Extranet or the Too-little-known Linchpin of Globalization

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Abstract

Little known outside of Intranet, the Extranet has grown from a simple entry point into a virtual territory where organizations collaborate, trade, handle exclusively their business partners, and ensure that any confidential content remain private. Since the Extranet has eliminated distance and time, it has become one major instrument of globalization, making most of its definitions obsolete in view of the strategic management roles it plays nowadays. Considering the main strategic platforms supported by Extranet, be it e-commerce, collaboration, protection of intangible assets and value constellations, this article suggests that a more accurate definition of Extranet be used; one that reflects the fact that over the past decade it has carved its own identity and its own role - well differentiated from the Intranet. An adaptation of Frohlich and Westbrook's (2001) theoretical framework "Arcs of Integration" is then suggested as further quantitative analysis of the measurement of the impact of the Extranet on a company's performance.

Key words: *Extranet, Intranet, web server, EDI, security, collaboration, integration, supply chain, CRM, value chain, value constellations*

Introduction

Three recent searches on Google[2] by the author, using three single keywords, 'Internet', 'Intranet' and 'Extranet,' respectively, produced the following numbers: Internet 1,550,000,000 results; Intranet: 49,500,000; and Extranet: 9,940,000.

While the one-billion-and-a-half results generated by the Internet search hardly come as a surprise, the low score of the Extranet as compared to the Intranet (almost 5 times less) is intriguing. Granted, the Intranet is a pre-requisite – and to some extent, an entry point - to the Extranet. Still, over the years, the Extranet has evolved into something much more significant than a gateway to the Intranet. It has now become the workhorse of business collaboration, literally connecting hundreds of millions of organizations together as well as their customers, suppliers, and all their other partners all over the world; a major change ushering a new era in the networking of our global economy, yet one which those searches failed to acknowledge.

This article aims to demonstrate that the Extranet has become a strategic tool for management and can now be considered one of the main pillars of globalization; which begs the question of what is Extranet.

There is no simple straightforward answer. There have been some misconceptions about the Extranet itself and multiple definitions have been suggested as a result, many of them inaccurate and raising some definitional issues. These issues will be considered in section one.

For the time being, let's say that the Extranet is a gateway into an organization information system whose access is restricted to authorized third parties to the organization. Thus, the Extranet is a bridge, a link and a shared platform where transactions and communications take place in privacy. As such, it has been utilized for various purposes.

As the subsequent sections will show, the Extranet is now used for: e-commerce purposes [Business to Business or Business to Consumer (B2B or B2C)]; protecting information (which should not be accessed by the public); exchanging information between companies (for instance, sharing knowledge about the market demand); implementing e-Customer Relationship Management (the Extranet allows

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for personalization); and deploying non-linear value chains (since the Extranet enables outsourcing through a real time link with our business partners).

As these various uses show, the Extranet has created a virtual sub-text with a different narrative. Beneath the virtual semantics - the virtual store, virtual office, virtual fence, and virtual meeting place – lies the reality of daily on-line transactions, a new way of co-creating across organizations, e-Customer Relation Management (e-CRM), and non-linear value chains.

1. Redefining the Extranet.

The following definition will be the premise to this discussion: "*an Extranet is an organization web server dedicated to and accessible by authorized third parties*" (Laudon & Laudon 2010; Chaffey *et al* 2006)[3]. Two key concepts here are "dedicated server" and "authorized access."

The server is exclusively dedicated to the Extranet. Since it is a web server, it is accessible from the public infrastructure Internet. Yet, it can only be accessed by authorized third parties, which means that the authorized organization or individual has to be issued an identification and password (ID/PW), which they then have to submit prior to being allowed to view any content located on this server. And of course, they can access only content that relates to their own specific businesses and transactions with the Extranet's owner.

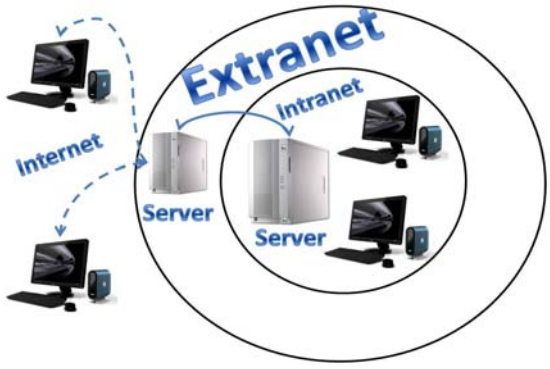
The Extranet, however, has also been defined as "*a part of the Intranet, extended to users outside the company.*" [4] Another definition which has been given is that *"Extranets are extended Intranets connecting multiple organizations including internal personnel, customers, suppliers, and strategic partners in a seamless closed-user group"* (Maloff 1997 re-used by Vlosky 1998). The author takes the view that these definitions no longer satisfactorily describe the specific functions of the Extranet.

Let's look at the Intranet first. It is also a web server but, in this case, one for internal collaboration and exchange purposes. The same authentication principle as with the Extranet also applies; the company's staff has to be issued an ID/PW that will allow them to log in. There is obviously a hierarchy of ID/PW and not every staff member will be allowed to access the whole content of the Intranet, which typically includes highly sensitive data about the organization. In short, the Intranet acts a bit the way a data dictionary will for Data Base Management Systems (DBMS) purposes. It helps to protect our intangible assets, i.e., our applications and database content.

Given the threats and security concerns on the Internet and the sensitive data in the Intranet, it is easy to see why it would be irresponsible to give any third party direct access - no matter how limited - to any Intranet content.

All these considerations make it abundantly clear that a proper Intranet/Extranet architecture requires two different servers: one in the Intranet; and another one in the Extranet that bars direct access by third party to the Intranet (see Figure 1).

Figure 1 - Internet/Extranet/Intranet Architecture



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The content of the Extranet server differs from that of the Intranet server in that it only includes whatever part of the Intranet content the organization decides to show and share with its various business partners, [5] thus preventing potential access to any material deemed confidential in the Intranet. Indeed, hackers would probably find an easy way into others' Intranet content from their primary access. In other words, there is a selected

mirroring of the Intranet server content into the Extranet.

The mirroring of the content of the Intranet database precisely appears to be at the root of the misleading definitions [6] found here and there, [7] including in some textbooks. The Extranet is indeed a copy of the Intranet content, which, in one of the two definition samples quoted above, is referred to as "*a part of the Intranet*," even though it is situated in another location - and another server; something which these samples fail to mention.

Depending on the intensity and urgency of the exchanges with the partners, that content might be updated in real time (typically B2C) or in batch (delayed) process with a re-synchronization of the database every few hours. A good example of such synchronization is Dell Computer with the refresh of its Extranet with suppliers every two hours.

The Extranet is thus a tool that must be:

- Personalized, as opposed to customized: indeed never will two Extranet**s** connected to the same Intranet be identical since the content that the organization allows to be viewed is selected based on the track record of and knowledge about a specific customer or supplier, which, obviously, cannot be shared with any other third party.
- Synchronized: eventually in real time to show what is the latest content or the transaction process taking place over a transaction, within the Intranet server.

It is important to stress that any Information Systems Audit companies would most probably reject any third party's direct access to the Intranet. The risks are too high. Located in databases, which are themselves located in (or accessible from) the Intranet server, these valuable intangible assets need to be protected. The last thing one wants is his/her customer database to be seen by his/her best competitor; hence the complexity of the authentication process.

The latest - and most complex - monetic platforms used, among others, for payments (PCI-DSS) show how demanding security requirements are on an organization. The authentication process is only the first step of a sophisticated path, which as Figure 2 indicates, goes through the firewall(s), the Intrusion Detection Systems (IDS), and the Intrusion Prevention Systems (IPS).

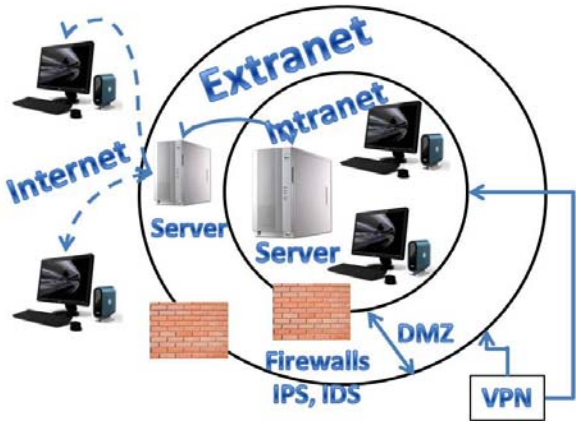

Figure 2 - Security Access Architecture Internet/Extranet/Intranet

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It all started with the Electronic Data Interchange (EDI), the ancestor of the Extranet. EDI became a *de facto* standard, which, although basic and lacking flexibility, would allow companies to exchange documents on-line, but not in real time. Today, most companies, including large conglomerates such as Wal-Mart and Tesco, and a great number of customs offices have converted all (or most of) their EDI into Extranet. Two main reasons: EDIs *"are generally incompatible with each other and expensive to develop and install"* (Frohlich *et al* 2001); and communications and transactions over the Net are far less costly (Evans *et al* 1999).

The flexibility brought by the standard and protocols of the "Net" and the addition of "Object Oriented" programming languages have opened up the systems to each others through Application Program Interfaces (APIs), making it possible to encapsulate proprietary data into a "package" which can then circulate over the Net.

Yet, these developments have in turn contributed to the inaccurate description of the Extranet. Obviously, since it is pretty clear that

we exchange documents electronically through an Extranet but not in an EDI standard, the Extranet is not an EDI, as written in capital letters, but an, "e-d-i" as written in small letters. Witness the new way of naming the electronic data interchange through Extranet: It is called I-EDI[8], not EDI; clearly underlining that EDI is obsolete and pointing to the fact that the new and only way to exchange data is Extranet-based.

It is thus critical for any definition of the Extranet to acknowledge that the Extranet has many functionalities which no other Information Systems can provide. Over the years, this powerful, flexible and open platform has become a strategic management tool, so much so that it has even been referred to as a "state of mind" [9] extending the concept introduced by Alavy and Al (2001) - the exchange of knowledge which can take place over the Extranet.

A great number of text books, articles and white papers have yet to reflect the fact that Extranet has widened and thickened. From a mere gateway at its onset, it has evolved into a platform and now supports strategic transactions and collaborations. In short, it has gained its own identity and is no longer the mere entry point into an Intranet it once was. We will first consider the Extranet as the entry point for e-commerce.

2. Extranet: The key to e-BUSINESS – the Virtual Store

All the new business models that emerged in the middle of the 90s are based on the Extranet as a gateway to e-commerce. Take, for example, such early entities - and future giants - as eBay or Amazon: "You" and "your" are ubiquitous, popping up all over the screen: "*your*" account, we have recommendations for "*you*." etc; each "you" referring to your own personalized corner in their database and each one made visible only to you. You have reached your personal virtual store.

Any transaction on-line requires registration. All e-commerce platforms - B2B and B2C, either pure play or click and mortar - are entered and activated through the Extranet. A customer has to go through that gateway every time he/she wants to purchase something from a company offering on-line purchasing functionalities, which means that customer and every single one of his/her past transactions are recorded. Several layers are involved in that whole process.

The first one is the "public" website. Accessible by anyone, it is basically a collection of screens with a few interactive connections with an application server (for instance, search). The second layer requires logging in. This is the point at which the customer has reached the Extranet. Here, the content can be personalized by referring to his/her preferences, past transactions and even the company's recommendations. The third layer is activated when that customer wants to enter into a transaction, which requires triggering the application server, located in the Intranet server.

An organization also has other ways of making sure the customer "qualifies". If the customer is a business entity, it will check its credit line status. If she/he is a consumer, it will check his/her credit card status as well. This checking process takes place through the Intranet and eventually through other Extranets again, this time, connecting to financial partners (for example, eBrokers, credit cards[10], banks) or logistic companies.

All these transactions can be secured (VPN and encryption) at many levels (SSL) and the secured payment path audited. They can also be facilitated by short cut processes. The most famous and reputable one is probably the one found in Amazon; the so-called "one click" purchase, which has been patented and licensed to iTunes among others.

Make no mistake though. All these transactions are triggered from the Extranet, not from the Intranet as some definitions claim. What is involved here are sequences of cross functional business processes, run in real time, all of them originating from and ending in the Extranet. Though the rule engines are located in the Intranet, the third party - in this case customers - interacts with the intermediary layer; i.e., the Extranet server.

Behind these on-line transactions - these cross-functional automated processes - lies a cascade of Extranets as systems, tied in together, serving outsourcing purposes, but nevertheless still connected in real time.

Apart from making shopping on line possible, the Extranet is also used to protect information.

3. Protecting our Intangible Assets – the Virtual Fence

When it comes to protecting intangible assets, the Extranet, by dint of being "*an organization web server,"* (and not merely "*part of the Intranet"* as asserted in some definitions), offers enhanced safekeeping. Suffice to mention that after it first came out, the Extranet was soon acknowledged to be the best way to protect one's internal digital assets, either applications or database, [11] and, as mentioned earlier, direct access to the Intranet - no matter how restricted - will most likely expose confidential information to any intruder with some skills at "hacking".

The Extranet is also the perfect virtual place for an organization to let its customers, distributors or dealers see what it does not want the competition to see, for example, a new product or catalog or its pricing policy. Take the latter. With the organization's pricing**,** discounts and any other incentives hidden behind the virtual wall of business secrecy, the Extranet makes it possible for that organization to differentiate its pricing policy from its competitors while maintaining it confidential.

The Extranet has even gone a step further. It has become a way of protecting intellectual property rights (IPRs). Indeed, it is common knowledge that providing access to content on a public website will invariably cause it to be pirated and unauthorized copies to be made, even in cases where that content is copyrighted. What is at stake here, are the WCAs (Web Content Aggregators) and their business model [12]. Technological protections had been made available as early as 1998 with the Digital Millennium Copyright Act of 1998, and Digital Rights Management (DRM) systems[13].

On the other hand, by providing access only to authorized third parties (for free or for a fee), the Extranet creates a protected virtual territory that insulates IPRs from intrusion. In short, as evidenced by the recent controversy involving engine and content providers, the Extranet has become a "virtual fence" (N. van Eijk 2009).

At issue in that dispute was a move to displace some content from the public website to the more-private Extranet so as to preclude access by search engine's crawlers; an unequivocal recognition of the high level of protection of the Extranet (*Ibid*). In spite of several initiatives such as, for instance, the Automated Content Access Protocol (ACAP), [14] a global protocol "*devised by the worldwide publishing community that provides content providers with the necessary tools to communicate their copyright terms and conditions online in a language that can be read, understood and interpreted by machines,"* the Extranet still appears to be the best way to date to avoid the non-authorized dissemination of copyrighted content[15].

In addition, the authentication process (ID/PW) can be supplemented with systems like "CAPTCHAS", which requires the identification and copying of distorted letters or characters and thus adds another level of transaction security.[16]

As a result, Extranet – not Intranet as often claimed – has become the foundation of many business models based on membership or on subscription. The fee is basically what one has to pay to obtain his/her "login ID/PW" and gain access to content. Different fees will give access to different – often richer contents. Many publication companies, Reuters or Hoovers to name a few, rely on such authentication process for customers subscribing to reports, e-newsletters or alerts.

In addition to being used for protecting information and e-commerce, the Extranet is also utilized for companies to collaborate and co-create.

4. The Collaborative Platform - the Virtual Common Office

Therein lies the rub: as we have moved from an "information based economy" into a "knowledge based ecosystem," how do workers become "co-workers" from a distance? How do, for example, accurate and updated analyses of the demand for a particular product are exchanged? In other words, how do knowledge workers bring together their expertise even though they are separated by the ocean or belong to different organizations?

Take the following hypothesis: virtual teams working together on common projects. Regardless of the collaborative tools they use, be it from a basic Lotus office suite, Rapid Application Development (RAD) or from a project software development[17] like the JAD (Joint Application Development), they all require a platform.

While some applications will obviously remain internal - and therefore run on the Intranet - inter-organizational collaboration more and more often requires a virtual meeting point. This is precisely where the Extranet comes in. These Extranets – the meeting point - become virtual, remote, and cross-functional organizational offices. In short, they make collaboration possible. "*Extranets can enable and improve collaboration by a business with its customers and other business partners. Extranets facilitate an on-line, interactive product development, marketing, and customer focused process that can bring better designed products to market faster*" (O'Brien et al 2006).

The increasing implementation of "groupware" or "intergroupware" such as, for example, Computer Supported Group Work (CSCW) (Turban *et al* 2005) [18] further evidences that Extranets act as essential links - joints - between organizations. Group Decision Support Systems (GDSS) have also been deployed through Extranets.

The benefits from sharing knowledge among the supply chain shareholders can be substantial. Avoiding bullwhip effects, allowing just-in-time (JIT) deliveries, optimizing inventories levels, to name a few, can save a company a lot of money and have a direct - and major - impact on its cash-flow management.

Today, this heightened visibility throughout the value chain relies on the Extranet – not the Intranet as often misleadingly suggested - and it is also through the Extranet that this sharing takes place.

The Extranet acts as a pipe. The data flow circulates upstream the supply chain through the sharing of the database content. Moreover, in-depth data analysis over data warehouses and their outputs processes by On-Line Analytical Processing (OLAP) and model-driven Decision Support Systems (DSS) are shared by business partners. Dell Computers, for instance, shares five quarterly forecasts with all its suppliers.

To be responsive, all the supply chain stakeholders must be well informed. Consequently, the Extranet has become the window to access knowledge located as close as possible to the market. What the Extranet performs is the virtual integration of the value chain. As shown in Figures 3 and 4, the Extranet makes the virtual integration of the value chain possible.

Re-using Michael Porter's (1985) value chain definition, the internal value chains in these two figures represent a value chain "extended" through the Extranet link that bridges over the partners' Information Systems.

Figure 3 - the Internal Value Chain

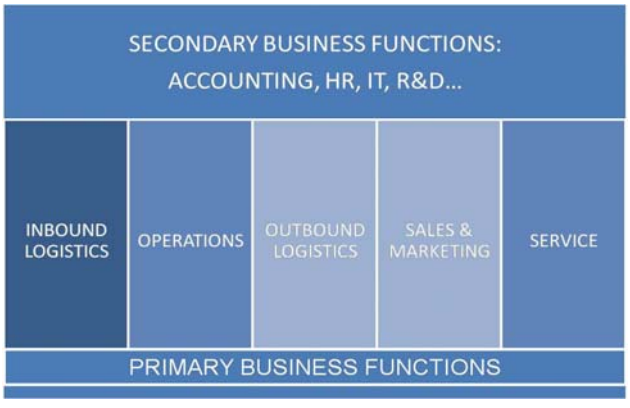

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Figure 4 assumes that all the partners themselves use an integrated information system, either Enterprise Resource Planning

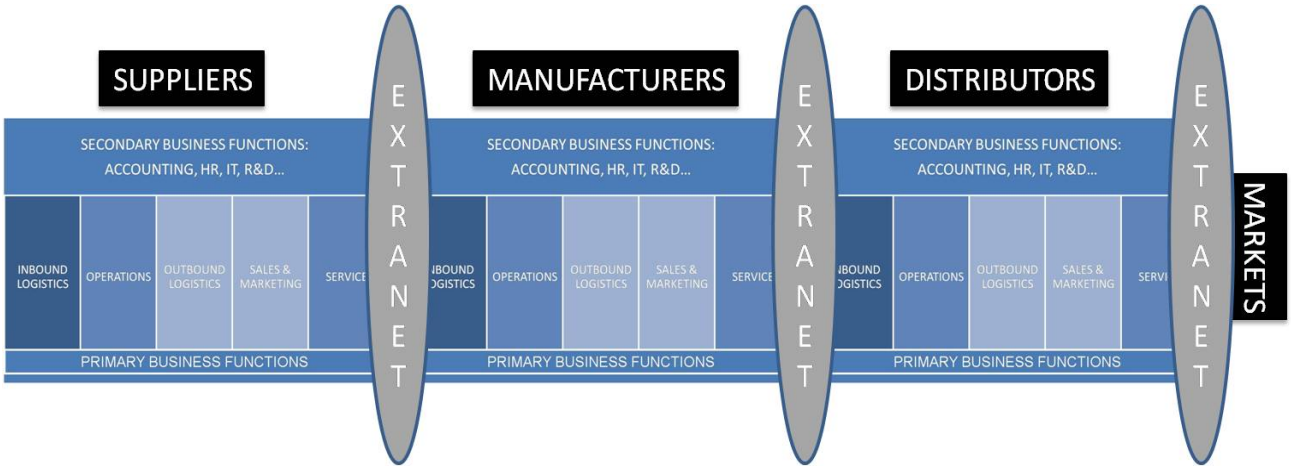
(ERP) or Enterprise Application Integration (EAI), and an Intranet.

Tellingly enough, the term "Intranet," coined by Steven L. Telleen in 1994 while he was working for Amdahl Corp,[19] was first named an "Enterprise Wide Web," which is really what this data sharing down the supply chain is all about.

The Extranet comes together with the APIs to form something sometimes called a "glueware;" which, as its name suggests, "glue" the partners together for the purpose of creating a collaborative platform. The business benefits derived from this Extranet-based platform are substantial.

First and foremost, it obviously generates massive savings in transactional and agency costs, which include, among others, administrative, travelling and telecommunications expenses. But collaboration through the Extranet goes beyond the usual productivity gains, it also creates value.

Figure 4 - the Extended Value Chain



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Take inventory management for example. While, on the one hand, supply chain management aims at reducing inventory at every stage, on the other, it focuses on avoiding missed sales opportunities. For instance, when Procter and Gamble realized that the-out-of-stock occurrences represented up to 11% of the total potential sales, *"[…*they*] developed private e-marketplace facilities for both suppliers and customers, allowing its key business partners to see its inventory levels and production plans and perform real-time transactions via Web-enabled front-end systems"* (Gartner 2010). In other words, they implemented Extranets for the purpose of giving visibility to all their partners. They called their platform the "CPFR": Collaborative Planning, Forecast and Replenishment.

"Supply chain management" has often been replaced by "demand chain management" in order for the whole chain to pull resources together - and "fulfill any customer request" - in real time (Hoover *et al* 2001). This, however, can trigger a sometimes complex real time sequence. While it is easy to figure out the mechanical benefits of a supply chain management system, what about the demand or value chain? What is the missing ingredient? The Extranet spices up the supply chain through the "one-to-one relationship" that a firm can establish with its customer first and then with its business partners.

5. The "One-to-one" Virtual Meeting Place

When we log-in and get into gmail, hotmail, yahoomail, etc, do we expect anybody else to have access to the content of our mail box? Of course not! This is our own virtual territory and it is meant to be this way.

Suffice to look, for example, at the home page of Amazon.com to understand that everything is dedicated to the customer and meant to protect his/her privacy. As previously mentioned, this customer-centric approach manifests itself in the omnipresent use of the "you" ("*your"* account, recommendations for "*you,"* etc). In other words, we, customers, somehow enjoy our own Amazon.com.

Each of us is indeed an existing member. In essence, what the ever present "*you*" says is that Amazon.com knows each of us: "*me*" an avid reader, "*you*" in Paris, "*you*" in Bangkok, etc. You, its customers are pampered through knowledge management. It perfectly knows what "*you"* need, what "*you"* want right now and what "you" will crave for in the future, etc. And since it might also be useful to know "*when*" "*you*" need it, it also knows that. In short, the Extranet wears several hats.

It becomes: a virtual customer representative; a consumer who will order a book, which that customer representative has advised "*you*" to read, one "*especially recommended for you*" even though it is the first time that this consumer hear about it; or a corporate buyer to whom a list of items is suggested for the next six-month purchase order (Dell Premier Page).

In essence, the Extranet operates as an agency gathering intelligence. Activating Knowledge Management Systems (KMS) intelligence is forwarded through the Extranet. *"Not only will knowledge flow more freely […] the firm can also capture knowledge directly"* (Turban *et al* 2005). What this points to is the way knowledge systems are linked together (intelligence gathering).

The Extranet is your passport. You must show it to clear the gateway. We, Amazon.com, have recorded into our database what we need to know about "*you*". Before we can accept "*you*" as a customer or a business partner, we are going to put our knowledge to work and verify all this information.

What is this all about? The forecasts and predictions, direct output from the front line leaders' data warehouse, reducing uncertainties, will enlighten all stakeholders. They are in the driver seat of the chain if the content of their database/data warehouse reflects the actual status of the market. They are the owner of the knowledge because they entertain the one-to-one relationship with their customers through the Extranet. They are the builder of the chain as they distribute their knowledge upstream to business partners. Without this Extranet based exchange, the latter would be blind and would face the well-known bullwhip effect.

Take Sidel, a global company headquartered in France that specializes in packaging for liquid/bottling equipment manufacturers. Since this equipment has a long life cycle, none of Sidel customers (35.000 worldwide) need to repeat order every month or even every year. So, as part of its long term Customer Relationship Management, Sidel invested in all the interfaces (APIs) needed to establish personalized relationships through Extranets: "MySidel."[20] It contains personalized catalogs, convenient spare parts ordering systems, and maintenance services. Welcome to e-CRM; this is Extranet at its best.

What "MySidel" represents is a long term relationship on a global basis made possible by the Extranet. e-CRM provides Supply Chain Management with a powerful tool with which to feed the up-stream path into the supply chain. It provides all the partners with actual knowledge at the demand level. Sidel has created a Value Chain by integrating its partners systems through the Extranet for the purpose of the transaction, informed ahead by accurate forecasting.

eCRM turns out to be a driving force in the efficiency of the supply chain. No wonder companies need skilled Marketing Managers more than any other business function. Much hinges on the ownership of the knowledge about the customers, their behaviors, track records, etc.

This is something Michael Dell understood very early. When he started in 1984, well before any Internet, every staff member returning to the office after a meeting with a customer had to enter any new information on that customer into a database.

It should be noticed that "service," the primary ultimate business function identified

by Michael Porter at the "tip" of the value chain, has led to business paradigm shifts and is therefore very significant to the value chain as a sustainable business model. Two examples will make this point clear.

One is Amazon.com and its new EC2 services,[21] offered as early as 2004. Having accumulated such expertise in IT platform (hardware, software and network) thanks to its own Amazon B2C based business, Jeff Bezos, Amazon's founder, realized that he had a new competency that he could turn into a new business, through Extranets. His company became an early cloud computing provider as an Application Service Provider (ASP), and more through Platform as a Service (PaaS) and was able to deliver IT services on-line (a B2B business model quite remote from the original B2C e-tailing business model).

The other is Dell Computers, which moved from Sales and Marketing to Services by remotely monitoring and maintaining the centers (previously installed by Dell) that contain its customers' applications and data on-line through Extranets.

The reason the Extranet has become a major eCRM tool is that there are never two identical Extranets connecting to the same Intranet. eCRM is deployed through the Extranet – "the"- personalization tool. Thanks to the Extranet, you, a customer, can have *"your"* catalog, *"your"* price, your past transactions, *"your"* credit status, "your" preferences. The "you" narrative does not stop here. There is more to it.

Looking at it realistically, Extranet can lock the company's partners into a value chain. The loyalty is being enforced through this tight relationship. Your switching costs are contained in the Extranet. Two straightforward examples will prove this point.

You, as a Dell customer, won't switch from Dell to HP. Why? Because you have five years record in Dell's Database, Dell services you through this accumulated knowledge. Your record in HP database is empty. Your switching cost has a name and a location: it is called *knowledge* and is located in the Extranet (in the Premier Pages in this particular instance).

By the same token, you, a Thai Air Royal Orchid member, won't switch from Thai Airways to Air Asia: your free frequent flyer ticket to London is just a few miles away. Again, your switching cost has a name and a location: it is called *the memory* (database) - in this example, Star Alliance memory - and is located in the Extranets – here, those of Star Alliance members updating your record in a common database.

And there is even more to it. Let's suppose that a company is the supplier or the customer of a large corporation. Further assume that the IT department of that large corporation offers very cheap IT services – for instance, an ASP – through the Extranet. This is how that large corporation will lock its partners into its value chain. We will name it a new kind of switching cost. For how much different is it from HP's or Thai Airways' switching costs?

This has turned the Extranet into a very strategic tool. Today, any strategic management plan is bound to incorporate the corresponding, aligned, IT strategic plan.

As we have just demonstrated, companies can "enforce" loyalty through Extranets. Next, we will look at Extranet as a global strategic tool enabling the creation of a non-linear value chain.

6. The Keystone of the New Global Value Constellations[22]

As stated earlier, since Michael Porter's 1985 description of an internal value chain as a combination of primary and secondary business functions, the Internet, as a standardized and unified public infrastructure, has been the critical link allowing the extended value chain. The Extranet plays a critical role in bridging the information systems of the value chain partners in order to form a string of companies, all contributing to a higher value delivered to customers.

It was actually possible to perform something similar with EDI. So, what has changed since? The answer lies in one of the fundamental characteristics of the Extranet.

The Extranet is a web server, which means all of us are using the same standards and

protocols. This is the fundamental change. "All" in this case refers to any particular business community. "All" here also means that through object-oriented programming languages and APIs, our proprietary systems could be neutralized, making it possible to re-use our legacies. The implication is that now millions of companies are ready to meet, virtually.

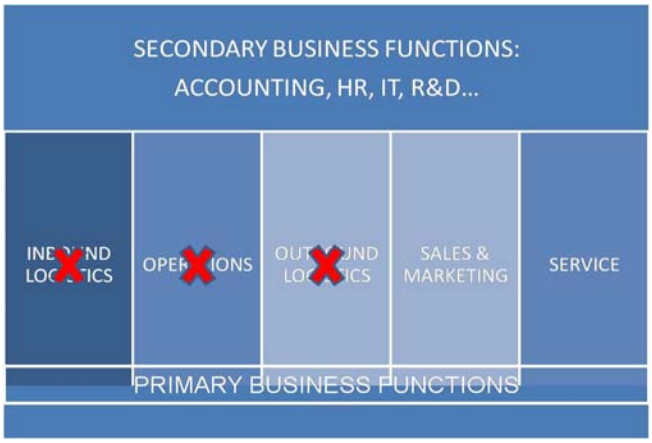
Although porting a traditional supply chain on-line was already a major business change in the way organizations transacted, the Extranet has brought in more opportunities in terms of strategic re-engineering of a company's portfolio of core competencies.

The linear communication line that companies can open through Extranets, connecting Customers, Distributors, Manufacturers, Suppliers, Third parties – in some cases, in real time and often in near real time – turns out to be a much more powerful tool than originally thought.

With the Extranet enabling personalization and privacy, triggering transaction applications, and allowing real time visibility, companies soon realized they had the perfect tool for outsourcing business functions which did not represent real core competencies. As a result, the last ten years have seen a flourishing of Third Party Logistics (3PLs) business. The successful ASP's business model born in 1999 with Salesforce.com not only provided IT services on-line, but initiated "webservices" also enabling outsourcing of primary or secondary business functions of the value chain. However, this cannot be done, without a real time connection allowing the exchange of any data contributing to the transaction and the value chain.

Take Cisco, for example, a worldwide leader in telecommunication equipment, especially in Internet infrastructures (routers). In 1999, it decided - most likely because it had enough input about the future of data interchange over the Net - that manufacturing was not its core competency and therefore should be outsourced; a major decision for a company whose manufacturing was supposed to be the major contributor to its value creation. With its operations gone, gone is inbound logistics and gone is outbound logistics. So, what is left? How can Cisco still claim to have a "value chain" after eliminating so many of its value-adding business functions? As shown in Figure 5 below, companies in Cisco's position still function as a value chain.

Figure 5 - Outsourcing Business Functions: What's Left?



Source: Created by the author for this article

Sales & Marketing together with Service are now the "owner of the value chain." They control the knowledge contained in their databases. They are next to the market, next to the demand, next to customers: which raises the question of how this value chain operates.

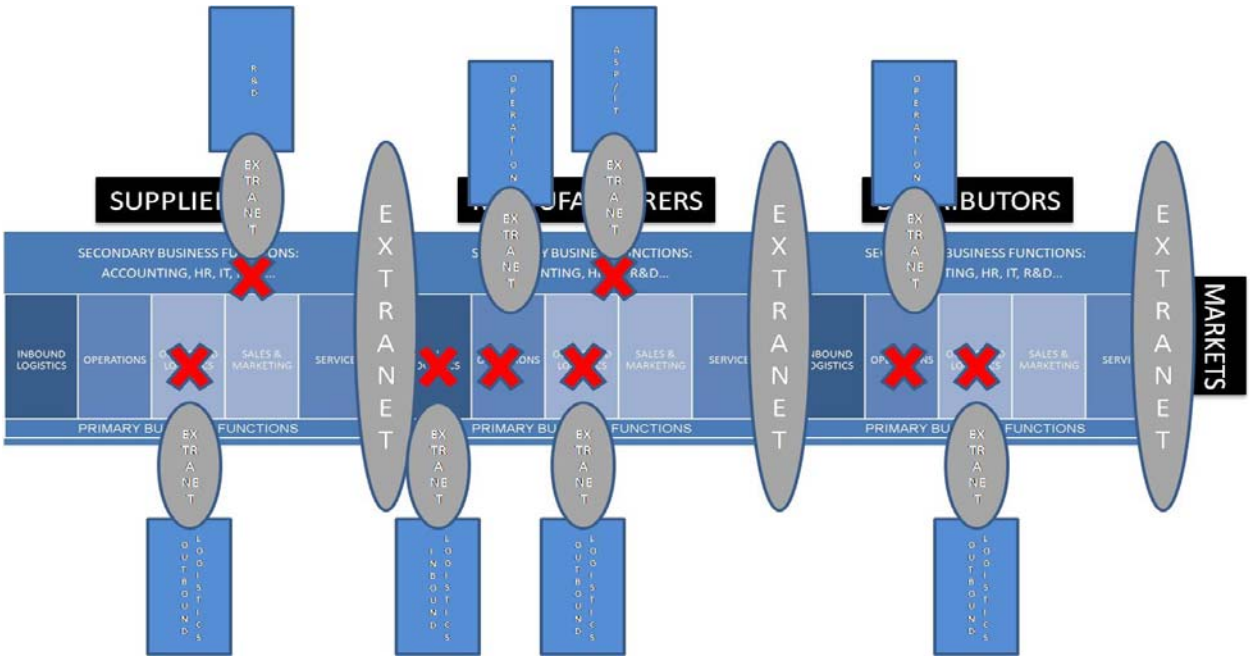
Let's go back to Cisco's value chain. It is now made of spheres of competencies; all of them contributing to Cisco delivering a better product
and service to its customers. From collaboration the company has now moved into co-creation. The value chain is no more a linear one. It is a spheric one. It looks like a constellation of stars organized for one specific purpose: fulfilling every customer request to the best of each partner's ability. All the partners are stars. They are the best in their own field of competency.

Why did this trend appear ten years ago? The extranet made it all possible. This is the reason why companies are now focusing on core competencies and outsourcing from anywhere while being informed in real time about a production batch, a parcel delivery.

As Figure 6 below shows, the Extranet has reshaped the extended linear value chain into a value constellation.

- The Extranet and Object Oriented programming language (Extensible Mark up Language (XML) on the Net) have given companies: the key to open platform for collaboration, co-creation and eventually co-opetition;
- the managerial flexibility to handle "virtual" business functions;
- the possibility of realizing what are its real strengths.

Figure 6 - From Linear Value Chain to Value Constellation



Source: Created by the author for this article

Consider CISCO again. Sensors connect its headquarters in real time with any of the production lines working for them anywhere in the world. They are in the driver seat of their value constellation, allocating core competencies and disseminating the knowledge contained in their database. This is all performed through the Extranets. "*Cisco® Smart+Connected Manufacturing solutions provide intelligent, timely information and collaboration in context to transform manufacturing businesses through continuous innovation, a differentiated customer experience, supply chain agility, and operations excellence."(CISCO website).*[23]

Again, the emphasis is on collaboration: It is becoming a strategic advantage; the deeper the collaboration over the Extranet (it has reached over 400 web pages for one Dell's Extranet), the tighter the integration and therefore the better the response to a customer's order. Virtual integrations through the Extranet have generated extended and constellation value chains; which raises the question of how deeply integrated with a company's business partners can be.

7. Depth of Integration

In a 2001 landmark study, Frohlich and Westbrook explored supply chains from the perspective of "arcs of integration" and corresponding business performances. Nine years later, that perspective should be changed to "Extranets, arcs of integration"[24] since their conceptual framework encapsulates exactly what is being performed by the Extranet or

what is missing in its absence or only partial deployment:

- "inward-facing": no integration with business partners (no extranet)
- "periphery-facing": limited integration (an Extranet limited to "e-brochure")
- "supplier-facing": extensive integration with suppliers (an Extranet dedicated to the upstream part of the value chain)
- "customer-facing": extensive integration with customers (an Extranet dedicated to the downstream part of the value chain)
- "outward-facing": extensive integration with all business partners (a fully deployed Extranet with deep integration of processes with the value chain partners)

What is the actual content of the Extranet? What is actually being shared with the partners, how often is the content "refreshed", how personalized is it?

It would be interesting, nine years later, to look at the same sample and assess the results in light of today's developments. One would most likely argue that "outward facing" has since then increased from the 9% reported in 2001 at the expense of "periphery-facing" and the 42.5% it then enjoyed. More importantly, though, Frohlich and Westbrook's 16 "integrative activities" listed would probably have to be modified and extended further. The author suggests the following should be added to the list:

- Collaboration on new products development/schedule
- Sharing short and medium term forecasts by markets and product lines
- Frequency of "refresh" or even real time mirroring of the latest MIS/DSS output
- Language, currency, time, customizations availability
- Span of the Extranets: number of customers/suppliers, number of countries
- Availability of "master" ID/PW leaving the subset of ID/PW to the partner's responsibility
- Transaction history and variations
- "Pushed" suggested P.O.s for customers
- "Pulled" deliveries in case of inflated inventories for suppliers

Conclusion

Today, *"work" is no longer bounded by coworker proximity or time zone. It also involves a much broader set of "workers" – not just employees, suppliers and partners, but customers, freelancers and an increasingly capable network of smart devices and interconnected systems, all tied together by business processes that span organizations, time and distance."* [25].

The Extranet represents the most recent and acute examples of the required alignment of strategic goals and Information Systems tools and platforms. As made clear by all the "virtual this and that" it has created, Extranet should have a higher status and be fully recognized for what it really is: a strategic management tool and platform. As such, it represents not only an opportunity but also a strategic advantage, especially when deployed for value chain or value constellation purposes.

The Extranet gives a sense of belonging to the virtual. It should be noticed, however, that without Extranet and its "virtuality", many supply/demand chains would not have any physical existence. In short, we are quickly shifting from "managing the digital firm" (Laudon 2010) to "managing the digital value chain".

What's next?

It can safely be predicted that the Extranet's content is going to keep thickening as global collaboration and co-opetition continue their exponential growth. But the virtual territory represented by the Extranet is bound to further expand along "Enterprise 2.0". Indeed collaborative places for professional social networking are starting to appear. [26] A significant example of this new trend is www.travelportopinions.com where 6.500 travel agents exchange reviews of hotels and other tourism providers in the safe and trusted shelter this Extranet provides.

Recommendation for Further Studies

Extranet is a necessary "virtuality" which allows for physical reality**.** Even though the theoretical framework leads to the conclusion that Extranet is the backbone of globalization, this needs to be further proven through quantitative analyses. The recent financial and economic crises showed the inter-dependence of the world economy in real or near real time. Therein lies food for thoughts and for such analyses.

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