non-core services, mainly informative communication. However, it does not support the exchange of documents related to the transactional cycle. The solution is used by a small percentage of suppliers, that represent the steadier ones. Concerning the transactional cycle, the related documents are exchanged in a non-structured way.

#### Downstream

The same technology is used downstream, helping the company to efficiently manage the wide and heterogeneous set of clients. Hence, Liu Jo has recently implemented a second Web Portal aimed at saving costs, thus achieving higher efficiency. The Web platform could be accessed by clients through a link sent via mail by the company. Once logged in, they could issue purchase Orders electronically but also view several information and documents such as Invoices and in the very short-term Delivery Notes as well. In this way, clients could easily download documents. All the above documents, are uploaded and stored by the company, that make them available for clients - compatibly with authorization rules - through the Extranet link. The solution is exploited by some actors, who reflect the 80% of Liu Jo business.

### **Other projects**

The digitalization project of Liu Jo would like to go further, including some technological solutions aimed at improving the internal performances through the achievement of higher efficiency with saving both in costs and time. Since seven years, the company has introduced a Document Management System (DMS), which help the company go rapidly retrieve and analyze documents and information.

Furthermore, it has enabled the implementation of Approval Workflows related to account payable. More in depth, the responsible of a cost center, periodically receive remainders related to Invoices and decide either to authorize or not the final payment –even visualizing the attached documentation. Moreover, Paper files and documents are scanned form an external organization to be afterwards uploaded in the Document Management System.

Finally, the company has implemented the Digital Archiving in order eliminate or at least reduce the physical space before available for documents in paper format. In particular, since two years, the company digitally archive the account receivable and since 2015 the account payable. Overall, the above documents are almost 70,000 per year.

### **Benefits**

The Extranet addressed to suppliers, allows the company to easily exchange several kind of documents and although it does not support the transactional cycle processes, it guarantees a considerable level of efficiency in the management of upstream actors.

Coherently, the Web Portal toward clients, has created the opportunity to provide a higher service level, processing more effectively the several requests of documents and information by downstream actors.

Furthermore, the Document Management System (DMS), allows Liu Jo to significantly reduce the low-value added activities, thus being able to re-allocate resources. Thereafter, the Approval Workflow, made more rapid and more efficient the payment of Invoices.

Finally, through the Digital Archiving, the company has now the opportunity to save costs derived from the physical space devoted to paper documents.

### **Criticalities**

Besides the internal resistances related to the change management – well-managed by the company through a constant support toward its employees – the company must deal mainly with the adoption rate of both the Extranets. The company is strongly committed to achieve a higher percentage of actors, both concerning clients and suppliers, however considering that not all of them, especially for suppliers, regularly relate with Liu Jo.

### **Future development**

Liu Jo has recently planned to improve the Web Portal addressed to clients with new functionalities. In the very short term, indeed, the Extranet will support also the Delivery Note. Moreover, the company would implement a more collaborative solution in order to easily share data concerning the production process, technical information and quality control.

### 3.2.23 Maire Tecnimont case

#### General information

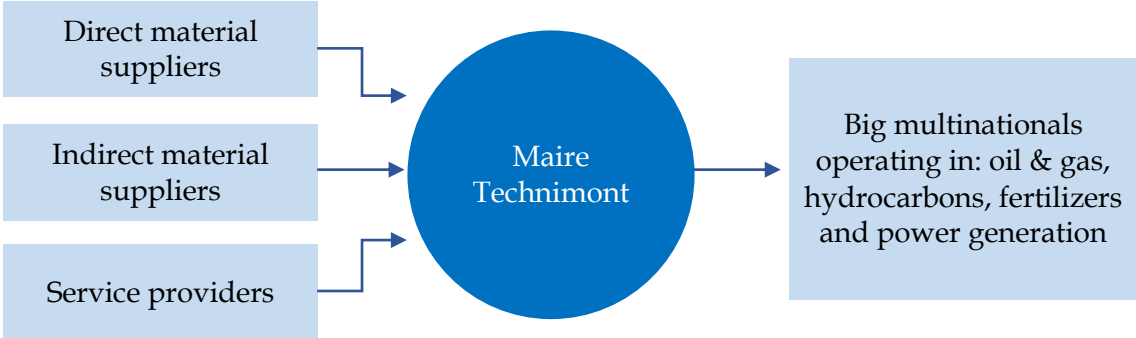
Company	Maire Tecnimont S.p.A.
Address	Viale Castello della Magliana 75, 00148 Roma (RM)
Company Web address	<a href="http://www.mairetecnimont.com/it">http://www.mairetecnimont.com/it</a>
Extranet Web address	<a href="http://www.mairetecnimont.com/it/business/global-procurement">http://www.mairetecnimont.com/it/business/global-procurement</a>
Business sector	Engineering
Turnover	€ 1.6 billion
Number of Employees	4,400
Position in the Supply Chain	Manufacturer
Type of suppliers	Direct material suppliers, indirect material suppliers, services suppliers
Type of Customers	Big multinationals operating in: oil & gas, hydrocarbons, fertilizers and power generation
Contact	Francesco Micheletti - Head of Project Procurement Management

Table 35: Maire Tecnimont's general information

Maire Tecnimont is one of the main companies in the Italian industry and was born in 2005 through the merging of Fiat Engineering; thereafter it was called Maire Engineering and Tecnimont. It is leader in large-scale engineering, plant engineering, building, technology, energy and infrastructures, with specific competence also in chemical, in particular hydrocarbons and fertilizers. The company is listed on the Stock Exchange of Milan (IPO in 2007). Furthermore, the company works in 30 countries and controls about 45 operating companies. Maire Tecnimont group is divided in five different areas: Tecnimont, main contractor for complex projects in oil & gas, petro-chemical and fertilizer, KT, contractor in process engineering, Stamicarbon, sub-company specialized in licensing intellectual property, world leader of urea technology, Tecnimont Civil Construction, main contractor for infrastructural project and civilians work, Met Newen, sub-company specialized in designing and implementation of renewable energy plants.



**Supply Chain Structure**



*Figure 57: Maire Tecnimont's Supply Chain*

Maire Tecnimont Supply Chain structure is very particular; its peculiarity comes from the fact that it operates in non-continuous filed, thus working on commission – which can be modify in progress – and stressing on covering all the Supply & Service chain for its customers, delivering a ready-to-use product. This means that they have no fixed Orders, and they cannot create a production plan for the year; this fact is reflected in their purchasing process features: very large suppliers base and difficulty in establishing a durable and stable relation with them. Nowadays Maire Tecnimont has in its register about 25,000 direct and indirect material suppliers and almost 12,000 services providers. Out of this amount only 15,000 material supplier has been active in the last 5 years, (8,000 considering only the last year). Moreover, considering suppliers dealing with active projects the number decrease to 3,000, that represent anyway a large amount. In order to efficiently support the relations with it wide set of suppliers, technology is required; nevertheless, the spot nature of these relationships make it difficult to create a structured digital integration. Downstream, the main customers are big multinationals operating into oil & gas, hydrocarbons, chemical and power generation field, that require high quality product which must respect strict quality and security standard as well as precise technical specifications.

**Extranet project**

The procurement project represents in Maire Tecnimont a crucial factor. In this particular sector a reduction of a single percentage point of costs impacts as a 100 million Order with a margin higher than 14%. Hence it could be the most efficient way (especially during this economic period that cause a great competition) to have a positive impact on EBITDA. The company has implemented a digital project for purchases, aimed at improving the efficiency of the purchasing department and standardizing processes such as call for tender and contracts, which have been fragmented. This is an innovative solution that eases the pre-transaction relationship between customers and suppliers, but also allows to manage supplier qualifications, tender notices, the expenditure analysis and the drawing up of contracts. Going deeper, the platform features are:

- Vendor Management: particularly critical due to the high number of suppliers in the database and to the quality of the materials purchased. It is now possible to collect information and to automatically update them. Furthermore, the suppliers can now be qualified on the base of objective criteria. This will lead to an increase in the use of information, as well as to a more efficient supplier qualification;
- eSourcing: its most significant feature is the automated management of online tender notices, which will ensure a very strict and fast process concerning technical alignments, negotiation and supplier selection;
- Contract management: the automated drafting of contracts ensures more standardization and time to be spent in actions with a higher added value;
- KPI and data management: allows ex-post supplier evaluations through given KPI, which are totally objective.

### **Other projects**

The company has implemented technological solutions also at an internal level; more in depth, since ten years, Maire Technimont has introduced a Document Management System (DMS), which is integrated in the company ERP, in order to eliminate the high use of paper and to ease the sharing and the tracking of information. Furthermore, the system allows the Approval Workflow management.

### **Benefits**

According to evaluations carried out in the design phase, the use of the purchase management platform will lead to a more flexible and efficient management of the supplier portfolio, from the pre-qualification phase to the performance evaluation throughout the supply phase. Moreover, it will allow a better management of contracts, more efficiency when performing them, standardization and faster fulfillment. Overall, it will also help to create a shared knowledge, which is particularly useful in on-boarding phases, as well as when evaluating performances or carrying out market intelligence activities.

### **Criticalities**

One possible limitation related to supply relationships is the difficulties of implementing an EDI solution in this kind of field (working for commission in the engineering). Such kind of relation implies a strong effort from both parties especially for the suppliers training. This effort results useless in the majority of cases, because of the short life-span that the relation could have. Moreover, an Order contains 300 - 400 pages of technical features for each product (maybe a final product is made by more than one sub-products), thus, the provider is forced to print them anyway.

### 3.2.24 Metalsistem Sardegna case

#### General information

Company	Metalsistem Sardegna S.r.l.
Address	Zona Industriale Predda Niedda Nord, str. n. 3, 07100 Sassari (SS)
Company Web address	<a href="http://www.metalsistem.com/index.php?Itemid=3208">http://www.metalsistem.com/index.php?Itemid=3208</a>
Extranet Web address	<a href="https://my.metalsistem.com/login.php">https://my.metalsistem.com/login.php</a>
Business sector	Service to commercial and logistics spaces
Turnover	€ 491,000
Number of Employees	5
Position in the Supply Chain	Service provider
Type of suppliers	Parent Company, services providers
Type of Customers	Public Administration, large-scale retail trade, direct retailers, independent business actors
Contact	Maurizio Ruzzetta - CEO

Table 36: Metalsistem Sardegna’s general information

Metalsistem Sardegna, part of Metalsistem Group, is an Italian SME based in Sardinia. The core business of Metalsistem Group is the production and selling of a wide range of products aimed at creating safe and functional storage spaces (shelves, desks and other technical furniture). Moreover, the group offers different scheduled maintenance services for a large line of commercial spaces which goes from logistics warehouses to restaurants.

#### Supply Chain Structure

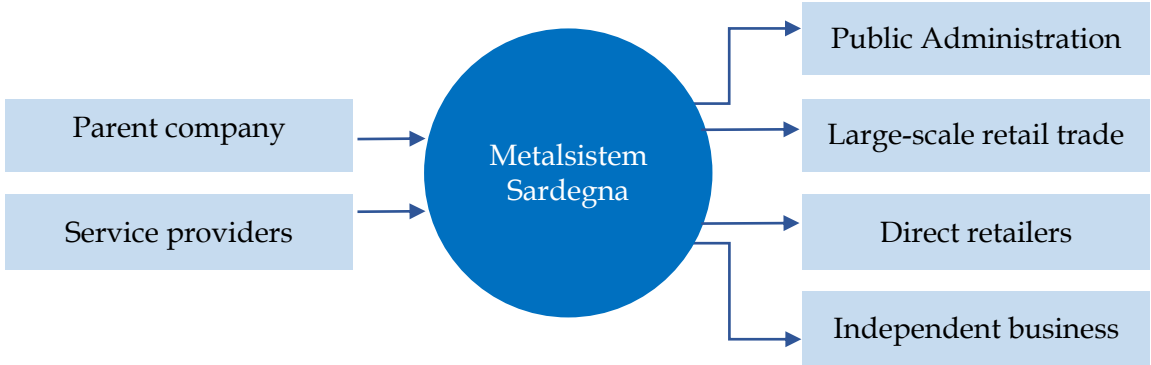


Figure 58: Metalsistem Sardegna’s Supply Chain

Metalsistem Sardegna business model consist in the selling to its customers of furniture, which are not directly produced by the company, but are purchased from its main supplier, Metalsistem S.p.A., that used its sub-company as warehouses for its products and produces MTO (Make to Order), as soon as a new Order arrives.

Metalsistem Sardegna Supply Chain is pretty simple and it counts about 3,100 partners, among which the higher part are customers. Downstream, it mainly interfaces with four parties: Large Scale Retail, Public Administration, direct resellers, which in Sardinia are almost 21, and other business parties such as logistics warehouses, offices, catering operators and restaurants. Upstream instead, Metalsistem Sardegna deals with utilities providers and on the other hand with its parent company (Metalsistem S.p.A), which is the main supplier of Metalsistem Sardegna, which represents 95% of annual costs and from which the company – that do not have any production plant – buy directly finished goods.

### **Extranet project**

The company exploit a Web Portal to interact with its parent company; the Extranet, enables the company to electronically send Orders directly to Metalsistem S.p.A. Once Orders they are received, the production process begins and the subsidiary is provided with the date of completion and delivery of the Order. Furthermore, the Web Portal, has other functionalities, such as catalogue updates and sharing of technical information on products.

Moreover, through the same Platform, Metalsistem Sardegna enables the 21 retailers working in Sardinia to send Orders to the company in an electronic format. Hence the same Extranet is addressed to Upstream and downstream partners. More in depth, thanks to the Web platform it is possible for customers to check the availability of Metalsistem Sardegna products, but also their technical specifications, their prices and past Orders overviews, which means to know whether they are being processed or they have been already completed. Thereafter, an Order can be issued and electronically received by Metalsistem Sardegna. The company will afterwards decide whether accepting it or not, by evaluating some information (e.g. the supplier's financial overdraft). In the case the Order is accepted, a notification of acceptance together with the receipt and delivery date, is forwarded.

### **Other projects**

Downstream, Metalsistem Sardegna has adopted the Electronic Invoicing toward the Public Administration. Although the amount is not as consistent as the total of Invoices issued, this solution can work as a stimulus for the company to adopt Electronic Invoices with all its customers in the future.

### **Benefits**

Thanks to the Web Portal, both the purchase and the selling relationships of the company result to be considerably effective. Overall the solutions adopted, allow to have a faster and easier management of activities, in the past carried out in a traditional way, such as Order receipts by telephone and exchange of paper or PDF documents to be modified or accepted. Furthermore,

the company has been able to fully understand the advantages of the Electronic Invoicing, which so far has only been addressed to the Public Administration; in particular, the company could now benefit of higher speed and ease of sending and receiving.

### Future development

Metalsistem Sardegna has been able to fully understand the advantages of the Electronic Invoicing, and its intention is to extend it to all customers, trying to deeply exploit the benefits of an already implemented solution on which the company has invested. This change in Invoicing will be probably well accepted by Large Scale Retailers.

## 3.2.25 Moncler case

### General information

Company	Moncler S.p.A.
Address	Via Stendhal, 47 - 20144 Milano
Company Web address	<a href="http://www.monclergroup.com/it/">http://www.monclergroup.com/it/</a>
Extranet Web address	N.a.
Business sector	Fashion & Clothing
Turnover	€ 880 million
Number of Employees	1,798
Position in the Supply Chain	Manufacturer and sellers
Type of suppliers	Raw material suppliers, manufacturing suppliers.
Type of Customers	Wholesalers and third parties stores; final customers
Contact	Emanuele Pesce - CIO

*Table 37: Moncler's general information*

Moncler was born in 1952, in France, but nowadays it has the headquarter in Italy. The company operates in the fashion industry, manufacturing and selling its apparel collection and accessories through owned point of sales, boutiques, department stores and international multi-brand retailers.

The company exploit a well-managed network of stores and boutiques to better reach customers providing a great experience, as well as the wholesale distribution channel. Thanks to these stores and to 1,798 Full-Time Equivalent employees, it was able to achieve in 2015, 880 million € turnover (+27% compared to 2014).

## Supply Chain Structure

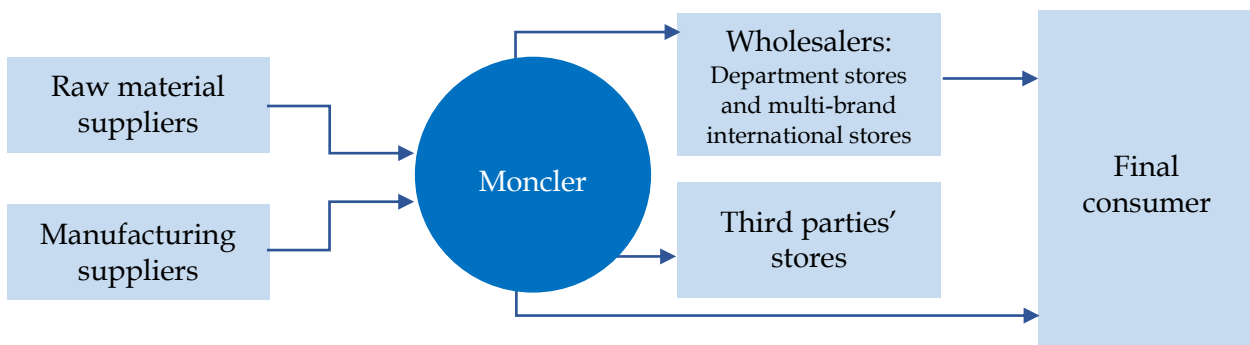


Figure 59: Moncler's Supply Chain

Upstream, the company has built several strong and deeply integrated relationships with suppliers. In particular, Moncler firstly has to purchase raw materials to produce its collections. Moreover, Moncler exploits specialized suppliers for some kind of manufacturing processes, not directly managed by the company, and final products as well. Overall, the company relates with 120 suppliers.

Downstream, Moncler exploits a network of 207 mono-brand shops (173 of which Directly Operated Stores) in exclusive locations worldwide as well as wholesale stores. More in depth, the company sells its collections to both department stores and multi-brand international stores – concerning wholesalers – spread all over the world; finally, the company manages also its own shops and third parties' mono-brand boutiques, reaching directly the final customer.

### Extranet project

Moncler has implemented an Extranet to efficiently manage its set of suppliers. Since there are some suppliers that relate sporadically with the company, it has so far implemented the Web Portal only for its main upstream actors. Nowadays the 70% of the overall amount of suppliers (120) exploit the technological solution. More in depth, the Extranet aims at supporting the complete Order cycle, allowing the exchange of all the documents and information from Orders to the final Payment. Furthermore, several technical documents related to productive processes are constantly uploaded into the Web platform.

Moreover, the manufacturing suppliers could update – through the Web Portal – the progress status of the manufacturing activities Ordered by Moncler. Thanks to this functionality, the company is continuously up-to-date concerning the evolution of activities.

Finally, the Extranet supports the electronic exchange of the Delivery Note, facilitating the goods activities.

### EDI project

Since 2013, Moncler has activated an EDI channel to exchange several kinds of documents with some client categories. More in depth, only structured enough clients can exploit this channel.

These actors are the biggest department stores, that are the 10% of the total wholesalers. It is worth noting that this small amount of actors generates the highest percentage of the company's turnover. Thanks to the EDI technology, Moncler exchange all the documents related to the full Order cycle from Orders to Invoices but also customs practices.

### **Other projects**

The digitalization project of Moncler included internal processes as well. Since seven years the company has introduced a Digital Archiving solution for both Orders and Invoices. In particular, every year are archived digitally 79,000 account receivable documents. The technological solution is developed and managed internally, due to both the lower maintenance costs and the opportunity to better manage the process.

### **Benefits**

Once implemented the technological solutions and solved the arisen criticalities or resistances, the company has started to run steadily its processes and activities in a new digital way. The main benefit achieved by the company is a remarkable level of efficiency, resulted from the Digital Archiving. In particular, it has guaranteed a decrease in the time required for administrative activities low-value added; furthermore, the Web Portal and the EDI channels, has considerably improved the relationships with suppliers and clients, not only reducing costs and increasing the efficiency, but mainly providing a better service level enhancing the overall effectiveness of processes.

### **Criticalities**

The company is constantly committed in solving the main difficulty since the digitalization project has been started. More in depth, smaller suppliers strongly refuse the digitalization of processes, preferring the paper way to manage documents. It is the main reason why Moncler has not achieved yet the 100% of suppliers that deal with the Extranet.

### **Future development**

Moncler has recently activated a project aimed at exchange documents electronically with carriers. The project will start to run regularly by the end of 2016, covering the 85% of transportation costs.

### 3.2.26 OTB case

#### General information

Company	OTB S.A.
Address	Via dell'industria 2, 36042 Breganze (VI)
Company Web address	<a href="https://www.otb.net/">https://www.otb.net/</a>
Extranet Web address	n.a.
Business sector	Fashion & Clothing
Turnover	€ 1.55 billion
Number of Employees	7,500
Position in the Supply Chain	Manufacturer-Distributor
Type of suppliers	External laboratories, carriers, material suppliers, services suppliers
Type of Customers	Retailers, wholesalers, final consumers (e-commerce)
Contact	Giulio Tonin - IT responsible

Table 38: OTB's general information

OTB (Only The Brave) is a multinational holding, working in the clothing sector, founded by Renzo Rosso and having its headquarter in Breganze (VI) Italy. The company is composed by more than 45 sub-holdings and owns different brands: Diesel, that account for more than 65% of the total turnover, Marni, Maison Margiela, Viktor & Rolf and Staff International that produce under licence for Dsquared2, Marc Jacobs, Vivienne Westwood, Just Cavalli, Marni Uomo and Maison Margiela. Moreover, through the owned brand Brave Kid the company design and produce under license for Dsquared2 Kid, John Galliano Kid e Marni Kid.

#### Supply Chain Structure

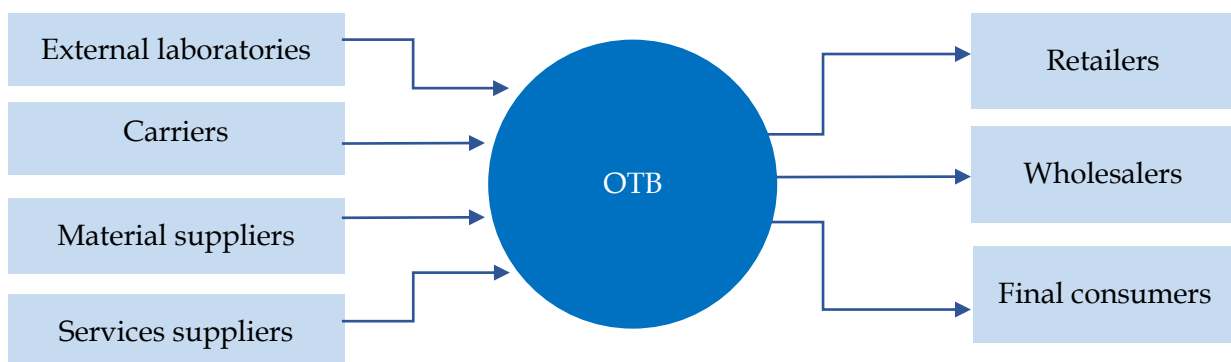


Figure 60: OTB's Supply Chain

Upstream, the most important relationship is the one with external laboratories (more than 100), that produce to Order the 30% of the total production volume of the OTB Group. This relation is very strategic both because of the final quality that products must have in order to respect the



brand standard, and from a logistic point of view; indeed, OTB must be promptly informed about batches status in order to organize its logistic and satisfy demand. Moreover, other upstream actors are carriers, material suppliers and services supplier, whose relationships are not considered strategic and no integration was implemented.

Downstream there are three customer categories: direct retailers, wholesalers and final consumers through the eCommerce. The first one account for 45% of turnover and are department stores or owned shops (420), spread worldwide; these, are divided in: 230 Diesel stores, 110 Staff International stores and 80 Marni stores. The second category are the wholesalers which are responsible for 50% of turnover and the remaining part is due to direct eCommerce to final consumers.

### **Extranet project**

#### Upstream

OTB has implemented an Extranet to manage the relation with more than 100 external laboratories that produce 30% of the total OTB production volume. This Web Portal has a collaborative scope and allows OTB to daily update the Order book; hence, each laboratory know exactly which Order has to work on and the relative deadline. On the other hand, laboratories register each progress and give precise information such as the amount of tissue that has been cut or the number of garments so far worked. Through this Extranet is also possible for laboratories to ask for material replenishment or missing accessories. Moreover, the Platform allows the sharing of pre-Invoices about batch committed.

#### Upstream

Concerning the customer side, the company has implemented a Web-Based RT (replenishment tool) addressed to wholesalers. More in depth, the solution enable selected customers to directly make replenishment proposal looking at digital book (eCatalog) and create their wish-list. For all not selected wholesaler the replenishment proposal is done by sales agent (500 all around the world) that physically visit the customers.

### **EDI project**

Since several years, the OTB group exploit an EDI channels to communicate with department stores and exchange document related to the Order cycle: Orders, Advanced Shipping Notice and receivable Invoices as well as stock situation and sales report. Moreover, with some customers and for some product categories, OTB has established a more collaborative EDI integration. Starting from sellout and stock visibility, OTB is able to make replenishment proposals to its customers and share replenishment plans.

## **Other projects**

OTB Group exploit a Shared Service Center that has financial and administrative tasks and manage about 240,000 service request every year.

Moreover, the company has gone further, implementing some solution to better manage internal processes; since 2011 OTB has adopted a Document Management System (DMS) - managed by the Shared Service Center - which allows the digitalization of payable and receivable documentation. Considering receivable and inter-company transactions, all document produced by the system are automatically archived, while considering payables, every holding must link to each relative document a bar code that identify univocally the transaction and afterwards scan it. Once the documentation has been scanned together with an archiving request, the Shared Service Center manage the registration of documents. Moreover, the company has implemented Approval Workflows alongside the DMS. The latter are used for all payable Invoices and non-standard Order requests. These request are electronically processed through different level of authority up to the CEO, according to the relative importance.

## **Benefits**

The department store integration has allowed important efficiency and effectiveness benefits concerning information exchanging due to reduction of time consuming actions. At the same time, it has reinforced the supplier - customer relationship and puts the basis for a collaboration of the parties that create a win-win situation, a clear example in the managing of replenishment plans that allows customer to have a prompt service and OTB to acquire market knowledge, due to the demand and sellout visibility. Moreover, the internal solutions ensure simplification and time saving of administrative procedures.

### 3.2.27 Patrizia Pepe case

#### General information

Company	Tessilform S.p.A.
Address	Via gobetti, 7/9 - 50013 Capalle (FI)
Company Web address	<a href="http://www.patriziapepe.com/it/it">http://www.patriziapepe.com/it/it</a>
Extranet Web address	<a href="http://b2b.patriziapepe.it/portal/index.html">http://b2b.patriziapepe.it/portal/index.html</a>
Business sector	Fashion & Clothing
Turnover	€ 145 million
Number of Employees	300
Position in the Supply Chain	Designer and prototype maker
Type of suppliers	Raw material suppliers, manufacturing suppliers
Type of Customers	Wholesalers and Franchising stores; final customers
Contact	Lorenzo Tazzi – IT Manager

Table 39: Patrizia Pepe's general information

Tessiform S.p.A is the company that own the fashion brand Patrizia Pepe. The latter, was born in Firenze in 1993. The company operates in the fashion industry designing and prototyping its apparel collections however producing them in outsourcing.

Thanks to a strong and constant improvement of the brand awareness, the company rapidly growth now relying on almost 300 employees and approximately 130 mono-brand stores. This growth is translated great result of 145 million € turnover in 2015.

#### Supply Chain Structure

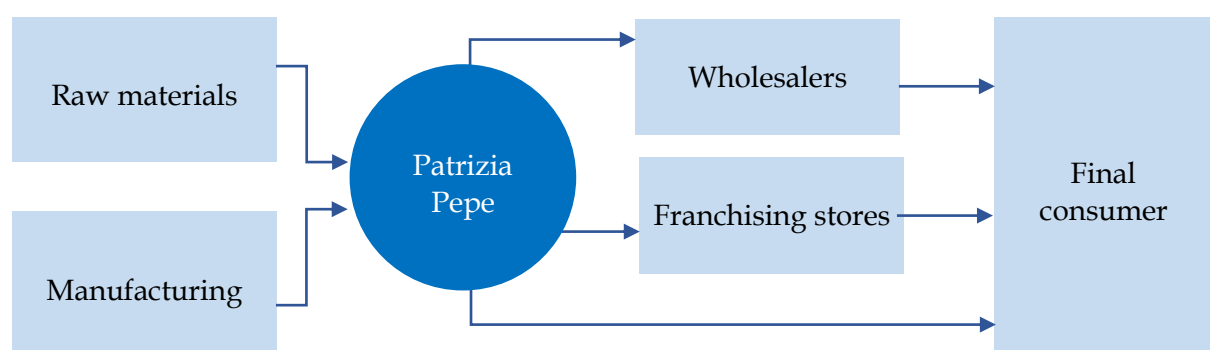


Figure 61: Patrizia Pepe's Supply Chain

On the account payable, the company relate with almost 100 small and medium suppliers. More than a half of them are regular partners while the other part is composed by more occasional ones (it mainly depends on the company's particular requirement and needs, season by season). More in depth, there are raw material suppliers and manufacturing ones. The former category is involved in the supply of all the raw components necessary for the final production of apparel

such as textile materials. On the other hand, manufacturing suppliers are the one that afterwards, concretely manufacture the final product being involved in the packaging as well.

These upstream relationships could occur in two ways:

- The supplier undertakes the manufacturing phase directly taking care about raw materials supply. In such a case the company is only involved in the designing process;
- The supplier undertakes the manufacturing and packaging phase. In such a case, the company both design the product and takes care about raw materials supply.

Concerning the account receivable, Patrizia Pepe built over the years a strong network of actors to reach efficiently and effectively the final customer. In particular, downstream the company related with 10 wholesalers' showroom, including nearly 2,500 B2b clients. Moreover, as a Tessilform brand, manage 130 mono-brand stores both directly owned and franchising ones.

### **Extranet project**

Since 2009, the company has implemented a Web Portal to better support the relationship with clients. In particular, the solution is addressed to wholesalers who rapidly understood the remarkable potentialities and opportunities it would provide. For this reason, nearly the 100% of wholesalers continuously benefits from the solution.

More in depth, the Web platform allows wholesalers to easily and more efficiently deal with the replenishment of products using an electronic catalog, even outside seasonal campaigns. Therefore, wholesalers could replenish products issuing Orders through the Web Portal and exchange several documents concerning the Order cycle. In particular, such documents are products information, Orders, Delivery Notes and Invoices. From the company point of view, the Web portal is well integrated with the ERP, thereby not requiring a manual upload of documents and data, since it is accomplished automatically; wholesalers, on the other hand, have not an ERP system integrated with the platform, thus carry out manually the related activities.

Nevertheless, the Web Portal is a parallel channel; indeed, all Invoices are sent also in a paper format, as well as bills of landing, which are dispatched alongside the goods.

### **Other projects**

Since 2007 the company has introduced the Digital Archiving for all the documents related to both account payable and account receivables.

### **Benefits**

The Digital Archiving is concretely helpful for the company, since it could benefit of an enhanced availability of information with an immediate access to them, moreover reducing the physical space dedicated to the paper archive.

Furthermore, the Web Portal was perceived from wholesalers as a powerful opportunity for replenishment, thus facing with higher reactivity and rapidity, to stock-out situations. For this reason, the company could from the beginning, work with the whole set of wholesalers improving both efficiency and effectiveness of relationships

**Criticalities**

Since all the wholesalers, understood rapidly the potentialities of the Web Portal, the company did not face any criticality from an external point of view.

Although some difficulties occurred during the implementation mainly concerning the internal change management, the company well manage them, supporting involved employees.

**3.2.28 Rhiag case**

**General information**

Company	Rhiag S.p.A.
Address	Via Tiraboschi 48, 24122 Bergamo (BG)
Company Web address	<a href="http://www.rhiag.com/">http://www.rhiag.com/</a>
Extranet Web address	<a href="http://ecommerce.rhiag.com/ne/jsp/neLandingPage.jsp">http://ecommerce.rhiag.com/ne/jsp/neLandingPage.jsp</a>
Business sector	Automotive
Turnover	€ 600 million
Number of Employees	2,500
Position in the Supply Chain	Distributor
Type of suppliers	Automotive spare parts producers, services providers, indirect materials providers
Type of Customers	Spare parts dealers (aftermarket)
Contact	Stefano Corradi – IT manager Italia

*Table 40: Rhiag’s general information*

Rhiag is the Italian leader in the distribution of automotive spare parts in particular for cars, business fleet, trucks and tractors. The company is part of Rhiag Group, composed by 14 companies from Italy and Eastern Europe out of which the most important are Rhiag, Bertolotti, Era, Elit, Lang and Auto Kelly. In Italy, the reference company, in addition to Rhiag Italy, is Bertolotti, a follower company that produces less distinctive items at lower cost, in order to meet customers which are most sensitive to price leverage. The core advantage of Rhiag is the ability to efficiently manage the aftermarket, providing a great range of product (more than 500,000 different items) of the best brands in addition to two private label, Era and Starline, which count more than 30 products line.

## Supply Chain Structure

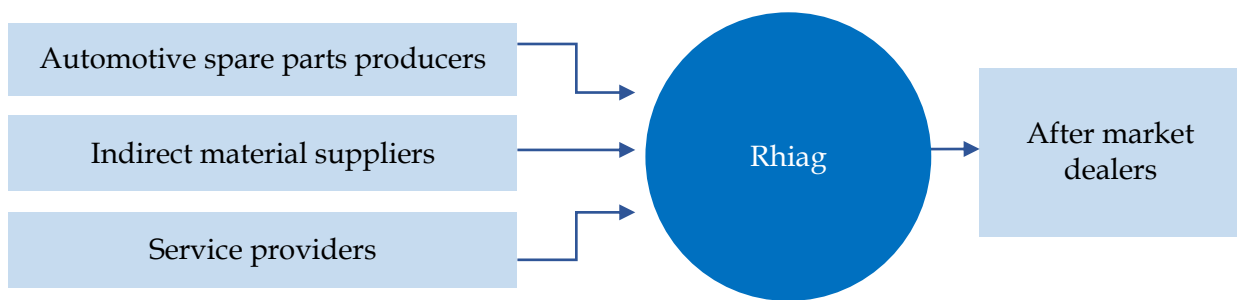


Figure 62: Rhiag's Supply Chain

The company business model consists in the purchase of parts from the top rank manufacturers in the world with whom Rhiag has strengthened relationship and important information-related synergies; thereafter Rhiag stock them in its 11 group warehouses - over one million cubic meters of stocking capacity - and distribute them through 220 European branches to make them available to customers, wherever and whenever they are needed in the shortest time possible. Customers are mainly represented by spare parts dealers (wholesalers) and in a minor number by business fleets and mechanics for a total number of more than 100,000 professionals. Suppliers are represented by about 200 top brand in spare part manufacturing. Moreover, Rhiag deal also with indirect material suppliers and services provides such as logistics partners.

### Extranet project

Since 2001 Rhiag has implemented a Web Portal to make more structured and effective the relationship with customers. More in depth, the solution supports the receipt of Orders and currently, almost 90% of them pass through this B2b eCommerce platform. Moreover, the Extranet allows customers to place Orders in different ways: (1) manually entering the product code, (2) selecting items from the electronic catalog (made available on the Extranet), or (3) searching items using images of the desired parts. During the Order phase customers access to information such as brand and description of the part, list price (that is not the acquisition price but the price at which the part is generally sold to the final user by mechanics), total value Ordered, availability and alternative items. Concerning the total value Ordered, the platform does not show a fix price per item, but on the basis of the selected quantity and discount policy, thanks to an algorithm it computes the total value and the net value for each item.

In order to facilitate customers during the searching activities among the 500,000 different items and eliminate mistakes during the Order phase, Rhiag has integrated with the eCatalog a search engine in which customers can input the plate number of the car and obtain all the specific spare parts that compose it. The latter, is a service that Rhiag acquired externally by ACI, and made available for free to spare parts dealers.

Furthermore, through the Extranet, customer can view the availability of items, check the progress of Orders and consult the own historical archive. In particular, for each specific Order in the archive, customer can find a digital dossier containing the relative Invoice and Delivery Note as well as download them directly from the Extranet. However, some spare parts dealers still require shipping of printed Invoice and their transmission by e-mail. Nevertheless, only a limited percentage of customers belongs to the latter category.

Finally, other services offered through the Extranet, are the return of goods for wrong Order/Delivery, the display of promotions and the Order cancellation. As far as the return is concerned, aftermarket wholesalers can fill out a Web-form and motivate their request that is afterwards automatically processed.

### **EDI project**

Rhiag is active in digitalization projects also upstream its Supply Chain. In particular, for the exchange of Orders, Delivery Notes and payable Invoices, the company has implemented EDI connections. These channels are exploited by almost 75% of the components and spare parts suppliers. More in detail, Rhiag uses both an international traditional platform, which represent the reference for the automotive sector, and Web EDI formats.

### **Other projects**

Rhiag has started a project called integrated logistics, aiming at improving the performance of its wholesaler customers, thus, obtain a win-win relationship. Indeed, the company understood that its customers often are either inefficient (e.g. warehouses are not sorted by frequency of movement but for progressive code), or have difficulties in structuring their business and do not have an entrepreneurial know-how. For this reason, Rhiag every year selects different customers “with high potential” and support them, establishing strong informatics and logistics integrations. This selection is made to increase fidelity as well. More in depth, exploiting a partnership with one of its IT provider, Rhiag provides and trains its customer with a software able to manage and optimize their business, especially considering catalog and logistics management. The software, allows to share data about sales and market situation via FTP (File Transfer Protocol) and process them automatically. Thereafter, customers receive a feedback about how to compose their items range, what products they must keep in stock and what items need to be Ordered, in such a way as to fill the shelves as effectively as possible and coherently with what are the final requirement of customers.

### **Benefits**

The Extranet with its set of features, has allowed Rhiag to achieve several benefits; first of all, the solution has digitalized the transactional cycle, from Order to Invoice, guaranteeing a reduction

of manual data entry activities and the internal use of paper material. Moreover, the creation of digital dossier has increased the traceability of customers' relationships. Furthermore, the possibility to download Invoices directly from the Web Portal, has eliminated a large part of costs linked to the printing of paper documents, with savings estimated at € 150,000 per year. Finally, all that features together with the integrated logistics have increased customers' loyalty.

Upstream, the usage of EDI channels, has allowed Rhiag to obtain remarkable efficiency benefits. Indeed, thanks to the Application-to-Application nature of the solution, human intervention is not required, thus eliminating the manual data entry activities and the related possible mistakes. In addition, EDI channels guaranteed a faster and automated management of the relationship with suppliers, resulting in significant savings in times.

### **Criticalities**

Concerning the customers' relationships, the solution adopted is certainly comprehensive, efficient, and does not show particular problems. The only limit, lies in the fact that the company has not completely digitalized the receivable cycle with the Digital Archiving for fiscal purposes. Another criticality emerged during the years, that is not directly related to ICT solution, is the lack of attitude for planning and for cash governance of customers. Customers tend to buy, through the eCommerce Portal, items in great volume – in such a way as to obtain lower price - also if not needed, and then sell them months later at low price because of the huge amount of stocks. This aspect destroys customers margin and they tend to ask for more discount to Rhiag. In order to overcome this problem Rhiag has implemented the above described integrated logistics project as well as some training course to teach customers how to use in a proper way the platform and manage cash and inventories.

### **Future development**

Upstream the future intention is to better manage the heterogeneity in the supplier base. Currently it represents only an abstract goal and no a detailed plan has been drafted. Furthermore, concerning customers, the company want to improve its forecasting ability and better understand what are the right items to stock in each distributive branch according to the local market.



### 3.2.29 S.A.C.B.O. case

#### General information

Company	S.A.C.B.O. S.p.A.
Address	Via Aeroporto, 13 -24050 Orio al Serio BG
Company Web address	<a href="http://www.orioaeroporto.it/it/">http://www.orioaeroporto.it/it/</a>
Extranet Web address	<a href="http://www.orioaeroporto.it/en/suppliers/">http://www.orioaeroporto.it/en/suppliers/</a>
Business sector	Passengers transport
Turnover	€ 100 million
Number of Employees	446
Position in the Supply Chain	Service provider
Type of suppliers	Indirect material suppliers, Service provider
Type of Customers	Air carriers, passengers
Contact	Ettore Pizzaballa - IT.&C. Manager

Table 41: S.A.C.B.O.'s general information

S.A.C.B.O. (Società per l'Aeroporto Civile di Bergamo – Orio al Serio), was born in 1970, and built its business around the transportation industry, by managing the Bergamo airport infrastructures. Several year of operations, allowed the company to continuously grow, becoming nowadays one of the more advanced entity in the low-cost transportation. Overall, S.A.C.B.O. manages 446 employees, being able in 2015 to achieve almost 100 million € turnover.

#### Supply Chain Structure

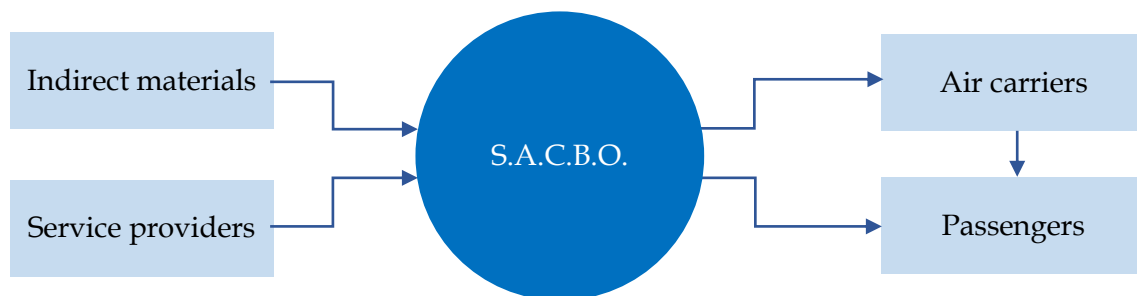


Figure 63: S.A.C.B.O.'s Supply Chain

Upstream, S.A.C.B.O. deals with two categories of suppliers; firstly, it has to manage indirect materials provisions and secondly, services providers. More in depth, the latter are related to ordinary and extraordinary maintenance as well as infrastructural purchases, concerning the development of new airport facilities. The company, in particular has invested nearly 5 million € for both refurbish already existing structures and expand the terminal. On the other hand, downstream, S.A.C.B.O. deals firstly with air carriers, which exploit the company's airport

infrastructures, sometimes creating some partnerships with it. Furthermore, it provides several services to passengers who benefits from them while waiting the flight.

### **Extranet project**

The company has revisited, in a digital way, the relationship with suppliers through the implementation of a Web Portal aimed at provide a higher service level and increase the efficiency of the account payables management. The technological solution allows upstream actors to be included into the supplier register. Thereafter, the latter are allowed to consult the company's calls for tender with both European and not European announcements but also those with a threshold. More in depth, the Web Portal supports the overall process of calls for tender allowing the company to manage it electronically, thus not archiving the related paper documents. Therefore, the technological solution provides the tools to manage the creation of calls for tenders, including the upload of all the data, documents required, but also the offer submitting on the Web platform. Furthermore, it allows to manage the execution of the afterwards activities of offers evaluation and publication of the awarded one.

Finally, the Web Portal support the generation of electronic purchase Orders which however, are dispatched in a more traditional way (paper format).

### **Other projects**

Since 2014, S.A.C.B.O. has adapted itself to the Italian Public Administration new guidelines concerning Electronic Invoicing. However - following the characteristics of the market and of its actors - the company proved a strong commitment toward the development and implementation of Aeronautics Invoicing related to Invoices management in electronic format (XML), helpful with bigger and more structured clients. Moreover, the company has implemented a Document Management System (DMS) through which is possible to produce the Invoice in electronic format. Thereafter, an automatic generated number, is linked to the invoice that is subsequently dispatched to the portal of the Electronic Invoicing provider, where starts a checking process for the afterwards forwarding to the Exchange System (ES) and the final attaching of a timestamp. Finally, the company has introduced the Digital Archiving of Electronic Invoices for both Aeronautics Invoicing - which compose the 90% of the overall turnover - and Italian Public Administration.

### **Benefits**

The company has started an ongoing digitalization project that first of all allowed it to achieve a better management of Invoicing process. Indeed, thanks both to the Electronic Invoicing toward the Public Administration and to the Aeronautic Invoicing toward bigger and more structured clients within the industry, the company has obtained a remarkable level of efficiency by decreasing the overall process costs.

Coherently, the Extranet is nowadays fundamental to improve the relationship with suppliers, managing them more efficiently but also giving a higher service level. Through the Web platform, S.A.C.B.O. could electronically manage the suppliers register and accurately process calls for tender. Finally, the Document Management System (DMS) alongside the Digital Archiving of account receivable, allowed the company both to optimize the timing of internal processes management and decrease the space used for paper volumes.

### **Criticalities**

The company, faced some criticalities, above all in the earlier stages of the digitalization process. More in depth, there were some problem in the final exchange of documents with suppliers, related to the Web Portal. Moreover, there were some issues concerning the Electronic Invoicing. The latter, has brought some difficulties in the transition from paper Invoices to the ones in XML format, but also in certify electronic signature to the Exchange System (ES). However, with a strong commitment toward these criticalities, after some months, the company has started to efficiently work and carry out activities with all the technological solutions implemented

### **Future development**

S.A.C.B.O. has planned to expand the Web Portal functionalities to better support suppliers, by dispatching electronically purchase Orders. Furthermore, the Document Management System, is already compatible with the implementation of Approval Workflow. Finally, the company is strongly committed toward the complete Digital Archiving of both account payables and account receivables, as well as of non-fiscal documents, such as the ones related to regulations and guideline of the aeronautics industry.

### 3.2.30 Sky case

#### General information

Company	Sky S.p.A.
Address	Via Monte Penice, 7 - 20138 Milano Via Salaria, 1021 - 00138 Roma
Company Web address	<a href="http://www.sky.it">http://www.sky.it</a>
Extranet Web address	<a href="https://procurement.sky.it/web/login.html">https://procurement.sky.it/web/login.html</a>
Business sector	Television services industry
Turnover	€ 2.95 billion
Number of Employees	8,000
Position in the Supply Chain	Service provider
Type of suppliers	Indirect and direct materials suppliers and services suppliers
Type of Customers	Final customers
Contact	Patrizia Borgonovo - Procurement processes and systems coordinator

Table 42: Sky's general information

Sky Italia, was born in 2003 from the merge between Stream and Telepiù and is one of the largest entity in the television services industry. The company offer payment contents to final consumers but also hardware devices to enjoy the latter and some pay per view channels. Moreover, it offers Sky Online for those not-subscribed clients, which is composed by a selection of streaming contents which could be saw through devices with an internet connection.

Thanks to a portfolio of 21 million of subscribed users spread within five European countries - 4.7 million in Italy - and almost 8,000 employees, the company was able in 2015, to achieve 2.95 billion € turnover in the Italian country and an overall turnover of 6 billion €.

#### Supply Chain Structure

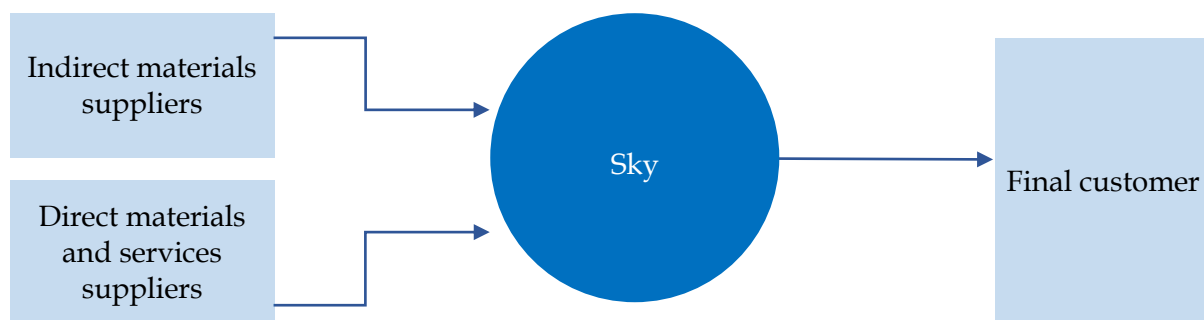


Figure 64: Sky's Supply Chain

Upstream, the company deals with a wide set of heterogeneous and small suppliers; the active actors are almost 1,500 with a total spending of 700 million € per year. Overall, the company issue

approximately 500 Invoices per month toward suppliers, 2,800 per month toward point of sales and sales agents and finally 1,500 per month are registered manually.

From its set of suppliers, Sky purchase firstly indirect materials, related to goods and services to support organizational stuffs such as the marketing one. Furthermore, Sky purchase items directly related to its core business. In particular, the direct materials are related mainly to the decoders hardware but also TV shows.

Moreover, the company own several point of sales spread in the country and work with a certain number of agents through which sell and promote its services.

On the other hand, downstream, Sky relate directly with its 21 million customers in Europe, 4.7 million of which are Italian.

## **Extranet project**

### Upstream

Since 2010, the company has implemented some new technological solutions aimed at improve the relationship with the wide and heterogeneous set of suppliers.

As far as the upstream actors is concerned, Sky has introduced firstly a Web Portal to better manage the pre-transactional phase. The Web platform, allows the company to efficiently and accurately manage the scouting of new suppliers through the qualification phase. Moreover, the Web Portal is helpful to electronically manage the whole calls for tender process. Recently the company has revised the qualification questionnaire, in order to make it more structured, adding new dynamics sections. This review is aimed at achieving a better control of documents and information provided by suppliers.

Overall, the solution is exploited by nearly the entire set of suppliers, managing a spending within the range of 140-190 million € per year.

Furthermore, the company has implemented a second “administrative” Web Portal to more efficiently manage the Order cycle, achieving an economic benefit resulted from the elimination, or at least reduction, of account payable Invoices data entry (approximately

1,500 per month) carried out manually. Once authenticated, the Web platform allows suppliers to view purchase Orders, accept or modify them, but also to upload Invoices and check their progress status. During the Invoice issuing phase, the supplier is required to link it to the related Order, necessary condition for the afterward payment step. Furthermore, the supplier could upload its Invoices on the Extranet, either manually, by filling out a Web-form, or through an automatic procedure of structured data flow. However, the higher percentage of supplier, is nowadays still exploiting the manual upload.

### Downstream

The administrative Web Portal supports the relationship with both point of sales and sales agents as well, through which the company digitally exchange Invoices (almost 2,800 per month) dispatching them toward these actors. Finally, the solution allows Sky to improve and strengthen the integration with both point of sales and agents, by managing purchase requests through electronic catalogues.

### **Other projects**

The digitalization of Sky includes a revising project also of internal activities, to achieve a better efficiency and effectiveness of the company processes. More in depth, the company has introduced the Digital Archiving for the whole account receivable, composed by almost 5 million Invoices, one for each client.

Finally, Sky has implemented an Intranet, well integrated with the company's ERP, through which it is able to internally manage purchase requests.

### **Benefits**

The implementation of all these technological solutions allow the company to achieve remarkable benefits, mainly concerning the management and integration of the supplier portfolio. This digitalization projects were necessary since the huge number of heterogeneous and small suppliers that work with the company.

In particular, the Web Portal is widely used to reduce processes costs and provide a better service level concerning qualification of suppliers and calls for tender. Furthermore, the "Administrative" Web Portal allows to considerably reduced the back-office activities related to both the relationships with point of sales and agents and the one with suppliers, now definitely more integrated with the company. Finally, the solution guarantees to suppliers a more accurate and rapid payment, thanks to a reduction of time of processes related to Invoices management.

### **Criticalities**

Although there were some internal resistances related to the change management - however well-solved through an accurate support by Sky toward employees - the most significant criticalities the company faced, are related the relationship with suppliers. More in depth, these difficulties arisen from the transition to the administrative Web Portal and thus, the Invoicing process. In order to better manage the change and the upstream actors, the company made available the Web platform step by step thereby creating some small set of target suppliers. In this way, Sky has developed a strong know-how to better support them.

### 3.2.31 Tod's case

#### General information

Company	Tod's S.p.A.
Address	Via Filippo della Valle 1, 63811 Sant'Elpidio a Mare (FM)
Company Web address	<a href="http://www.tods.com/it_it/">http://www.tods.com/it_it/</a>
Extranet Web address	n.a.
Business sector	Fashion & Clothing
Turnover	€ 965.6 million
Number of Employees	3,400
Position in the Supply Chain	Producer
Type of suppliers	Direct material suppliers, contract manufacturers
Type of Customers	Wholesalers, retailers, franchising shops
Contact	Roberto Stella - CIO

Table 43: Tod's general information

Tod's was founded in the early 1900s as a small shoe factory. The transition from a family to an industrial company took place at the end of the 70s, when the company started to become a leading player in the Italian luxury clothing, shoes and leather sectors. Nowadays the company is the head of Tod's Group which owns different brand such as Hogan - created in the 80s as a shoe manufacturer - Fay - created in the mid-80s as a high quality casual wear producer - and Roger Vivier - acquired in 2003 and described as the "Fabergé of Footwear" -. Independently from its brand, Tod's is known for its quality craftsmanship, for the excellence of its materials, a meticulous attention to craft details and its high functionality without sacrificing style and quality.

#### Supply Chain Structure

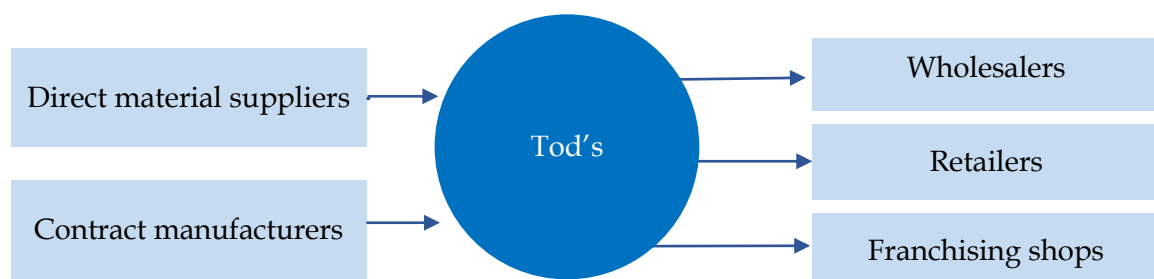


Figure 65: Tod's Supply Chain

Concerning the upstream side of the Supply Chain, Tod's manufactures the 40% of its products, the remaining 60% is produced by contract manufacturers which represent a strategic partner for

the company. Out of them 90% are Italian and 10% European. Other important upstream actors are direct material suppliers, and their importance comes from the high relevance to quality in the luxury sector.

Downstream the company has recently changed its revenues stream. Fifteen years ago, the only Tod's customer was represented by wholesalers, which now account for the 35% of revenues while the 65% is due to retailers. The company relies on 315 brand shops all over the world and about 100 franchising shops.

### **Extranet project**

As for the relationship with about 100 suppliers of finish goods, a Web Extranet has been created 7 years ago. The Web Portal does not support the Order cycle, but it has a Collaborative aim: exchanging information and documents useful for making more efficient and effective the relationship. In particular, the Extranet is used by the company as a tool for sending communications of batches processing - although the official Order request is sent in paper form - and from suppliers as a tool for the communication of production progress status. Moreover, the Web Portal allows the sharing of technical documents such as working techniques, product images and data sheets.

### **EDI project**

In order to simplify the relationship with the world's leading Wholesaler - few in number, but accounting for a significant share of sales - the Group has implemented EDI connection for the exchange of the key documents related to the Order-Payment cycle such as Order, Order Confirmation and Invoice.

### **Other projects**

The company is constantly putting effort in providing customers with Invoices and Delivery Notes in an unstructured (PDF) electronic format. This project aims at simplifying the relationship with suppliers in term of accounting operations and goods receipt. However, the sending of these documents in digital format does not definitively replaced the exchange of paper documents. As for the Invoices, through the corporate CRM system it is automatically decided whether electronic issuing must be accompanied with paper documents, while for Delivery Notes, the paper copy is always delivered with the goods.

Another project aimed at improving the operational and administrative activities, concerns the implementation of a Document Management System (DMS) that supports purchase Approval Workflow for the product categories which do not foresee formal purchase requests. Moreover, by Digitally Archiving with an identifying barcode all the payable and receivable documents, the company can efficiently conduct documentary research to support daily operations. Within the



same project, an OCR (Optical Character Recognition) system is also used for the extraction, from payable documents, of the main information, useful for administrative purposes, thereby enabling the pre-registration of documents.

**Benefits**

The introduction of these projects has enabled the company to obtain several significant benefits in terms of efficiency and effectiveness about downstream and upstream relationship as well as from an internal point of view. In particular, the implementation of the Document Management System, has allowed the streamlining of administrative document management, considerably reducing the time spent for searching printed documents in the archive.

**Criticalities**

The company has faced some internal difficulties during the implementation of the Document Management System. In particular, for more than one year in parallel to the Document Management System (DMS) were used also paper documents; this aspect has slowed down the digitalization process. Employees did not want to change their way to work and did look at DMS only as an alternative way to support their traditional job and not as a way to do it quicker and more efficiently. For this reason, the company did not exploit all the possible benefits of digitalization from the beginning.

**3.2.32 Unico case**

**General information**

Company	Unico S.p.A.
Address	Via Garbagnate, 61 - 20020 Lainate (MI)
Company Web address	<a href="http://www.unicospa.it/unicoPreview/default.faces">http://www.unicospa.it/unicoPreview/default.faces</a>
Extranet Web address	<a href="http://www.unicospa.it/unicoPreview/default.faces">http://www.unicospa.it/unicoPreview/default.faces</a>
Business sector	Pharmaceutical
Turnover	€1.3 billion
Number of Employees	1,000
Position in the Supply Chain	Intermediate distributor and service provider
Type of suppliers	Pharmaceutical manufactures
Type of Customers	Drugstores; Public Administration (ASL)
Contact	Antonio Aitoro – Executive Director

*Table 44: Unico's general information*

Unico was born in 2002, form the merge between two pharmaceutical cooperatives “Unione Farmaceutica Novarese” and “Codifarma”. The company operates in the pharmaceutical

industry as an intermediate distributor, between pharmaceutical companies and drugstores. Unico makes directly available 70,000 categories of pharmaceutical, para-pharmaceutical, homeopathic, healthcare and similar products to more than 7,000 clients spread at national level. Through the accurate management of 10 operative offices and almost 1,000 employees, Unico has been able to achieve in 2015, 1.3 billion € turnover.

### Supply Chain Structure

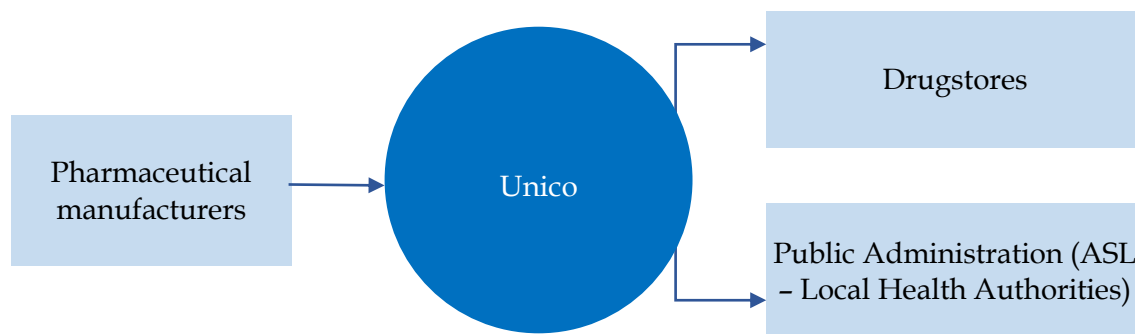


Figure 66: Unico's Supply Chain

Upstream, the company deals with pharmaceutical manufactures, from which it constantly purchases several categories of products. More in depth, these items refer to prescription drugs, pharmaceutical, homeopathic, healthcare products, but also natural and supplement ones. Overall, Unico deals with almost 350 suppliers with a daily flow of 2,000 Orders, necessary to ensure the considerable service level toward its clients.

Downstream, the company's clients are pharmacies; there are more than 7,000 drugstores spread in the country supplied by Unico, reflected in approximately 24,000 daily Orders and 10.3% market share. Despite these huge quantities which need to be managed, the company is constantly able to provide a remarkable service level. Such result is translated in the capability to guarantee an average of only 2.5 hours lead time in the receiving-Order-Delivery process.

### Extranet project

Clients daily Orders, are issued through a Web Service protocol and could be exchanged in a telematics way but also - more rarely - there might be phone Orders or commercial ones in Order copy.

As far as telematics Orders is concerned, after the receiving, the company send an electronic-structured file toward the client, including all the Order-lines which Unico is not able to process; afterwards, since this file is completely supported by pharmacies' Management System, it could be transferred toward another distributor which will fulfill the remaining Order-lines.

On the other hand, non-telematics Orders require to be registered into the company ERP. Such process is carried out by a structured Call Center. Thereafter, an automatic-generated structured email is sent to pharmacies as Order confirmation.

Orders, with all details, information and data, could be immediately consulted in the company Web Portal, through a restricted access area. Furthermore, the Extranet give to each client the possibility to monitor the progress status of the Order fulfillment and the real departure of the carrier from the related logistic platform. Thus the Web Portal allow to check several data about Orders, progress status but also tracking information until the final delivery.

Furthermore, the company exploits a second Web Portal, called WebDPC (Distribuzione Per Conto), well integrated with all distributors' ERP system. Unico operates as a service provider on the behalf of Local Health Authorities (ASL) on the basis of regional agreement. More in depth, the company manage - through its warehouse - the fulfillment of ASLs' high value products. The process does not involve Invoicing, but it is only related to the handle of products and to their delivery. Moreover, through the Extranet, the company receive and process Orders submitted by clients, providing a tracking functionality as well.

### **EDI project**

Unico is a partner of Consorzio Dafne, being involved both in operative terms and in the planning, exploiting all the services offered by the community. Dafne is a B2b consortium composed by pharmaceutical companies and intermediate distributors, with the aim of integrate partners and final users of the pharmaceutical Supply Chain through EDI for the exchange of the full Order cycle documents and information. More in depth, Unico take advantage of EDI protocol provided by the consortium, with a daily flow of 2,000 electronic Orders toward almost 350 suppliers of all the products managed by the company.

Although the issue of Orders is completely managed through EDI, the Order confirmation is not received through this channel by the company, as well as Invoices which are exchanged by means of email or in paper format. The latter are scanned, linked to a barcode and finally made available in the ERP system.

### **Other projects**

Even though the company send the Delivery Note in PDF format before the real delivery, a paper version of the document is however printed and sent to drugstores together with the goods.

Furthermore, the company has implemented a system for the automatic forward via PEC of Invoices toward clients.

Moreover, Unico has activated since 2007 the Digital Archiving for Delivery Notes, but also for both the account receivable and payable.

Finally, a CRM system filled with information about Order tracking, claims alerts and corrective actions, support the company in the analysis of statistics as well as in the generation of new strategies concerning the relationship with clients letting them become more personalized.

### **Benefits**

Overall, the digitalization project of Unico has allowed the company to take advantage of several benefits. The company is now able to provide clients with a remarkable service level, achieved through the Web Portal which include several information and data about Orders and tracking of the goods. Moreover, Unico is committed in offering services to the Public Administration (ASL) achieving a considerable efficiency in managing its high value products with the WebDPC Portal.

Concerning internal processes, the Digital Archiving of Delivery Notes and Invoices, has allowed the company to radically reduce the paper files, thus saving money; moreover, it has improved the rapidity in managing and retrieving information, now immediately available.

### **Criticalities**

The main boundary to the complete digitalization of the company's processes are reflected in the client relationships. In particular drugstores are not structured enough to manage their activities in a digital way and usually prefer and require the paper format of the Order cycle documents. Nevertheless, Unico is promoting the digital way of exchanging information among these small realities.

### **Future development**

The company is strongly committed about the implementation of Electronic Invoicing - through certified flows - toward drugstores. Unico is currently testing the solution, the usage of which is for this reason forthcoming.

Moreover, the company is planning to completely manage in a digital way the Delivery Notes, currently delivered both in PDF and paper format alongside the goods. In this new scenario the Delivery Note is received by the carrier (identified by unique credential) on a mobile device, and afterwards digitally countersigned before the delivery activities start. Finally, an external service provider ensures the digital archiving in a certified way, performing an analysis of both documents and digital signatures.

## Chapter 4: Findings and results

### 4.1 Census

Throughout the activities related to the census, more than 750 Extranets has been identified; in order to implement further detailed analysis (according to the work goals), almost 400 solutions were selected, classified as “Transactional Extranet”. In particular, they enable the exchange of at least one document related to the Order – Delivery – Invoicing – Payment cycle. Moreover, the 57% of these Web Portals are upstream oriented while the remaining 43% are downstream oriented.

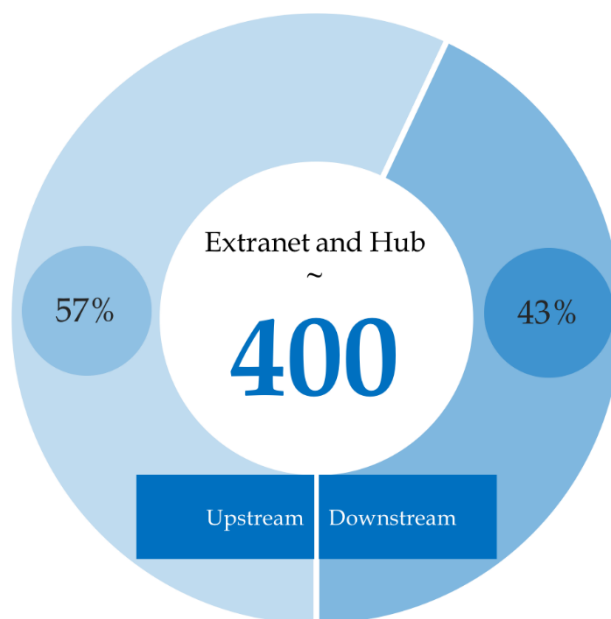


Figure 67: Extranets selection

Considering the 400 Transactional Extranet, they are implemented mainly by Supply Chain leaders, involving almost 100,000 companies – including Small-Medium Enterprises (SME) and Micro Enterprises.

As shown in the following figures (68, 69, 70) it has been identified the percentage of companies connected to an Extranet, depending on a classification based on their dimensions (ISTAT):

- Big Enterprises: they have more than 250 persons employed;
- Small-Medium enterprises (SME): they have from 10 to 249 persons employed;
- Micro enterprises: they have less than 10 persons employed.

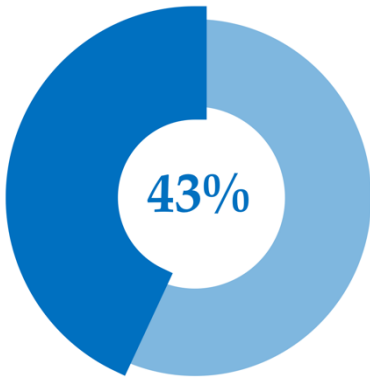


Figure 68: Big Enterprises

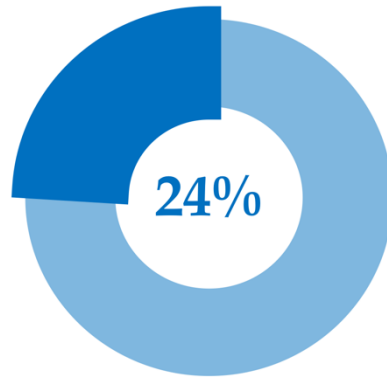


Figure 69: Small-Medium Enterprises

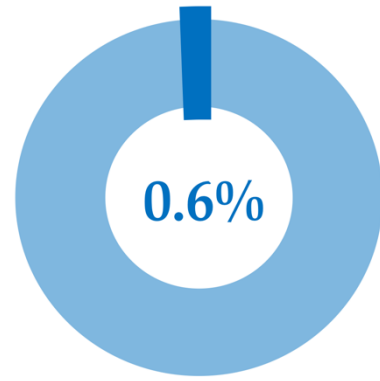


Figure 70: Micro Enterprises

More in depth, in the Italian country, the 43% of 4,500 big Enterprises, the 24% of 250 thousand Small-Medium Enterprises and the 0,6% of 4.7 million Micro Enterprises exploit an Extranet connection to improve their business and better relate with partners.

These number are very important, especially if compared with other solutions' data. In particular EDI technology is used on the Italian territory by about the 40% of big Enterprises, similarly to Web-based solutions, but what is different is the usage by Small-Medium and Micro Enterprises. In particular, Extranet involve more than 60,000 Small-Medium Enterprises and 30,000 Micro ones while EDI only about 10,000 Small-Medium companies and no Micro ones (Bertelé et al., 2016). These data are the symptom of the flexibility and versatility of Web-based solutions, that thanks to their week entry barriers (especially in term of costs), can involve also companies with limited resources and digital skills.

Going deeper with the analysis, it is possible to highlight the percentage of existing upstream and downstream Extranet depending on the industry.

Downstream		Upstream	
Consumer goods	12%	Engineering	16%
Electrical equipment	11%	Consumer goods	15%
Fashion	10%	Engineering works	12%
Engineering	8%	Utility	7%
Automotive	8%	Appliances	6%
Appliances	7%	Automotive	6%
Logistic & Transportation	7%	Fashion	6%
Utility	6%	Logistic & Transportation	4%
Pharmaceutical	5%	Electrical equipment	4%
Other	19%	Other	23%

Table 45: Extranet diffusion per industry

These data show that there are no particular relations between sectors and the adoption of Web-based solutions since they seem to be quite homogeneously divided across sectors without any particular peak of concentration.

Going further with the analysis it is possible to find an interesting result concerning the existing Extranet development: in particular, there are two scenarios:

- The 18% of eSourcing and eProcurement Extranet already implemented, had recently improved their functionalities, going beyond the pre-transactional phase and including the exchange of the Order cycle documents.

This is very important since it attends an improvement of all the Supply Chain. Indeed, eProcurement solutions bring benefit mainly to Supply Chain leader who has implemented the solutions, while supporting also the Order cycle, benefits are spread among all Supply Chain partners;

- The number of collaborative projects which have improved their functionalities and added new ones - extending their width - has increased by the 12%.

## 4.2 Companies panel analysis

The interviewed panel is composed by 32 companies, belonging to 20 different sectors.

Company	Business sector	Company	Business sector
1 Aeroporti di Roma	Passengers transport	17 Hera	Utility
2 Artsana	Sanitary	18 Hilti	Building utensil
3 Autogrill	Food distributor	19 Intersport-Cisalfa	Sport & Clothing
4 Bayer	Pharmaceutical	20 Italtel	Telecommunication
5 BCUBE	Logistics	21 Leitner	Transport (ropeway technology)
6 Bionike	Pharmaceutical	22 Liu Jo	Fashion & Clothing
7 Bolton Group	Consumer goods	23 Maire Tecnimont	Engineering
8 BTicino	Electrical equipment	24 Matalistem Sardegna	Services-commercial spaces' equipment
9 Chiesi Farmaceutici	Pharmaceutical	25 Moncler	Fashion & Clothing
10 Costa Crociere	Tourism	26 OTB	Fashion & Clothing
11 Dolce & Gabbana	Fashion & Clothing	27 Patrizia Pepe	Fashion & Clothing
12 ENI	Utility	28 Rhiag	Automotive
13 Ermenegildo Zegna	Fashion & Clothing	29 S.A.C.B.O.	Passengers transport
14 Esprinet	Information Technology	30 Sky	Television-Services
15 GoodYear Dunlop	Automotive	31 Tod's	Fashion & Clothing
16 Gruppo PAM	Retailing	32 Unico	Pharmaceutical

Table 46: Companies panel

More in depth, companies are not equally distributed among sectors, indeed, there is a prevalence of the Fashion & Clothing one, followed by Pharmaceutical:

Companies		Upstream	
Fashion & Clothing	7	Engineering	1
Pharmaceutical	4	Logistic	1
Automotive	2	Tourism	1
Passengers transport	2	Telecommunication	1
Utility	2	Food distribution	1
Sanitary	1	Information Technology	1
Consumer goods	1	Retailing	1
Electrical equipment	1	Sport & Clothing	1
Building utensil	1	Services-commercial spaces' equipment	1
Transport equipment	1	Television	1

Figure 71: Companies distribution

Overall, the interviewed companies - except for Metallsistem Sardegna - are classified as “big company”, according to the ISTAT classification, since they have either more than 250 employees or a turnover higher than 50 million €. Despite of this classification, not all of them have a similar size thus, it is possible to create a map through which derive a more accurate classification and identify a clear axis which could represent the dimension. In particular, the latter, has been built according to the number of employees and the turnover (€).

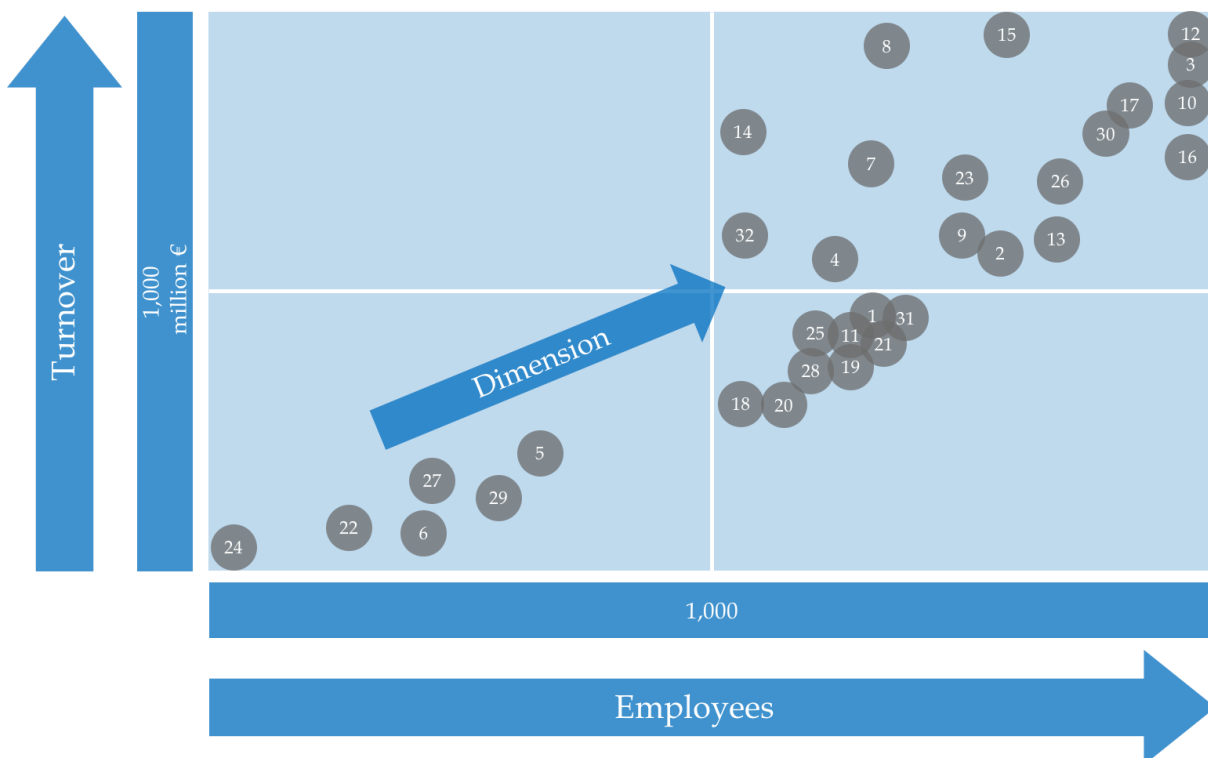


Figure 72: Dimension of companies



Furthermore, applying a Euler-Venn diagram it has been possible to classify companies according to the implemented solution: upstream and downstream oriented Extranet. More in depth, it is possible to observe that interviewed company are not equally distributed and are more oriented toward upstream solution. In particular:

- 15 companies (47%) have implemented only an upstream oriented Extranet;
- 9 companies (28%) have implemented an Extranet both for customers and suppliers;
- 8 companies (25%) have implemented only a downstream oriented Extranet.

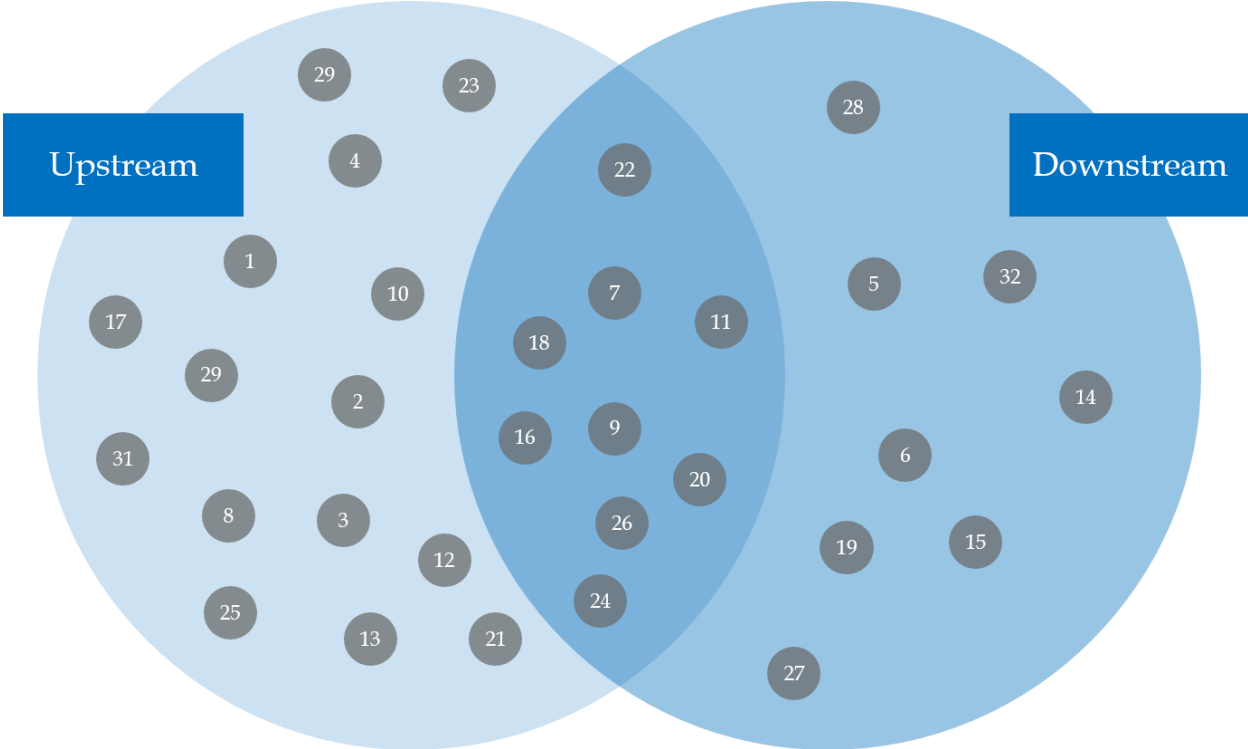


Figure 73: Upstream/Downstream Extranet classification

Since some companies have implemented more than one Web-based solution, the analysis has pointed out 45 Extranets, 28 (62%) upstream oriented and 17 (38%) downstream.

In order to take it into account, in the following graphics are used numbered spots with decimal places, where the non-decimal place represent the company and the decimal places (if present) represent the number of the solution belonging to the same company. A further classification has been used to understand if there are some relationships between market sectors and the tendency to implement upstream or downstream solutions. Hence, a matrix has been created using on one axis the solution orientation (upstream or downstream) and on the other the macro-sectors. Since 20 sectors are graphically inconvenient to be represented, an aggregation in three macro areas (Manufacturing, Services and Distribution) has been done.

Manufacturing	Services	Distribution
Sanitary	Passengers transport	Food distribution
Pharmaceutical	Logistics	Information Technology (distribution)
Consumer goods	Tourism	Retailing
Electrical equipment	Utility	Sport & Clothing (distribution)
Fashion & Clothing	Telecommunication	Commercial spaces equipment (distribution)
Automotive	Television	Automotive (distribution)
Building utensil		
Building of transports (ropeway technology) equipment		
Engineering		

Figure 74: Macro areas aggregation of sectors



Figure 75: Extranet solutions per macro area

From the above chart it is possible to see that the majority of solutions have been implemented by manufacturers (58%) (manufacturer are the companies more interviewed, the previous data has not a statistical meaning). Moreover, spots are quite equally spread (in term of orientation) for both manufacturers and distributors, while for services providers there is a strong emphasis on upstream Extranet.

### 4.3 Extranet penetration

In this chapter Extranet penetration has been assumed as the ability for a solution (and the relative company) to be extended toward the majority of partners' categories and, at the same time, to involve the targeted actors as much as possible.

In order to understand the penetration of the implemented solution, a couple of matrix (one for upstream solutions and the other downstream), have been created, having as "x" axis the number of partner's categories (suppliers or customers) impacted by the solution; they could be "all" if the solution is used to relate with all type of partners or "some", if the Web-Portal is used to deal with only a part of the total actors with which the company work.

The other dimension is represented by the percentage of involved partner out of the targeted category/ies and not out of all the partners dealing with the company.

It has been decided to use the latter dimension (and not the percentage of involved partners out of the totality), since the fact that the company do not integrate all its partner is already taken into account by the "x" axis, otherwise this aspect would have had a double weight. The following figure show the upstream mapping.

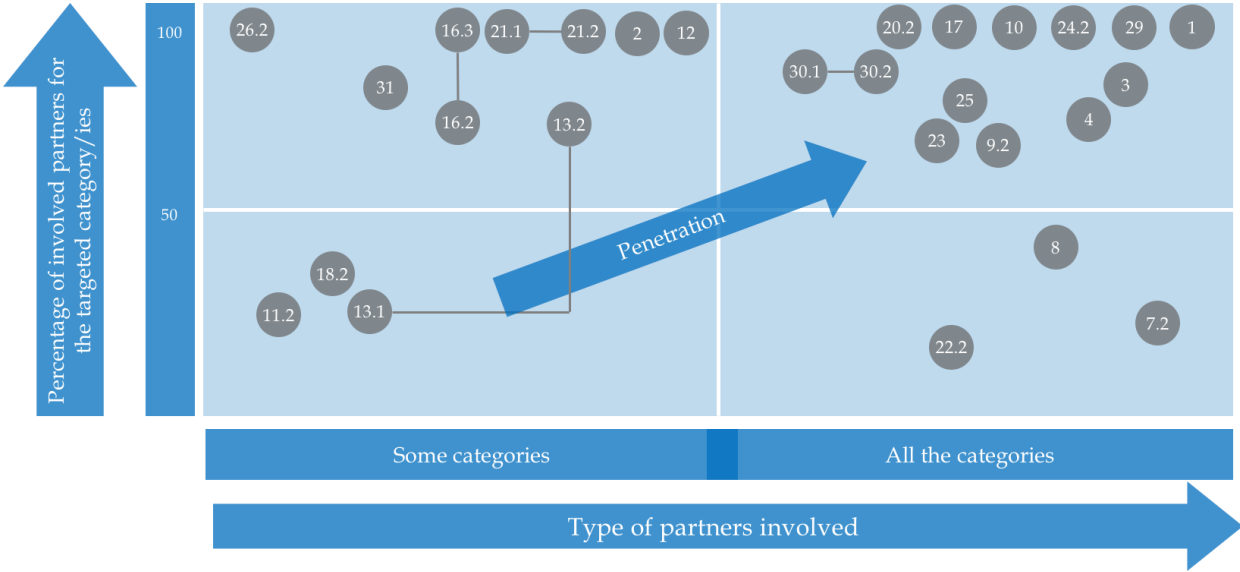


Figure 76: Upstream Extranet penetration

Analyzing this matrix, it emerges out that points are not uniformly distributed and the majority of spots (77%) lay on the upper side of the matrix. This means that companies are able to well integrate their suppliers target. What is important to remember is that the left part of the matrix refers to solution which integrate only some partners' categories and not all the actors, otherwise all that points would have been on the down side of the matrix, indeed, the impacted categories may account only for the 20% of the total partners dealing with the company.

Another important aspect to be pointed out is that the 40% of companies extend their solution only to a part of their suppliers. During interviews it comes out that the involvement of only some partners' types is the result of a strategic choice and not a lack of the solution. It could depend either from the aspect that the solution it is not suitable and convenient for some kind of relationships, (e.g. ENI (12)), or because the other suppliers' categories are integrated in different ways (EDI) (e.g. Gruppo PAM (16)).

**ENI - Lorenzo DeFilippi**  
(ICT manager):

*"We have strategically decided to address our centralized Procurement solution to all non-core supplier such as services and indirect materials, while core ones such as raw materials are directly managed by the relative business unit."*

**Gruppo PAM - Sandro Trevisanato**  
(CIO):

*"The web-based solution is dedicated to small services and material providers, especially related to the technical sectors, because quite all goods suppliers (80%) are integrated by EDI."*

Moreover, in the down side of the matrix it seems that some solutions are unsuccessful since the relative companies have not been able to integrate a significant amount of targeted suppliers. In order to understand if this is the real situation, each single case has been analyzed and it emerges that BTicino (8) and Liu Jo (22.2) strategically have decided to implement the solution with several categories of partners, however involving only Pareto optimal ones (few in number); it means that involved partners account for more than 80% of the business volume used for the company KPI (order line or purchasing value).

**BTicino - Giovanni Rosina**  
(ICT director):

*"We integrate only 50 suppliers, but they account for more than the 80% of the total purchase value and issue about 70,000 Invoices per year."*

**Liu Jo - Andrea Veroni**  
(CIO):

*"The solution is exploited only by some actors, who reflect the 80% of Liu Jo business."*

Similarly, Ermenegildo Zegna (13) and Hilti (18) have integrated only few partners, nevertheless, in this case belonging to a unique category, but accounting for a significant amount of business volume.

**Ermenegildo Zegna - Roberto Cappa**  
**(IT and Supply Chain Manager):**

*"We integrate 30 out of the 150 raw material suppliers that account for 80% of purchasing volume."*

As far as Bolton Group (7.2) is concerned, the solution has just been implemented and for this reason the involved partner base represents a small percentage; nevertheless, it is expectable a future growth with the inclusion of the majority of actors.

The only company which reach a low level of involvement considering its target not for a strategic choice is Dolce & Gabbana, which integrate only 30 out of 200 labor suppliers since, until now, the company has faced difficulties related to the small and craft nature of suppliers. Coherently, the following figure show the downstream mapping.

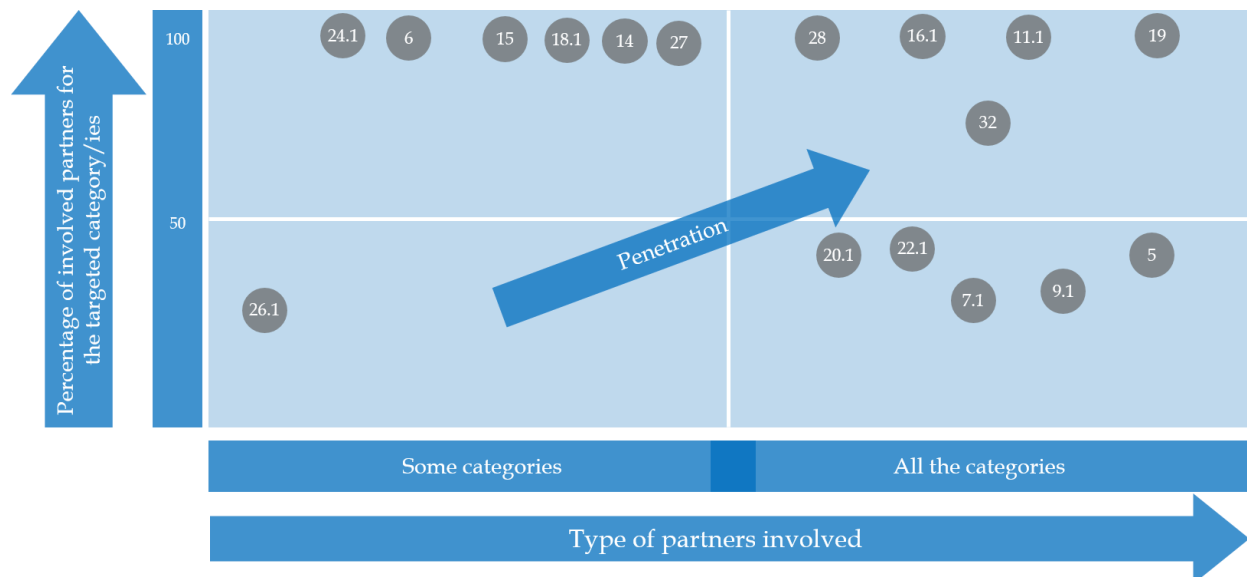


Figure 77: Downstream Extranet penetration

Similarly, to the previous figure, the upper side of the matrix is the most populated (65% of spots) and almost 40% of solutions involve only some categories.

In order to understand the low level of involvement of the down side of the matrix, it is possible to focus on each case and it comes out that OTB (26) use its solution only with selected wholesalers (less than the 50%) while the remaining are managed by sales agents. Italtel (20) and Liu Jo (22) address their solutions to several categories of customers however deciding to involve only Pareto optimal ones.

Furthermore, Bolton Group (7.1) use its solution as a parallel channel, it pushes toward EDI, and it use its Web Portal only with customers not able to communicate with the structured format.

The only exceptions are represented by BCUBE (5) and Chiesi Farmaceutici (9) which for several reason were not able to full integrate their target. More in depth, Chiesi Farmaceutici is still sending paper Invoices by mail or e-mail since its customers show some resistances toward

digital change, while BCUBE deal with international trade and because of foreign law some documents are still required in a paper copy.

In conclusion it is possible to state that company not always decide to integrate all their partner and it is the result of their business strategy: sometimes the solution is not suitable for a certain kind of partner or in other cases only a category is chosen since other ones are already integrated in different ways. Moreover, it could happen that company focus only on Pareto optimal partners while excluding the others.

#### 4.4 Focus on processes

In order to have a comprehensive view on process coverage, a dedicated map has been adopted. In this case a company point of view has been used, thus considering the company and not each single solution. Hence if a company has adopted two upstream or downstream Extranet to support different processes it will result on a unique spot without decimal places.

In the following images will be presented the upstream map, showing for each company the process covered by Web-bases solutions.

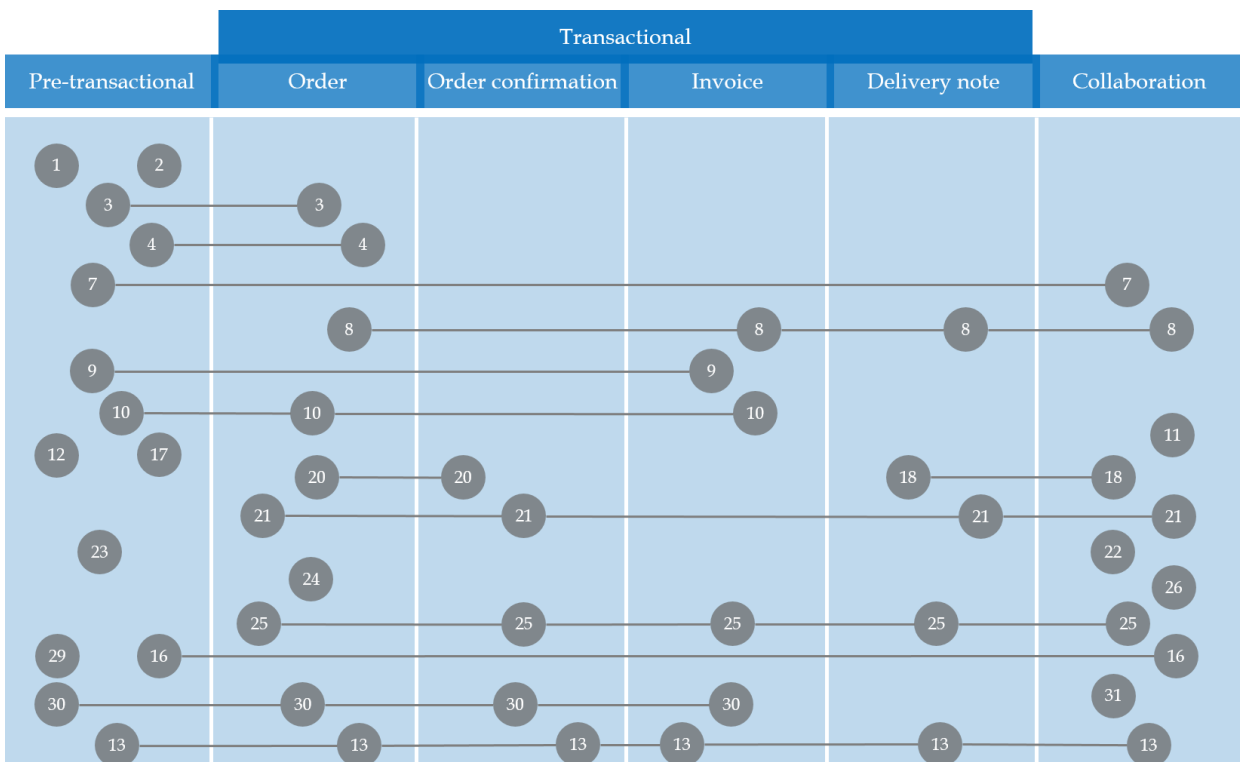


Figure 78: Upstream Extranets processes coverage

Considering the processes covered by upstream Extranets it comes out that 50% of the analyzed companies support at least two processes; moreover, out of the other 50% which support only one process, the majority have implemented pre-transactional solutions (50%) or collaborative

ones (33%). Furthermore, there is a company (i.e. Metalsistem Sardegna) which supports only the transactional phase and in particular only Order issuing. The most supported process is the pre-transactional one, 58% of the companies, followed by the transactional, 50% and the collaborative one, 46%. In particular:

- Focusing on the pre-transactional process, it generally provides great advantage to the company which has implemented the solution and only marginal ones to the users since it is a mono directional way to interact. For this reason, it emerged that companies which has implemented pre-transactional Web Portals are the bigger ones which deal with a lots of suppliers and has enough bargaining power to force them to adopt their solution. Looking at the figure 78 it is possible to notice that out of the six biggest companies, all have adopted such a solution: ENI (12), Autogrill (3), Costa Crociere (10), Gruppo Pam (16), Sky (30) and Hera (17). Analyzing each case, it is clear that pre-transactional Extranets are implemented by companies which want to cut their sourcing costs and do not consider strategic the relationships with suppliers which are small and heterogeneous. Therefore, as a result, companies do not extend these solutions to a lots of processes, specifically 43% of companies whose has implemented eProcurement platforms do not go further, while the remaining 57% shows some week collaborative feature or support at most one sub-phase of the transactional process, Order or Invoice issuing. Finally, only Sky (30) and Ermenegildo Zegna (13) strongly support also the transactional process in the majority of its sub-phases thanks to the usage of more than one Extranet;
- Focusing on the transactional phase, the most exchanged document is the purchase Order (83% of cases). The above figure seems to highlight that companies are focusing a lot on this document of the transactional process thus considering Order the most important document to be exchanged. Actually, it is different; more in depth, during interviews it emerges that Order never represent the core part of digital projects but it is a consequence; indeed, there are not companies that implemented it without some other functionalities (with the exception of Metalsistem Sardegna which is a very small affiliate company of a bigger Group). In some cases, such as Autogrill (3) and Bayer (4), Order represent the extension of an eProcurement solution (and not the driver that push the actualization of the project), in some other cases such as Bticino (8), Leitner (21) and Moncler (25) it is only a part of the project that integrate quite all the transactional cycle. This Extension toward Order issuing is simply explainable since the Order is directly created by the owner of the Extranet; hence, being some of these Web Portals integrated with the ERP as well as with the Document Management System of the company, publishing is easy and sometimes even automated;

The second most exchanged document is the Invoice (50% of cases), which emerged to be very important for company which has implemented Extranet, since it is an external document that, if digitally provided can make easier and more complete the internal digitalization and the whole Transactional cycle. Usually Invoices are directly uploaded in PDF format by suppliers. Such documents are afterwards archived in this format, or is Digitally Archived once its data have been captured and extrapolated through an Optical Character Recognition (OCR) system.

Delivery notes and Order confirmation are the less exchanged documents, (42% of cases), but while the first represents a parallel channel since a paper copy of the document in all cases accompany the goods on the vehicle, the second is very important. Indeed, it is usually sent in a structured format such as for Leitner (21) or Moncler (25) and represent an important step toward collaboration since it is one of the first sign of a double way interaction;

- Focusing on the collaborative phase, it is immediately possible to find out that out of the six Fashion & Clothing companies with upstream oriented platforms, all have implemented Web-based Portal aiming at supporting some collaborative processes. Hence, it is possible to conclude that such kind of collaborative relationships are strongly related to the business context in which the company operates. In particular, Fashion & Clothing industry is affected by a strong seasonality and continuous redesign of products due to fashion trend, that is reason why it need strong collaboration in the design of products' parts and accessories. Moreover, the quality of raw material or finish goods represent a distinctive trait for all these companies and the relationship with suppliers assume a strategic mean, since it could represent a competitive advantage. The goal of companies in this case is to create a strong relationship, aiming at increase quality, efficiency (more in term of time than cost, even if they are related) and effectiveness, differently from eProcurement platform where the main objective was to reduce costs.

Finally considering all the upstream oriented companies, almost no one supports completely all the transactional cycle together with the pre-transactional showing at the same time collaborative features. However, for each process a best practice can be found out. As far as the pre-transactional phase is concerned, Maire Tecnimont (23) is one of the more complete project having a lot of functionalities (Vendor Management, eSourcing/eTender, Contract management, KPI and data management) as well as Moncler (25) for the Transactional process which is completely supported. Moreover, considering collaboration, one of the best projects is the one of BTicino (8), which allows to share demand forecasting, purchasing plans, technical information



and quality specifications. Furthermore, this solution hosts an Available-To-Promise algorithm (ATP), which makes it possible for BTicino (8) to be promptly informed about delays or changes in dates or shipping volumes and re-schedule them optimally.

In the following images the same mapping proposed for upstream relationships will be presented for downstream ones.

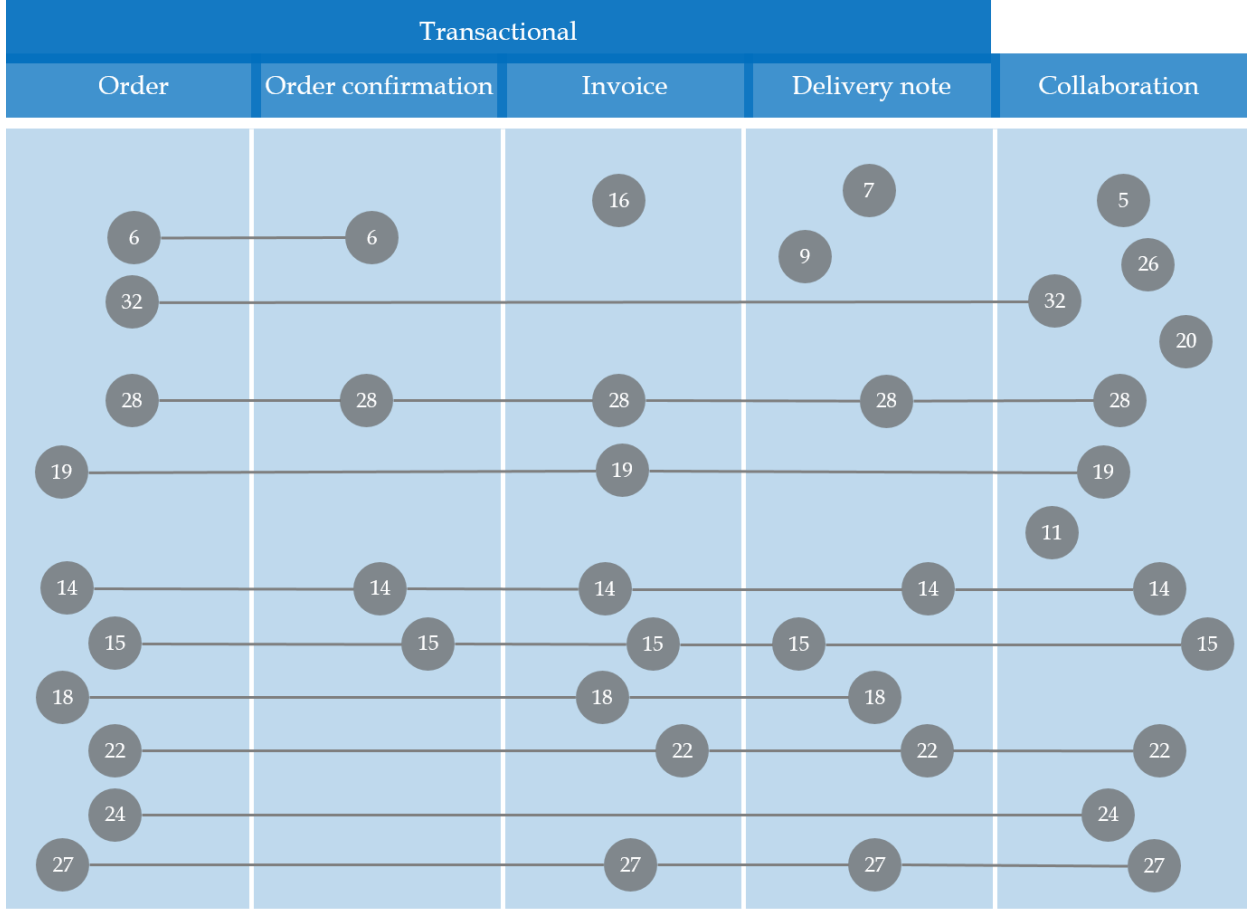


Figure 79: Downstream Extranets processes coverage

Considering the downstream situation, it emerges that the 76% of companies support through Extranets at least one sub-phase of the transactional process, differently from the upstream situation where it was supported only in the 50% of cases. Similarly, it results that the 71% of companies supports collaboration with customers while only the 33% supports it with suppliers. Therefore, based on these data it can be asserted that downstream solutions are more executional and collaborative-oriented than upstream ones. Such a difference is mainly due to the role that the technologies have upstream and downstream: when addressed to suppliers, they aim at collecting documents produced by third parties, while when addressed to customers, their main goal is to publish documents internally produced by the company. This aspect causes a different managerial and technological complexity in the two cases.

In particular:

- Focusing on the transactional phase, the most shared document is represented by Order (77%), and differently from the upstream situation, in this case it represents also the main objective of transactional Extranet because it is the only Transactional cycle document that the company does not produce internally. Moreover, it is required to complete internal digitalization. Orders are generally exchanged through Web form and software interfaces, thus standardizing and gathering the entry data and thus, simplifying the back-office processing. Thereafter, they are automatically uploaded into the ERP system. In some cases, such as BioNike (6), Goodyear (15) and Esprinet (14) the uploaded Order follows an Approval Workflow and an Order confirmation is generated after the process.

The second most exchanged document is the Invoice (62% of cases) which is internally produced and generally uploaded on the Web Portal in PDF in order to make it easily accessible to everyone. Providing in such a way this kind of document, allows companies with a lot of customers to save a great amount of money, otherwise used for postal charges.

Coherently, Delivery Notes are shared in the 62% of cases. Nevertheless, it generally represents a parallel channel since a paper copy usually stays with the goods.

Concerning the Order confirmation, it is exchanged only by few companies (31%) and generally is the final part of an Order approval workflow. Companies do not focus their attention on this documents since it does not provide any advantage in as companies already know internally if the order is confirmed or not;

- Focusing on downstream collaboration, also in this case there is a relation between sectors and companies which implement that solutions. Indeed, out of five clothing companies, all have implemented collaborative Extranet. Furthermore, also the automotive sector seems to have such kind of relation, as shown by Rhiag (28) and GoodYear Dunlop (15) cases.

Out of all the cases examined, Rhiag (28) and Esprinet (14) can be considered a best practice of downstream extranet, since their solution covers all the processes and are in some way innovative. Rhiag (28) allows its customers to issue Order in three different ways (i.e. by items' code, from the eCatalog and by images) and has a lot of innovative collaborative features such as a search engine in which customers can input the plate number of the car and obtain all the specific spare parts that compose it. Furthermore, other functionalities are the possibility to check availability of goods, compare different parts, claim management and the creation of a digital dossier for each Order containing all possible relevant documents such as Order, Invoice and Delivery Note. Esprinet Extranet supports all the Transaction cycle and shows great collaborative functions such as: delivery tracking, visibility on goods status and availability, on all products master data,

sharing of purchasing plan and management of claims and returns. However, its most singular and distinctive trait is the “showcase for third parties” functionality. Esprinet customers can use the Web Portal – revising and customizing it according to design, contents and prices - addressing directly to their final customers.

### 4.5 Extranet maturity

In order to estimate the maturity of the solutions, two different classifications have been made, since they give a different mean to the concept of maturity.

The first one takes into account the above explained penetration axis and relate it with the ability to cover several processes. In particular, three macro-processes have been considered: pre-transactional (eProcurement and eSourcing), transactional (eSupply Chain Execution) and collaborative (eSupply Chain Collaboration). Coherently with this work goal, more attention has been given to the transactional process, further divided into the issuing of: Order, Order Confirmation, Invoice, Delivery Note. The axis has been build up giving to each process (and sub-process) a weight and comparing each solution on the basis of their score, obtained as the weighted sum of the process that they cover. It has been decided to give more importance to Collaboration compared to Procurement since it is a double way relation and not a mono-directional one.

The following figure show respectively upstream and downstream solutions mapping.

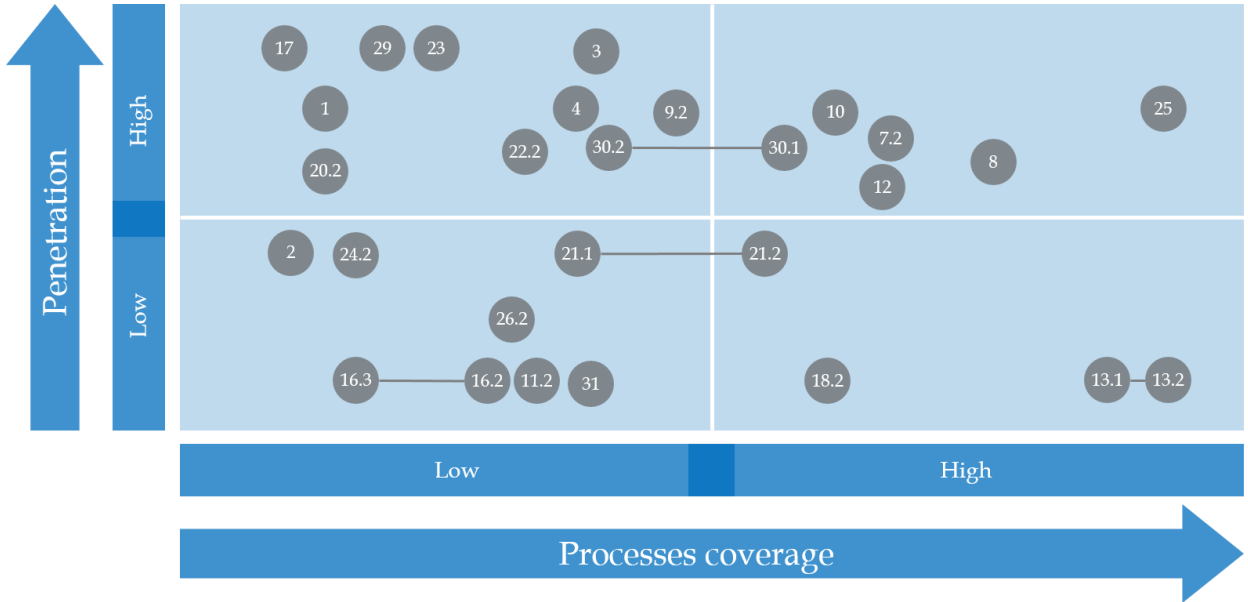


Figure 80: Upstream Extranet maturity depending on penetration

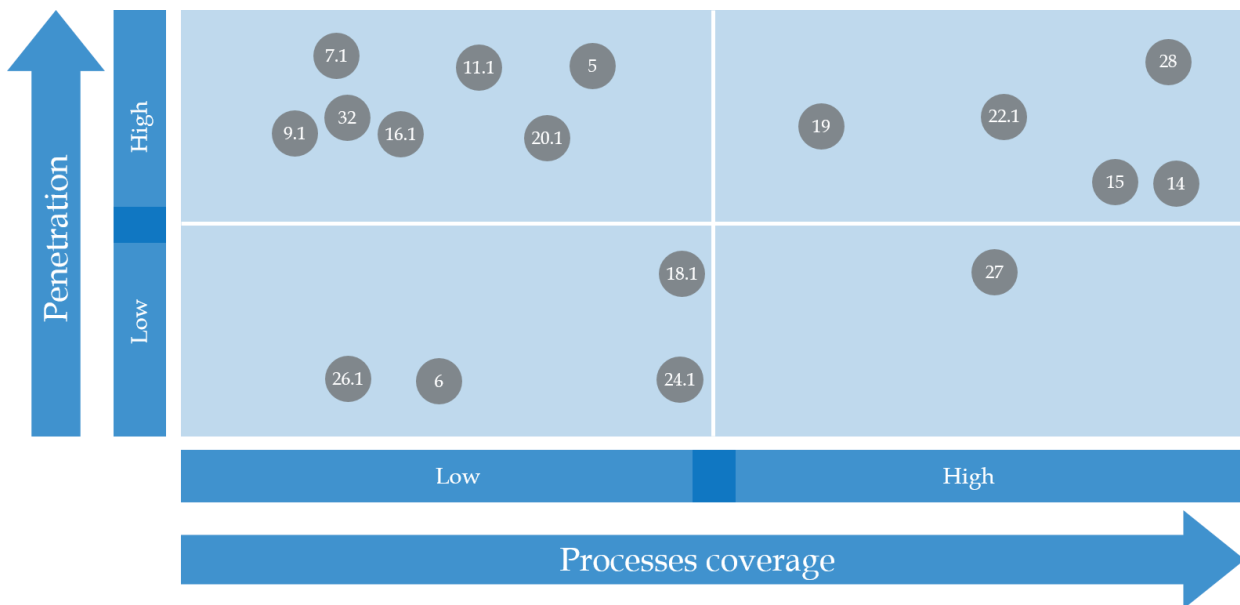


Figure 81: Downstream Extranet maturity depending on penetration

From the positioning of the companies in the two maps, it comes out that there are no particular trends except for a prevalence of solutions which do not cover completely all the above mentioned process. In particular:

- Only 32% of the upstream solutions cover the majority of processes (right side of the chart) and out of them, only the 44% (14% if considered on the total amount of solutions) show a high penetration;
- Similarly, only the 35% of the downstream Web Portals have a good coverage indicator and only half of them (17,5% of the total downstream Extranets) show a good penetration.

In order to understand the reason beyond this, an analysis has been done considering each single case of the upstream matrix, thus it is possible to point out that:

- Several Extranets, especially the ones which lay on the L-H quadrant, (e.g. Bayer (4), Autogrill (3), Sky (30) etc.), show a poor coverage score since they are only eProcurement solutions. This does not mean that the other processes of the relative company are not covered, but simply that they are not covered by the considered Web-based application. Indeed, the relative companies in order to support all the transactional process relies on EDI connection, as well as other Extranet (such as Sky) or proprietary solutions such as in the case of Bayer, which through a Supplier Network Communication (SNC) tools is able to integrate its ERP system with suppliers' one obtaining a A2A interaction;

**Autogrill - Marcello Chierici**  
 (Head of organization development):

*"In Italy almost the 60% of the overall purchase Invoice volumes are exchanged through EDI as well as purchase Orders."*

- Others companies such as Maire Tecnimont (2) and Hera (17) have implemented only eProcurement solution because their business shows some peculiarities which do not allow to go over this kind of relation. Indeed, since they work on commission they are not able to have production plan and consequently a purchasing ones; moreover, the majority of purchasing relationships are spot and not worth it establishing digital connection for manage them.

**Maire Tecnimont – Francesco Micheletti**  
(Head of Project Procurement Management):

*“When you work on commission and not in a continuous way you cannot integrate the Order cycle, because you sent on average one Order per year to your suppliers and you drastically enlarge your customer base. Moreover, the life span of relationship is short and is not cost efficient to digitalize it.”*

Coherently, the downstream matrix shows that some companies (e.g. Chiesi Farmaceutici (9) and Bolton Group (7)) have integrated the Order cycle using other tools rather than Web Portal ones, such as EDI.

**Chiesi Farmaceutici- Umberto Stefani**  
(CIO):

*“Since 10 years, Chiesi Farmaceutici has completely digitalized its Order cycle, since we receive documents in EDI format, through DAFNE (Distribuzione Aziende Farmaceutiche Network EDI) network.”*

**Bolton Group – Gianluca Ceruti**  
(ICT director):

*“With large-scale retail trade actors, we communicate using EDI. By this it is possible to share documents about the Order cycle such as purchasing Orders, receivable Invoices and dispatch advices.”*

The second map adopted to analyze Extranets maturity introduce a temporal dimension; more in depth, web Portals are mapped on the basis of the involved partner (on the “y” axis) and the age of the solution (on the “x” axis). On the latter, it has been used 5 years as a discriminant value since it is the average of the timespan which the Extranet need to become mature. The following figure shows the upstream map.

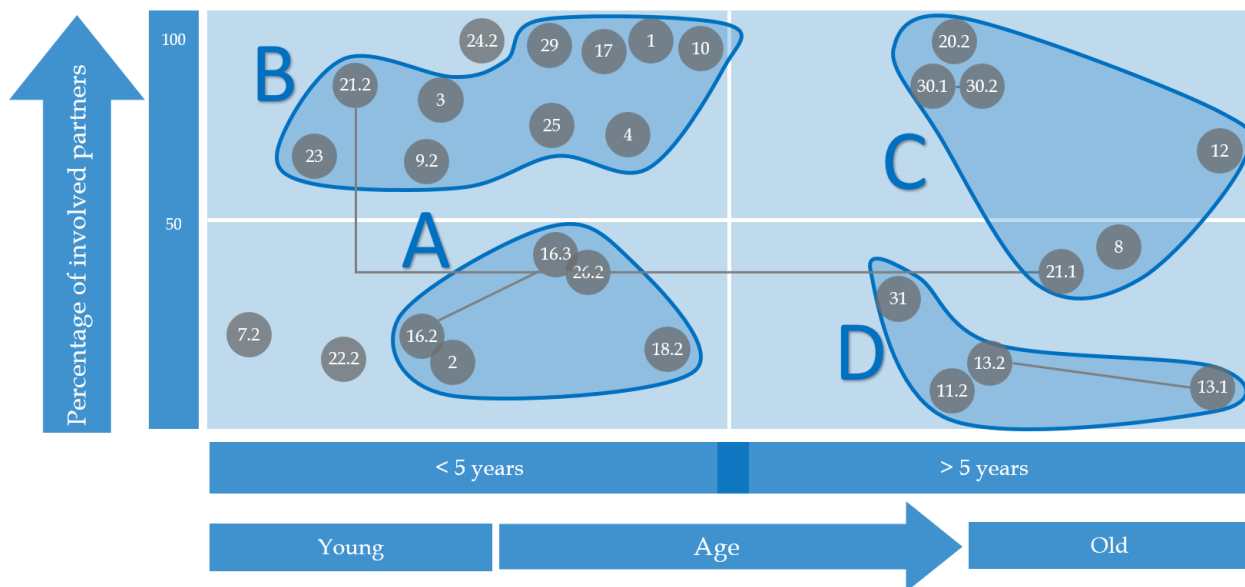


Figure 82: Upstream Extranet maturity depending on the age

Analyzing the matrix, it is possible to group the spots into 4 clusters:

- The A cluster, called “in progress integrators” is populated by solutions which are quite young, and whose relative companies have decided to integrate only a determined part of actors, such as carriers for Hilti (2), external laboratories for OTB (26) and technical material provider for Gruppo Pam (16). However, since the solutions are young this decision can be not a final one and the platform can evolve. That is the case of Artsana (2), who, at the moment, reserve the platform only to raw material suppliers but do not exclude a different usage.
- The B cluster, called “focused integration”, contains Extranets which are young and mainly focused on pre-transactional features. These solutions thanks to a favorable series of factors, especially a strong bargaining power of the relative companies (e.g. Bayer (4), Autogrill (3), Aeroporti di Roma (1), Costs Crociere (10), Hera (17), Maire Tecnimont (23) and Chiesi Farmaceutici (9)) were able to obtain a high level of involvement. The only non-Procurement platform are Leitner (21) and Moncler (25) ones, and also them, have reached a great involvement thanks to the strong bargaining power as well as a strong commitment;
- The C cluster, called “stable integration”, is composed by extranet which, operating by more than 5 years, have reached a stable level of integration and represent historical point of reference for the relative Supply Chain. In particular, three of them are eProcurement platforms owned by services companies (television, utility and telecommunication) such as Sky (30), ENI (12) and Italtel (20) and the remaining two are solutions implemented by

manufacturing companies, (i.e. BTicino (8) and Leintner (21)), which integrate Pareto optimal partners (that is the reason why they show a low level of involvement);

- The D cluster, called “collaborative solutions” is populated by solutions which shows collaborative features. In particular, all these solutions have been implemented by Fashion & Clothing companies and are used by the relative companies to deal with only external laboratories and raw material suppliers (that’s why the low level of involvement). This is a further evidence of the relation above explained between sectors and Extranet functionalities;

It has been decided not to group Metalsistem Sardegna (24) in the B cluster since it has nothing in common with the cluster population. Indeed, it is a small affiliate company of a bigger group and has only one suppliers - the parent company - (reason why of the high level of involvement) thus, it does not have any bargaining power.

Concerning Bolton Group (7.2) and Liu Jo (22.2), they have not been grouped into A cluster for two different reasons; first of all, Bolton Group solution has been just implemented, thus it is in the early stages of development, for this reason the involved partner base represents a small percentage. On the other hand, Liu Jo (22.2) use its portal only for informative communication and has never put strong effort on that solution; indeed, the transactional cycle is carried out traditionally for several reason such as the small dimension of suppliers. At the moment the company prefer to focus on downstream solutions.

The following figure shows the downstream matrix.



Figure 83: Downstream Extranet maturity depending on the age

As in the previous case, the same four clusters could be identified:

- The A cluster, called “in progress integrators” is composed by quite recent solution that by now have involved only some selected customers such as medium-small companies

(not able to communicate in A2A mode) for Hilti (18) and Bolton Group (7), only the main actors (in order to provide a higher service level) for Italtel (20) and Chiesi Farmaceutici (9) as well as few customers accounting for the majority of business for Liu Jo (22);

- The B cluster, called “focused integration” is composed by Extranets which have reached a good level of integration even though some of them are quite young and which are mainly focused toward a capillary integration of a lot of small-medium customers, aiming at serving them throughout the national territory. That is the case of BioNike (6), which thanks to its solution collect orders from thousands of pharmacies and drugstores. Also Gruppo Pam (16), Dolce & Gabbana and Intersport-Cisalfa (19) use their solution to deal with numerous affiliate or franchising stores as well as with owned point of sales;
- The C cluster, called “stable integration” is populated by historical Extranets, which represent a reference point for downstream solutions thanks to their high level of involvement as well as completeness in term of process coverage. Two out of four belong to companies operating in the automotive sector, Rhiag (28) and GoodYear Dunlop (15), while Unico works in the pharmaceutical sector and Esprinet (14) is an Information Technology wholesalers. That solution supports a good part of the transactional cycle and show interesting and distinctive collaborative features;
- The D cluster, called “collaborative integration” contains Extranets which main goal is a collaborative one. In particular, two of the three solutions are implemented by Fashion & Clothing companies, OTB (26) and Patrizia Pepe (27), and are used to communicate with their big wholesaler customers, which are few (that is the reason behind the low level of involvement) but very important for their business volume. Concerning BCUBE (5), it works in the logistic business dealing with air carriers and small freight forwarders and the firsts (few in numbers) are collaboratively integrate through its Web-based solution.

Metalsistem Sardegna (24) has been excluded from all cluster for the same reason above mentioned for its upstream solution.



## 4.6 Benefits and Criticalities

This paragraph will show all the benefits and criticalities that companies have faced through the implementation of Extranets both from an internal and an external point of view.

### 4.6.1 Benefits

In order to analyze benefits, the following categories have been identified:

- Effectiveness: it is related to the quality of both the relationship with partner and internal activities. In particular, through Extranets companies are able to offer a higher service level and an improved overall quality and accuracy of processes;
- Efficiency: it is related to an improvement of the efficiency, thus, meaning that the Extranet allowed the company to reduce its costs of processes while exchanging documents with partners;
- Time saving: it is related to the opportunity of companies to significantly reduce the time of non-value added activities, thus being able to reallocate the personnel to more value added ones as well as to the improved rapidity in performing daily tasks;
- Easier availability of documents: it is related to the possibility of companies to easily manage and retrieve current and past documents and information;
- Traceability & control: it is an intangible benefit that guarantees companies to have a higher protection and knowledge about both internal activities and Supply Chain processes;
- Partner loyalty: it is an intangible benefit occurring when partners deeply understand the advantages of exploit Extranets and digital relationships, thus, enhancing or even creating a loyalty toward the company.

Downstream	Effectiveness	Efficiency	Time saving	Availability of documents	Traceability & control	Partner loyalty
BCUBE	✓	✓	✓			
BioNike	✓	✓				
Esprinet	✓		✓		✓	✓
GoodYear Dunlop	✓	✓	✓			✓
Intersport Cisalfa	✓		✓			
Patrizia Pepe	✓	✓	✓			
Rhiag	✓	✓			✓	✓
Unico	✓	✓		✓	✓	

Upstream						
Aeroporti di Roma	✓	✓	✓		✓	
Artsana	✓		✓	✓		
Autogrill	✓		✓	✓		
Bayer	✓	✓	✓		✓	
BTicino	✓	✓	✓	✓		
Costa Crociere	✓	✓	✓			
Ermenegildo Zegna	✓		✓			
ENI	✓	✓		✓		
Hera	✓	✓	✓	✓		
Leitner	✓	✓	✓		✓	✓
Maire Technimont	✓	✓				
Moncler	✓	✓	✓			
SACBO	✓	✓	✓			
Sky	✓	✓				
Tod's	✓			✓		
Both						
Bolton	✓		✓			
Chiesi Farmaceutici	✓	✓				
Dolce e Gabbana	✓					
Gruppo PAM	✓	✓	✓	✓		
Hilti	✓	✓	✓	✓		✓
Italtel	✓	✓	✓			
Liu Jo	✓	✓	✓	✓		
Metalsistem Sardegna	✓		✓	✓		
OTB	✓	✓	✓			

Table 47: Benefits of Extranets

Regardless of upstream or downstream solution, almost all the companies which as implemented an Extranet, achieved a considerable level of efficiency and effectiveness of relationships with partners, as well as a saving of the time previously dedicated to non-value added activities. For this reason, it is possible to classify them as the main “standard” benefits guaranteed when adopting an Extranet to accomplish task and daily activities compared to the traditional way.

#### GoodYear Dunlop - Walter Falavigna

(Distribution operation manager):

*“The benefits of our Web Portal are countless: first of all, higher efficiency but also all non-value added activities (e.g. data entry, etc.) are eliminated. Moreover, higher effectiveness and rapidity of processes.”*

#### Leitner - Massimo Fornalé

(Material management):

*“The majority of the time saved – compared to traditional systems – is related to the digital management of documents such as Order, Order confirmation and...; we are now able to save 1/3 of the day for each of the three employees dedicated, thus exactly a person that could be assigned to more value added activities.”*

**Costa Crociere - Alessandro Monteverde**

**(Supply Chain Systems Project & Delivery Manager):**

*"Invoices payment time significantly decreased, thus, indirectly allowing also the purchases department to benefit from of the platform: now, indeed, it owns a new leverage to be exploited with suppliers in the negotiation phase."*

Moreover, the Extranet solution, allows companies to achieve a higher quality of internal processes. This benefit is mainly perceived by companies that implemented an upstream Web Portal, since the activities related to the pre-transactional phase are more structured and complex compared to the transactional one. To support this aspect, also some companies within the fashion and automotive industry – where Extranets are used for more collaborative and complex aims – recognize this kind of benefit.

**ENI - Lorenzo DeFilippi**

**(ICT Manager):**

*"By digitizing upstream relationships, it has been possible to have more consistency and standardize a so far heterogeneous process, thus creating a faster and more accurate procurement system."*

Although it could seem a benefits more related to internal projects (i.e. Digital Archiving and Digital Management System), Extranet have brought in several cases to an easier availability of documents, available to both the company and all its partners in a digital way, simply through a Web browser. Indeed, depending on the implemented processes, through Web Portals companies can easily have access and availability to transactional past and present data as well as procurement and more collaborative information, technical and project documents etc.

**Hilti - Andrea Ferrero**

**(Head of Logistics):**

*"Thanks to the integration with our carriers through a Web-based platform, we are able to guarantee an easier access and make digitally available to clients all the Delivery Notes and Invoices, as well as share the progress status of the delivery."*

Moreover, some companies perceived an enhanced traceability and control of both internal and Supply Chain processes related to the implementation of the Extranet solution.

**Aeroporti di Roma - Guido Massimo Mannella**

**(Tenders, Purchases and ICT Executive Vice President):**

*"Concerning the account payable, we have developed a solution that allows to improve the traceability giving higher visibility on the process from Order Request to the final Order issuing."*

**Leitner - Massimo Fornalé**  
(Material management):

*"Our Web Portal is well-integrated with the transportation system, thus allowing to have traceability and better control the Order."*

The less perceived benefit is the partner loyalty, which however could result one of the most important from a strategical point of view since it can create competitive advantage. It seems to be more perceived by small-medium customers of companies which has implemented downstream solutions.

**Rhiag - Stefano Corradi**  
(IT manager Italia):

*"The numerous features of our platform as well as the integrated logistic project have increased the loyalty of our customers."*

**Esprinet - Cesare Pedrazzini**  
(CIO):

*"Our portal has created a strong competitive advantage and a deep integration with some customers that have based their logistic structure on the Esprinet one, thus increasing their loyalty."*

## 4.6.2 Criticalities

Going forward toward criticalities, the following categories have been identified:

- Internal change: in the same way of external change, a structured change management program is needed to allow employees better understand the enhanced simplicity and rapidity in accomplishing activities. Indeed, Extranets – but more in general B2b digital solutions – deeply change the way to accomplish daily activities;
- External change: it is related to the need of a structured change management program, since usually partners do not want to carry out activities differently compared to the traditional way;
- Partner competences: it is related to the lack of skills and competences of partners both upstream and downstream. In particular, they are either not enough structured to really exploit the B2b integration, or they initially did not receive the adequate support and guidelines;
- Technology: it is related to the update and maintenance of digital solutions;
- Security: it is related to the security in exchanging information and documents. Indeed, companies exchange digitally “core” data.

Downstream	Internal change	External change	Partner competences (not enough structured)	Technology (update, maintenance, etc.)	Security
BCUBE		✓	✓		
BioNike	✓				
Esprinet				✓	
GoodYear Dunlop	✓	✓			
Intersport Cisalfa					
Patrizia Pepe	✓				
Rhiag			✓		
Unico			✓		
<b>Upstream</b>					
Aeroporti di Roma			✓		
Artsana	✓	✓		✓	
Autogrill	✓		✓		
Bayer	✓				
BTicino			✓		✓
Costa Crociere	✓				
Ermenegildo Zegna		✓			
ENI	✓				
Hera		✓			
Leitner		✓			
Maire Technimont					
Moncler		✓			
SACBO			✓		
Sky	✓	✓			
Tod's	✓				
<b>Both</b>					
Bolton	✓	✓			
Chiesi Farmaceutici					
Dolce e Gabbana			✓		
Gruppo PAM			✓		
Hilti	✓		✓		
Italtel	✓	✓			
Liu Jo	✓	✓			
Metalsistem Sardegna					
OTB					

Table 48: Criticalities of Extranets

The main element brought by interviewed companies, is related to the change management both from an internal and external point of view. In particular, almost the 50% of companies identified difficulties in letting employees understand the benefits of digital solutions, since they were used to accomplish daily activities in a traditional way. Thus a general lack of digital mindset caused the main problem in the implementation of digital solutions (Extranet above all).

**Artsana - Luigi Binelli**  
(Head of Planning and CRM):

*"The main internal problem found out during project implementation is linked to cultural barriers against digitalization, especially from salesmen that have to work with this solution every day. In order to overcome these resistances, we have created a Change Management team that has trained people and that nowadays is still organizing periodical refresher courses."*

**Hilti - Andrea Ferrero**  
(Head of Logistics):

*"Hilti is investing a lot in B2b digital solutions because we think it could bring to a great competitive advantage. Nevertheless, it is needed to go beyond some barriers and cultural inertias, both within the company and related to external relationships with some partners, less inclined toward the change."*

Furthermore, a well-diffused criticality is related to the competences of partners, that usually are not well structured to welcome Extranets integrating them with other Supply Chain companies.

**Italtel - Sergio Giuseppe Lazzaroni**  
(CIO):

*"There are also some small-medium companies – family businesses as well – with which is very difficult to collaborate in a digital way because not enough structured to support this kind of relationship."*

Moreover, Esprinet (14) and Artsana (2), see in the technology development not only a way to gain a competitive advantage, being able to offer higher service level to partners, but also an important criticality.

**Esprinet - Cesare Pedrazzini**  
(CIO):

*"A continuous renovation, to follow the technological innovation and development (e.g. responsive Websites) is usually costly and not easy, in particular with an Extranet complex and structured."*

**Artsana - Luigi Binelli**  
(Head of Planning and CRM):

*"There is a problem with the Software on which we work; every time Operating Systems upgraded, could happen that there was not perfect compatibility, thus, with some malfunctioning."*

Finally, although it is the only interviewed company which has brought this kind of difficulty, BTicino (8) has faced security problems; since it is an intrinsic criticality related to the Internet, and thus to Extranet, it is interesting to report it.

**BTicino - Giovanni Rosina**  
(ICT director):

*"Technical data exchanged through our Web Portal, are usually sensitive, for this reason an external disclosure of such information could be very dangerous."*

## 4.7 Conclusions

From the census analysis it emerges that there are no industries with a particular peak of concentration of Extranet, since they seem to be quite homogeneously divided across different businesses. This aspect, does not mean that industries do not affect the functionalities of Extranet – which could be different depending on the particular requirement of sectors – but simply that Web-based solution are used in different context without a particular preference.

Furthermore, some business sectors strongly affect the goal and functionalities as well as the supported processes of the implemented solution. In particular, all the analyzed Fashion & Clothing as well as downstream oriented Automotive companies have implemented Web Portals aiming at supporting collaborative processes. Hence, it is possible to conclude that such kind of collaborative relationships depend on context in which the company operates.

Coherently, in other sectors it is not possible to extend the Web-based solution beyond pre-transactional features. That is the case of companies working on commission which are not able to have production plan and consequently a purchasing ones; moreover, the majority of purchasing relationships are spot and does not worth it establishing digital connection for manage them.

Another interesting aspect that emerged out from this work is that Extranets can be used to support the long tail integration. It means than thanks to their flexibility and low adoption barriers, Web Portals are used to integrate small-medium actors which are not integrated with other technologies such as EDI, since the latter require high technological and structural skills which are owned only by few actors. This message is supported by a lot of data, such as the amount of involved small-medium actors of Extranets compared to EDI (more than 90,000 versus 10,000) (Bertelé et al., 2016). Secondly, several testimonies have been collected about company which strategically use Web Portals to deal whit some specific partners that otherwise would not be involved because of their limited resources and digital skills.

Going forward, toward benefits and criticalities, it is possible to point out that the main benefits provided by Extranets are an increase of efficiency and effectiveness, both concerning internal activities and the external relationships with partners, as well as a saving of the time previously dedicated to non-value added activities. Almost all the companies which as implemented an Extranet, achieved considerable benefits in term of effectiveness and service level (100% of companies) as well as efficiency (72%) both internal and in term of relationships with partners. Furthermore, companies perceived a remarkable level of time saving (expressed by the 72% of companies), previously dedicated to non-value added activities.

Coherently, the most important criticality companies perceived in implementing a Web-based solution is the resistance toward change, both from an internal and external point of view, which is mainly due to difficulties in letting employees and supply chain partners understand the real benefits of digital solutions. Hence, it is especially related to the mindset of people. In particular, almost the 50% of companies identified difficulties in letting employees understand the benefits of digital solutions, since they were used to accomplish daily activities in a traditional way. The same situation happens with upstream and downstream partners which make resistance since they do not completely understand the advantages that the digital integration could bring to both involved parties.



## References

- Agi, M., Ballot, E. and Molet, H. (2005). "100% EDI-connected suppliers" projects: An empirical investigation of success factors. *Journal of Purchasing and Supply Management*, 11(2-3), pp.107-115.
- Anand, K. and Mendelson, H. (1997). Information and Organization for Horizontal Multimarket Coordination. *Management Science*, 43(12), pp.1609-1627.
- Anandarajan, M., Anandarajan, A. and Wen, H. (1998). Extranets: a tool for cost control in a value chain framework. *Industrial Management & Data Systems*, 98(3), pp.120-128.
- Anderson, D. and Lee, H. (1999). Synchronised Supply Chains: the new frontier. Achieving Supply Chain Excellence Through Technology, *Montgomery Research Inc, San Francisco, CA*, pp.112-121.
- Andraski, J. (1994). Foundations for Successful Continuous Replenishment Programs *International Journal Logistics Management*, 5(1), pp.1-8.
- Angeles, R. (2000). Revisiting the role of Internet-EDI in the current electronic commerce scene. *Logistics Information Management*, 13(1), pp.45-57.
- Angeles, R. (2001). Creating a digital marketplace presence: lessons in extranet implementation. *Internet Research*, 11(2), pp.167-184.
- Angeles, R., Corritore, C., Basu, S. and Nath, R. (2001). Success factors for domestic and international electronic data interchange (EDI) implementation for US firms. *International Journal of Information Management*, 21(5), pp.329-347.
- Alor-Hernández, G., Sánchez-Ramírez, C., Cortes-Robles, G., Rodríguez-González, A., García-Alcaráz, J. and Cedillo-Campos, M. (2014). BROSEMWEB: A brokerage service for e-Procurement using Semantic Web Technologies. *Computers in Industry*, 65(5), pp.828-840.
- Alvarez-Rodríguez, J., Labra-Gayo, J. and de Pablos, P. (2014). New trends on e-Procurement applying semantic technologies: Current status and future challenges. *Computers in Industry*, 65(5), pp.800-820.
- Angeles, R. and Nath, R. (2007). Business-to-business e-procurement: success factors and challenges to implementation. *Supply Chain Management: An International Journal*, 12(2), pp.104-115.
- Auramo, J., Aminoff, A. and Punakivi, M. (2002). Research agenda for e-business logistics based on professional opinions. *International Journal of Physical Distribution & Logistics Management*, 32(7), pp.513-531.

- Bak, O. (2016). Investigating Organizational Transformation in Automotive Supply Chains: A Case Study on B2B and Extranet. *Strategic Change*, 25(3), pp.299-314.
- Balocco, R., Perego, A. and Perotti, S. (2010). B2b eMarketplaces. *Industrial Management & Data Systems*, 110(8), pp.1117-1137.
- Batenburg, R. (2007). E-procurement adoption by European firms: A quantitative analysis. *Journal of Purchasing and Supply Management*, 13(3), pp.182-192.
- Bayraktar, E., Lenny Koh, S., Gunasekaran, A., Sari, K. and Tatoglu, E. (2008). The role of forecasting on bullwhip effect for E-SCM applications. *International Journal of Production Economics*, 113(1), pp.193-204.
- Barratt, M. and Oliveira, A. (2001). Exploring the experiences of collaborative planning initiatives. *International Journal of Physical Distribution & Logistics Management*, 31(4), pp.266-289.
- Becker, S. (1999). Internet Supply Chain management. *Electronic News*, 45(33), p.48.
- Bertelé U., Perego, A., Rangone, A., Mainetti, S. and Catti, P. (2004). Il B2B in Italia: Finalmente parlano i dati.
- Bertelé U., Perego, A., Rangone, A., Mainetti, S. and Catti, P. (2005). eProcurement, eSupply Chain: una scelta tattica o strategica?.
- Bertelé U., Perego, A., Rangone, A. and Catti, P. (2008). La fatturazione elettronica come “chiave di volta” nella collaborazione tra imprese, banche e PA.
- Bertelé U., Perego, A., Rangone, A. and Catti, P. (2009). Fare sistema: il vero motore della Fatturazione Elettronica.
- Bertelé U., Perego, A., Rangone, A. and Catti, P. (2011). Oltre la Fattura.
- Bertelé U., Perego, A., Rangone, A. and Catti, P. (2016). Trasformazione Digitale: B2b... or not to be.
- Blatherwick, A. (1998). Vendor-managed inventory: fashion fad or important Supply Chain strategy?. *Supply Chain Management: An International Journal*, 3(1), pp.10-11.
- Boyle, B. and Alwitt, L. (1999). Internet Use within the U.S. Plastics Industry. *Industrial Marketing Management*, 28(4), pp.327-341.
- Cachon, G. and Fisher, M. (2009). Campbell soup's continuous replenishment program: evaluation and enhanced inventory decision rules. *Production and Operations Management*, 6(3), pp.266-276.

- Cagliano, R., Caniato, F. and Spina, G. (2003). E-business strategy. *International Journal of Operation & Production Management*, 23(10), pp.1142-1162.
- Cai, S., Jun, M. and Yang, Z. (2006). The Impact of Interorganizational Internet Communication on Purchasing Performance: A Study of Chinese Manufacturing Firms. *The Journal of Supply Chain Management*, 42(3), pp.16-29.
- Caniato, F., Cagliano, R., Kalchschmidt, M., Golini, R. and Spina, G. (2009). Evolutionary patterns in e-business strategy. *International Journal of Operation & Production Management*, 29(9), pp.921-945.
- Caniato, F., Golini, R., Luzzini, D. and Ronchi, S. (2010). Towards full integration: eProcurement implementation stages. *Benchmarking: An International Journal*, 17(4), pp.491-515.
- Capgemini Consulting and GT Nexus, 2016. The Current and Future State of Digital Supply Chain Transformation.
- Chandrashekar, A. and Schary, P. (1999). Toward the Virtual Supply Chain: The Convergence of IT and Organization. *International Journal Logistics Management*, 10(2), pp.27-40.
- Chen, J. and Ching, R. (2002). A proposed framework for transitioning to an e-business model. *Quarterly Journal of Electronic Commerce*, 3, pp.375-389.
- Chen, L. and Holsapple, C. (2012). E-business adoption research: Analysis and structure. *AMCIS 2012 Proceedings*, (21), pp.1-9.
- Chen-Ritzo, C., Harrison, T., Kwasnica, A. and Thomas, D. (2005). Better, Faster, Cheaper: An Experimental Analysis of a Multiattribute Reverse Auction Mechanism with Restricted Information Feedback. *Management Science*, 51(12), pp.1753-1762.
- Chinying Lang, J. (2004). Social context and social capital as enablers of knowledge integration. *Journal of Knowledge Management*, 8(3), pp.89-105.
- Chong, A., Ooi, K. and Sohal, A. (2009). The relationship between Supply Chain factors and adoption of e-Collaboration tools: An empirical examination. *International Journal of Production Economics*, 122(1), pp.150-160.
- Chou, D., Tan, X. and Yen, D. (2004). Web technology and Supply Chain management. *Information Management & Computer Security*, 12(4), pp.338-349.
- Chung, W., Ko, C., Cheung, E. and Wong, T. (2007). IT-enhanced order and delivery process of a fast moving consumer goods (FMCG) company. *Benchmarking: An International Journal*, 14(1), pp.123-139.

- Christopher, M. (1999). Logistics and Supply Chain Management: Strategies for Reducing Cost and Improving Service (Second Edition). *International Journal of Logistics Research and Applications*, 2(1), pp.103-104.
- Clark, T. and Hammond, J. (2009). Reengineering channel reordering processes to improve total supply-chain performance. *Production and Operations Management*, 6(3), pp.248-265.
- Cooper, M., Lambert, D. and Pagh, J. (1997). Supply Chain Management: More Than a New Name for Logistics. *International Journal Logistics Management*, 8(1), pp.1-14.
- Croom, S. (2005). The impact of e-business on Supply Chain management. *International Journal of Operations & Production Management*, 25(1), pp.55-73.
- Cucchiella, F., Fratocchi, L., Pelagagge, P. and Scacchia, F. (2002). Analysis of Factors Affecting E-Supply Chain Performances. *Journal of International Technology and Information Management*, 11(2), pp.51-62.
- Dai, Q. and Kauffman, R. (2006). To be or not to B2B: Evaluating managerial choices for e-procurement channel adoption. *Information Technology and Management*, 7(2), pp.109-130.
- Davila, T., Gupta, M. and Palmer, R. (n.d.). Moving Procurement Systems to the Internet: The Adoption and Use of E-Procurement Technology Models. *SSRN Electronic Journal*.
- De Boer, L., Harink, J. and Heijboer, G. (2002). A conceptual model for assessing the impact of electronic procurement. *European Journal of Purchasing & Supply Management*, 8(1), pp.25-33.
- Dearing, B. (1990). The Strategic Benefits of EDI. *Journal of Business Strategy*, 11(1), pp.4-6.
- Deeter-Schmelz, D., Bizzari, A., Graham, R. and Howdyshell, C. (2001). Business-to-Business Online Purchasing: Suppliers' Impact on Buyers' Adoption and Usage Intent. *The Journal of Supply Chain Management*, 37(1), pp.4-10.
- Disney, S. and Towill, D. (2003). The effect of vendor managed inventory (VMI) dynamics on the Bullwhip Effect in Supply Chains. *International Journal of Production Economics*, 85(2), pp.199-215.
- Drozdowski, T. (1986), At BOC They Start with the Product, *Purchasing*, pp. 62B5-11.
- Eadie, R. (2007). Drivers and barriers to public sector e-procurement within Northern Ireland's construction industry. *Electronic Journal of Information Technology in Construction*, 12, p.103.
- Ellram, L. and Cooper, M. (1990). Supply Chain Management, Partnership, and the Shipper - Third Party Relationship. *International Journal Logistics Management*, 1(2), pp.1-10.

- Elmaghraby, W. (2009). Auctions within E-Sourcing Events. *Production and Operations Management*, 16(4), pp.409-422.
- Essig, M. and Arnold, U. (2001). Electronic Procurement in Supply Chain Management: An Information Economics-Based Analysis of Electronic Markets. *The Journal of Supply Chain Management*, 37(4), pp.43-49.
- Farhoomand, A. (2005). Managing (e)business transformation. *Houndmills, Basingstoke, England: Palgrave Macmillan*.
- Fawcett, S., Ellram, L. and Ogden, J. (2007). Supply Chain management. Upper Saddle River, NJ: *Pearson Prentice Hall*.
- Fawcett, S., Magnan, G. and McCarter, M. (2008). Benefits, barriers, and bridges to effective Supply Chain management. *Supply Chain Management: An International Journal*, 13(1), pp.35-48.
- Fink, D. (2006). Value decomposition of e-commerce performance. *Benchmarking: An International Journal*, 13(1/2), pp.81-92.
- Fliedner, G. (2003). CPFR: an emerging Supply Chain tool. *Industrial Management & Data Systems*, 103(1), pp.14-21.
- Foster, T. (2007). Into the depths of the I-E-I framework: using the internet to create value in supply-chain relationships. *Supply Chain Management: An International Journal*, 12(2), pp.96-103.
- Frohlich, M. and Westbrook, R. (2001). Arcs of integration: an international study of Supply Chain strategies. *Journal of Operations Management*, 19(2), pp.185-200.
- Fu, S., Chung, J., Dietrich, W., Gottemukkala, V., Cohen, M. and Chen, S. (1999). A Practical Approach to Web-Based Internet EDI. *IBM IAC, T. J. Watson Research Center*.
- Garrido, M., Gutiérrez, A. and San José, R. (2008). Organizational and economic consequences of business e-procurement intensity. *Technovation*, 28(9), pp.615-629.
- Glenn Richey, R., Tokman, M. and Dalela, V. (2009). Examining collaborative Supply Chain service technologies: a study of intensity, relationships, and resources. *J. of the Acad. Mark. Sci.*, 38(1), pp.71-89.
- Grey W., Katircioglu K., Shi D., Bagchi S., Gallego G., Adelhelm M., Seybold D., Stefanis S. (2005), "Beyond ROI", *Supply Chain Management On Demand*, 1-16
- Gryna, F. and Juran, J. (2001). Quality planning and analysis. Boston: *McGraw-Hill*. Chapter 15.
- Gunasekaran, A. and Ngai, E. (2004). Information systems in Supply Chain integration and management. *European Journal of Operational Research*, 159(2), pp.269-295.

- Gunasekaran, A. and Ngai, E. (2008). Adoption of e-procurement in Hong Kong: An empirical research. *International Journal of Production Economics*, 113(1), pp.159-175.
- Hammer, M. (1990). Reengineering work: don't automate, obliterate. *Harvard Business Review*, 68(4), pp.104-113.
- Harrigan, P., Boyd, M., Ramsey, E., Ibbotson, P. and Bright, M. (2008). The development of e-procurement within the ICT manufacturing industry in Ireland. *Management Decision*, 46(3), pp.481-500.
- Heikkilä, J. and Cordon, C. (2002). Outsourcing: a core or non-core strategic management decision?. *Strategic Change*, 11(4), pp.183-193.
- Henriksen, H. and Mahnke, V. (2005). Drivers and barriers to public sector e-procurement within Northern Ireland's construction industry. *Scandinavian Journal of Information Systems*, 17(2), pp.85-106.
- Hidayanto, A., Ditari, Y. and Chahyati, D. (2012). Study of e-Procurement Implementation Impacts: A Case Study in PT. PLN. *IEEE 6th International Conference on Management of Innovation and Technology*.
- Holweg, M., Stephen Disney, S., Holmström, J. and Småros, J. (2005). Supply Chain Collaboration: Making Sense of the Strategy Continuum. *European Management Journal*, 23(2), pp.170-181.
- Hong, P., Tran, O. and Park, K. (2010). Electronic commerce applications for Supply Chain integration and competitive capabilities. *Benchmarking: An International Journal*, 17(4), pp.539-560.
- Houlihan, J. (1988). International Supply Chains: A New Approach. *Management Decision*, 26(3), pp.13-19.
- Hult, G., Ketchen, D. and Slater, S. (2004). Information processing, knowledge development, and strategic Supply Chain performance. *Academy of Management Journal*, 47(2), pp.241-253.
- Ireland, R. and Webb, J. (2007). A multi-theoretic perspective on trust and power in strategic Supply Chains. *Journal of Operations Management*, 25(2), pp.482-497.
- Iskandar, B., Kurokawa, S. and LeBlanc, L. (2001). Business-to-business electronic commerce from first- and second-tier automotive suppliers' perspectives: a preliminary analysis for hypotheses generation. *Technovation*, 21(11), pp.719-731.
- Iyer, K., Germain, R. and Claycomb, C. (2009). B2B e-commerce Supply Chain integration and performance: A contingency fit perspective on the role of environment. *Information & Management*, 46(6), pp.313-322.



- Jiménez-Martínez, J. and Polo-Redondo, Y. (2004). The influence of EDI adoption over its perceived benefits. *Technovation*, 24(1), pp.73-79.
- Jones, T. and Riley, D. (1985). Using Inventory for Competitive Advantage through Supply Chain Management. *International Journal of Physical Distribution & Materials Management*, 15(5), pp.16-26.
- José Garrido-Samaniego, M., María Gutiérrez-Arranz, A. and San José-Cabezudo, R. (2010). Assessing the impact of e-procurement on the structure of the buying centre. *International Journal of Information Management*, 30(2), pp.135-143.
- Juzhi Zhang, Erfeng Zhou, Qinglong and Susan Li, (2014). "Encyclopedia of Business Analytics and Optimization" Chapter 133: *Marketing Decisions with Reference Price Effect* (pages 1476-1485).
- Kaipia, R., Holmström, J. and Tanskanen, K. (2002). VMI: What are you losing if you let your customer place orders?. *Production Planning & Control*, 13(1), pp.17-25.
- Kallioranta, S. and Vlosky, R. (2004). A Model of Extranet Implementation Success Effects on Business Performance. *Louisiana Forest Products Development Center Working Paper*, (66), pp.2-20.
- Kauffmann, R. and Mohtadi, H. (2004). Proprietary and open systems adoption in e-procurement: a risk-augmented transaction cost perspective. *Journal of Management Information Systems*, 21(1), pp.137-166.
- Kim, J. and Shunk, D. (2004). Matching indirect procurement process with different B2B e-procurement systems. *Computers in Industry*, 53(2), pp.153-164.
- Koh, S., Gunasekaran, A. and Rajkumar, D. (2008). ERP II: The involvement, benefits and impediments of collaborative information sharing. *International Journal of Production Economics*, 113(1), pp.245-268.
- Koppius, O. and Heck, E. (2003). Information Architecture and Electronic Market Performance in Multidimensional Auctions. *Working paper, Erasmus University of Rotterdam*.
- Kulp, S., Lee, H. and Ofek, E. (2004). Manufacturer Benefits from Information Integration with Retail Customers. *Management Science*, 50(4), pp.431-444.
- La Londe, B. (2002). Who can you trust these days?. *Supply Chain Management Review*, p.11.
- La Londe, B. and Masters, J. (1994). Emerging Logistics Strategies. *International Journal of Physical Distribution & Logistics Management*, 24(7), pp.35-47.
- Lambert, Douglas, M., Stock, J. R., & Ellram, L. M. (1998). *Foundamental of Logistics Management*. Boston: Irwin/McGraw-Hill.

- Lancioni, R., Schau, H. and Smith, M. (2003). Internet impacts on Supply Chain management. *Industrial Marketing Management*, 32(3), pp.173-175.
- Lancioni, R., Smith, M. and Oliva, T. (2000). The Role of the Internet in Supply Chain Management. *Industrial Marketing Management*, 29(1), pp.45-56.
- Lankford, W. (2004). Supply Chain management and the Internet. *Online Information Review*, 28(4), pp.301-305.
- Laukkanen, S., Sarpola, S. and Kemppainen, K. (2007). Dual role of extranet portals in buyer-supplier information exchange. *Business Process Management Journal*, 13(4), pp.503-521.
- Le Blanc, H., van Krieken, M., Fleuren, H. and Krikke, H. (n.d.). Collector Managed Inventory, a Proactive Planning Approach to the Collection of Liquids Coming from End-of-Life Vehicles. *SSRN Electronic Journal*.
- Lee, H., Padmanabhan, V. and Whang, S. (1997). Information Distortion in a Supply Chain: The Bullwhip Effect. *Management Science*, 43(4), pp.546-558.
- Leonard, L. and Clemons Davis, C. (2006). Supply Chain replenishment: before-and-after EDI implementation. *Supply Chain Management: An International Journal*, 11(3), pp.225-232.
- Li, L. (2002). Information Sharing in a Supply Chain with Horizontal Competition. *Management Science*, 48(9), pp.1196-1212.
- Ling, R. and Yen, D. (2001). Extranets: a new wave of Internet. *SAM Advanced Management Journal*, p.39.
- Lee, H. and Whang, S. (2000). Information sharing in a Supply Chain. *Information sharing in a Supply Chain*, 20(3/4), pp.1-15.
- Lee, H. and Whang, S. (2001). E-Business and Supply Chain Integration. *Stanford Global Supply Chain Management Forum*, pp.1-20.
- Lutz, D., Liang, Y. and Neinert, S. (2010). A Framework for Dynamic and Reliable E-Procurement. *IEEE International Conference on E-Business Engineering*.
- Mackay, D. and Rosier, M. (1996). Measuring organizational benefits of EDI diffusion. *International Journal of Physical Distribution & Logistics Management*, 26(10), pp.60-78.
- Macneil, I. (1981). MaEconomic Analysis of contractual relations: its shortfalls and the need for a rich classificatory apparatusneil. *Northwestern University Law Review*, 75(1), pp.1018-1063.



- Mahesh S. Raisinghani, 2009. "Encyclopedia of Information Communication Technology". Chapter 69: *Leveraging Supply Chain Management in the Digital Economy* (pages 526-531)
- Maier, P. (2000). Ensuring Extranet Security and Performance. *Information Systems Management*, 17(2), pp.29-36.
- Mainardi, C.R.; Salva, M.; and Sanderson, M, (1999). Label of origin: Made on earth. *Strategy and business*, pp.42-53.
- Malone, T. (1987). Modeling Coordination in Organizations and Markets. *Management Science*, 33(10), pp.1317-1332.
- Matopoulos, A., Vlachopoulou, M., Manthou, V. and Manos, B. (2007). A conceptual framework for Supply Chain collaboration: empirical evidence from the agri-food industry. *Supply Chain Management: An International Journal*, 12(3), pp.177-186.
- McGaughey, R. (2002). Benchmarking business-to-business electronic commerce. *Benchmarking: An International Journal*, 9(5), pp.471-484.
- McIvor, R. and Humphreys, P. (2004). The implications of electronic B2B intermediaries for the buyer-supplier interface. *International Journal of Op & Prod Management*, 24(3), pp.241-269.
- McLaren, T., Head, M. and Yuan, Y. (2002). Supply Chain collaboration alternatives: understanding the expected costs and benefits. *Internet Research*, 12(4), pp.348-364.
- McLaren, T., Head, M. and Yuan, Y. (2004). Costs and Benefits in Supply Chain Collaboration. *Idea Group Inc.*, pp.259-284.
- Mentzer, J., DeWitt, W., Keebler, J., Min, S., Nix, N., Smith, C. and Zacharia, Z. (2001). Defining Supply Chain management. *Journal of Business Logistics*, 22(2), pp.1-25.
- Mentzer, J., Fonghin, J. and Golicic, S. (2000). Supply Chain collaboration: enablers, impediments and benefits. *Supply Chain Management Review*, 4, pp.52-80.
- Metz, P. (1998), "Demystifying Supply Chain management", *Supply Chain management review*, v. 1, no. 4 (winter 1998), p. 46-55
- Michelino, F., Bianco, F. and Caputo, M. (2008). Internet and Supply Chain management: adoption modalities for Italian firms. *Management Research News*, 31(5), pp.359-374.
- Morgan, D. (2004). Deploying extranets?. *Network Security*, 2004(12), pp.12-14.
- Monczka, R., Trent, R. and Handfield, R. (2002). *Purchasing and Supply Chain management*. Cincinnati, Ohio: South-Western College Pub. Chapter 8.

- Muchstadt, J., Murray, D., Rappold, J. and Collins, D. (2001). Guidelines for collaborative Supply Chain system design and operation. *Information System Frontiers*, 13(1), pp.15-30.
- Narayanan, S., Marucheck, A. and Handfield, R. (2009). Electronic Data Interchange: Research Review and Future Directions. *Decision Sciences*, 40(1), pp.121-163.
- Nelli, R. (2004). Le strategie Internet-based delle aziende italiane. Caratteri fondamentali e modalita  evolutive. *Milano: Vita e Pensiero*.
- Nurmilaakso, J. (2008). Adoption of e-business functions and migration from EDI-based to XML-based e-business frameworks in Supply Chain integration. *International Journal of Production Economics*, 113(2), pp.721-733.
- Nurmilaakso, J. (2009). ICT solutions and labor productivity: evidence from firm-level data. *Electronic Commerce Research*, 9(3), pp.173-181.
- Overby, J. and Min, S. (2001). International Supply Chain management in an Internet environment. *International Marketing Review*, 18(4), pp.392-420.
- Vasudeva, P. K. (2011): "International Trade: Text and Cases". *First edition, New Delhi*.
- Palma-Mendoza, J. (2014). Analytical hierarchy process and SCOR model to support supply chain re-design. *International Journal of Information Management*, 34(5), pp.634-638.
- Park, S. and Ungson, G. (2001). Interfirm Rivalry and Managerial Complexity: A Conceptual Framework of Alliance Failure. *Organization Science*, 12(1), pp.37-53.
- Pawar, K. and Driva, H. (2000). Electronic trading in the Supply Chain: a holistic implementation framework. *Logistics Information Management*, 13(1), pp.21-32.
- Perego, A. and Marazzi, D. (2010). Benefits of inter-company b2b trade process integration: the super-additional rule. *Department of Management, Economics and Industrial Engineering of Politecnico di Milano*.
- Pol Antr s and Elhanan Helpman, (2004): "Global Sourcing" *Journal of Political Economy*, Vol. 112, No. 3, pp. 552-580
- Porter, M. (2001). Strategy and the Internet. *Harvard Business Review*, 79(3), pp.63-78.
- Power, D. (2002). Application of established and emerging B2B e-commerce technologies: Australian empirical evidence. *Integrated Manufacturing Systems*, 13(8), pp.573-585.
- S. Sohal, A., Moss, S. and Ng, L. (2001). Comparing IT success in manufacturing and service industries. *International Journal of Operation & Production Management*, 21(1/2), pp.30-45.

- Puschmann, T. and Alt, R. (2005). Successful use of e-procurement in Supply Chains. *Supply Chain Management: An International Journal*, 10(2), pp.122-133.
- Ranganathan, C., Teo, T. and Dhaliwal, J. (2011). Web-enabled Supply Chain management: Key antecedents and performance impacts. *International Journal of Information Management*, 31(6), pp.533-545.
- Rangone, A. and Balocco, R. (2002). Le Applicazioni B2b e il ruolo degli e-marketplace. *Mondo digitale*, 3.
- Rangone, A., Perego, A., Catti, P. and Mangiaracina, R. (2004). I modelli Extranet. *Una ricerca dell'osservatorio b2b della school of management del politecnico di milano*, (2), pp.12-13.
- Ratnasingam, P. (2000). The influence of power on trading partner trust in electronic commerce. *Internet Research*, 10(1), pp.56-63.
- Riggins, F. and Rhee, H. (1998). Toward a unified view of electronic commerce. *Communications of the ACM*, 41(10), pp.88-95.
- Roberts, B. and Mackay, M. (1998). IT supporting supplier relationships: The role of electronic commerce. *European Journal of Purchasing & Supply Management*, 4(2-3), pp.175-184.
- Ronchi, S. (2003). The effects of the internet adoption in customer-supplier relationships. *Continuous Innovation Network*.
- Sanders, N. and Premus, R. (2002). IT applications in Supply Chain organizations: a link between competitive priorities and organizational benefits. *Journal of Business Logistics*, 23(1), pp.65-83.
- S. Sohal, A., Moss, S. and Ng, L. (2001). Comparing IT success in manufacturing and service industries. *International Journal of Operation & Production Management*, 21(1/2), pp.30-45.
- Sahay, B. and Gupta, A. (2003). Development of software selection criteria for Supply Chain solutions. *Industrial Management & Data Systems*, 103(2), pp.97-110.
- Sanders, N. and Premus, R. (2002). IT applications in Supply Chain organizations: a link between competitive priorities and organizational benefits. *Journal of Business Logistics*, 23(1), pp.65-83.
- Shah, R. and Shin, H. (2007). Relationships among information technology, inventory, and profitability: An investigation of level invariance using sector level data. *Journal of Operations Management*, 25(4), pp.768-784.
- Shang, R., Chen, C. and Liu, Y. (2005). Internet EDI Adoption Factors: Power, Trust and Vision. *ACM*, pp.101-108.
- Sheridan, John, H. and Leibs, S. (1999). Managing the Chain. *Industry Week/IW*, 248(16), p.50.

- Shin, K. and Leem, C. (2002). A reference system for internet based inter-enterprise electronic commerce. *Journal of Systems and Software*, 60(3), pp.195-209.
- Simatupang, T. and Sridharan, R. (2003). The collaborative Supply Chain. *International Journal of Logistics Management*, 13(1), pp.15-30.
- Simchi-Levi, D., Kaminsky, P. and Simchi-Levi, E. (2008). Designing and managing the Supply Chain. Boston: McGraw-Hill/Irwin.
- Småros, J., Lehtonen, J., Appelqvist, P. and Holmström, J. (2003). The impact of increasing demand visibility on production and inventory control efficiency. *International Journal of Physical Distribution & Logistics Management*, 33(4), pp.336-354.
- Soliman, K. and Janz, B. (2004). An exploratory study to identify the critical factors affecting the decision to establish Internet-based interorganizational information systems. *Information & Management*, 41(6), pp.697-706.
- Spina, G. (2007). La gestione dell'impresa. 2nd ed. Milano: ETAS.
- Spralls, S., Hunt, S. and Wilcox, J. (2011). Extranet Use and Building Relationship Capital in Interfirm Distribution Networks: The Role of Extranet Capability. *Journal of Retailing*, 87(1), pp.59-74.
- Stank, T., Daugherty, P. and Ellinger, A. (1999). Marketing/Logistics Integration and Firm Performance. *International Journal Logistics Management*, 10(1), pp.11-24.
- Stevens; Graham, C. (1989), "Integrating the Supply Chains," *International Journal of Physical Distribution and Materials Management*, Vol. 8, No. 8, pp. 3-8.
- Sun, S., Zhao, J. and Wang, H. (2012). An agent based approach for exception handling in e-procurement management. *Expert Systems with Applications*, 39(1), pp.1174-1182.
- Tan, G., Shaw, M. and Fulkerson, B. (2000). Web-based Supply Chain Management. *Information Systems Frontiers*, 2(1), pp.41-55.
- Tatsis, V., Mena, C., Van Wassenhove, L. and Whicker, L. (2006). E-procurement in the Greek food and drink industry: Drivers and impediments. *Journal of Purchasing and Supply Management*, 12(2), pp.63-74.
- Teich, J., Wallenius, H., Wallenius, J. and Koppius, O. (2004). Emerging multiple issue e-auctions. *European Journal of Operational Research*, 159(1), pp.1-16.
- Turban, E., King, D., Lee, J., Liang, T.-P., & Turban, D. (2011). Electronic commerce a managerial and social perspective 2012. New Jersey: Pearson-Prentice Hall.

- Verma, D. (2002). Simplifying network administration using policy-based management. *IEEE Network*, 16(2), pp.20-26.
- Vlosky, R., Fontenot, R. and Blalock, L. (2000). Extranets: impacts on business practices and relationships. *Journal of Business & Industrial Marketing*, 15(6), pp.438-457.
- Walker, H. and Harland, C. (2008). E-procurement in the United Nations: influences, issues and impact. *International Journal of Operation & Production Management*, 28(9), pp.831-857.
- Waller, M., Johnson, M. and Davis, T. (1999). Vendor-managed inventory in the retail Supply Chain. *Journal of Business Logistics*, 20(1), pp.183-203.
- Walton, S. and Maruchek, A. (1997). The Relationship Between EDI and Supplier Reliability. *International Journal of Purchasing and Materials Management*, 33(2), pp.30-35.
- Watson, R. and McKeown, P. (1999). Manheim Auctions: Transforming Interorganizational Relationships with an Extranet. *International Journal of Electronic Commerce*, 3(4), pp.29-46.
- Weitzel, T., Buxmann, P. and Westarp, F. (2000). A Communication Architecture for the Digital Economy 21st century EDI. *IEEE network*, pp.1-8.
- Wiengarten, F., Humphreys, P., McKittrick, A. and Fynes, B. (2013). Investigating the impact of e-business applications on Supply Chain collaboration in the German automotive industry. *International Journal of Op & Prod Management*, 33(1), pp.25-48.
- Whipple, J. and Russell, D. (2007). Building Supply Chain collaboration: a typology of collaborative approaches. *International Journal Logistics Management*, 18(2), pp.174-196.
- Wu, F., Zsidisin, G. and Ross, A. (2007). Antecedents and Outcomes of E-Procurement Adoption: An Integrative Model. *IEEE Transactions on Engineering Management*, 54(3), pp.576-587.
- Yen, D. and Chou, D. (1999). Extranet: Current developments and future analyses. *The Journal of Computer Information Systems*, 40(2), pp.46-53.