

02-WIS

What are Web Information Systems (WIS)?

Definition of WIS as a system where:

1. The communication among machines (servers and clients) uses the public Internet or an IP-based private VPN
2. Users access functionalities through a browser

It represents a very broad definition including both sites and portals, as well as traditional information systems (core ERPs) redesigned to provide their functionalities through the Internet with a browser-based interface.

LLM creates difficulties in integration with business, but they will remain only because they are really useful data wise.

Problem: when you want to implement a client side application at first is bound to fail, then when the SW mature the issues decreases. You have to deal with all the issues one as a time as they related to PC, SW, etc...

Usually not a good idea to use a client idea as it requires money to develop and to resolve all the related issues. Browsers "eliminate" this problem as there is only a few of them and, nowadays, there are strong framework to work with. Interface need to be simple to make the framework responsive. Also browsers are important as they changed the paradigm: no client side logic, only server side the client only take care of visualization. This let small devices to run access the application. If the application is heavy the provider will require you to install a client to oblige you to use your resources.

Engineer approach is not visionary as they focus on making things work now with now technologies and not think about 10 years after.

Companies can use Fleet Manager to create the environment on the desktop computer in the company, but this only work on site if they are sick/cannot be in office they don't have the resources to work. Browsers enable the flexibility to work from everywhere.

Connecting and connecting easily are two different things: easy connection is something that helps a lot.

Innovation with WIS

The Internet is a network that has brought connectivity to individuals → companies are connected with their retail customers

Nov. 2000 stock exchange failure (dot com bubble)

The Web is a window on a company's processes (and their performance)

The quality of Web sites and portals cannot be high if companies have not completed the integration of their information processes (common unified data, consistent omni-channel processes)

The Web is the enabling technology of customer relationship management (CRM) and allows the omni-channel integration of service distribution

As omni-channel integration is deployed, the Web becomes the single access point for both customers and internal users

Vision helps technologies to rapidly adapt to new technologies.

Can also use virtual agency to reach someone. Geographical presence is no longer a must/no longer needed/alternative approach as you can have multiple clients distributed on the planet that you can reach instantly. But if you already have agency around the world what happens?

Are you going to be replaced by virtual agency? The answer is difficult, but trend to access services through web services is still increasing. The penetration is different between the services. For example grocery shopping for fresh products is still done mainly in presence. Having legacy can be a hindrance as there could be something that cannot be adapted to new channels. Someone can think to open new agency/location to not have legacy to permit an easily adaptation. For example there is banks that totally dematerialize their agency and tried to have everything online (really need a lot of time to emerge). Nowadays also companies need to be able to prove they can produce earnings and not doing them to have investment in the stock market. Volatility as there is only investment and not real money in the making.

eCommerce – definition

eCommerce is the activity of buying or selling of products (goods or services) on online services (ref. Wikipedia).

Most eCommerce services are on the Web.

The term eCommerce usually refers to retail customers.

The term eBusiness is used to refer to business customers.

The term eGovernment is used to refer to services offered by public institutions to citizens.

On web there is an incorrect approach that if you have the best product you can sell really well on the web, as you can have access to much more possible customer than the ones you can reach locally.

On the Web you have to be Visible/acquire Visibility as it is necessary to emerge from the crowd.

Also with Web Shops the company need to make sure they handle logistics about the product reaching the customer/activities done by costumers before. The price necessary is different between in presence and web shopping as web shopping requires more actions done by the costumer.

The starting point of eCommerce projects

eCommerce sites have been often implemented by separate teams, often involved in rebranding initiatives (e.g. Bank24 - Deutsche Bank)

The design of eCommerce sites involves a variety of competences (typically, IT + design + product innovation + marketing)

The management of eCommerce sites involves new competences, in particular editors creating and updating content

The Web is a distribution channel, a production technology, and a source of external information
→ it involves revolutionary change

Company sites: information services

Presentation of company

- Mission and objectives
- Organization structure
- Balance sheet
- Press reports
- News and events
- Work with us

Product information:

- (Product catalog in pdf)
- Multimedia online catalog

Contacts:

- Call center
- Company sites, agencies, etc.
- Map

A website is like the window of a shop, it needs to contain the information of the company, the catalogue of the company and contacts.

Amazon is really good in the mass market, for quality things people still wants to go in person to assure the quality.

Company portal, eCommerce, organizational structure

Issues:

- Design a navigation structure for information and online services
 - Retrieve information
 - Constantly update information
- Solutions
- Federation: one central site with general information and services and multiple local sites serving different organizational units that are locally managed (e.g. university/departments)
 - Editorial committee: it should be created at the beginning of the WIS project and it becomes a permanent organizational unit
 - Help desk: the call center and the Web should be tightly integrated.
- Information can be distributed and difficult to reach. Cost of an editor that goes around, catch information and then changes the website.

Quality criteria of an eCommerce site

Content– It represents the quality of the information and services provided by the site. It depends on:

- Completeness
- Dependability, i.e. user ability of assessing the correctness of information

Structure– It describes the quality of the structure of content and depends on:

- Centralized vs. federated, if federated different organizational units provide diverse information with no standard (quality is lower, but it is cheaper)
- Understandability, i.e. users' ability to build a conceptual model of the site that supports easy retrieval of information and easy interpretation/use.

Presentation– It describes the quality of the Web interface and depends on:

- Graphics, i.e. appeal and visualization tools.
- Coherence of graphic style
- Page layout, i.e. position of information and links

Navigation:

- paths
- intuitiveness
- reference points (e.g. «home» or «back»)
- Interaction (amount of cross-links)

Need to have the important information updated frequently/be precise and don't want to make customers confused as this will hinder the sellings.

Also comfort in having similar website design as it helps the customers to find information easily and let them buy your product easily.

You don't want to have dead ends as they hinder your capacity to retain customers.

Search engines

Google, Bing, Yahoo!

Differences: total number of Web pages in the directory of the search engine (between 1 and 3 billion pages).

60% to 90% of Web pages is not considered by search engines

Ranking of results based on term similarity Pay for ranking (Google adwords)

Google can decide who is the one that is reached by web searches.

Target advertising on the web is more difficult as it needs to calculate the click for dollar ratio as there is no desired hours where to put your advertisement to be more efficient.

Marketplaces

They sell products and services from multiple companies, e.g.:

- Geographical brands (e.g. «Franciacorta» or «Ticino»)
- Users' needs (aggregators, e.g. Yoox).

Companies should share order management and delivery processes.

Common within districts for SMEs.

Standard in mobile app market (App store, Play store).

Yoox is a well known aggregator for fashion as it understand the dynamics of fashion selling. Tries to promote local brands as they can help in not spending too much time on search engines.

Online auctions

Give a benchmark to the market, can help also a price differentiate strategy (depending on how much they are selling and how the company is doing in the market). Clients have a confidence interval for the price they expect (can play in this range).

Non perfect market conditions, the price of the product is not known at the start, the customer behaviour is not rational as the product is usually scarce/unique/special so the value usually is higher than the one of the product itself (dynamic pricing). Pushed to pay the higher price possible.

Ascending (or English) auction. The vendor sets a minimum price. The product is sold to the last highest offer (with timeout). The price only goes up (dynamic marketing). Example of applying is art (need to convince the market that the resource is scarce and/or rare).

Descending (or Dutch) auction: The vendor sets a maximum price that is decreased by a fixed amount at regular time intervals down to a minimum price. The product is sold to the first client offering to buy at the current price. Different mechanism but still you need to considerate when stopping the descending price to beat the others. Discounts can acts as descending auction of some sort (no time pressure, but the idea is similar, also in house selling you start with an high price and then lower it).

Vickrey auction: all customers make an undisclosed offer within a given time frame. The product is sold to the second highest offer. Always used by public administration, but sometimes also private company use it to see the prices that the suppliers may want to offers (this done

also to see if the current supplier is still convenient). The buyer has a need (very simple or complex, they need to write down a document specifying some characteristic of the wanted product (ERP), this document could be highly specific or have some vague guideline depending on how much the company knows about the wanted product). Usually there is a difference between the technical part of the auction and the financial part of the auctions (could specify budget, payment conditions, penalties, level of service,...).

When customer can choose based on fixed price we are in ideal market as customer trust that the price coincide with quality.

At the end of the negotiation you have a contract derived from the discussion done after the winning of the auction. The requirements could change in a minimum part, but pay attention to not change too much otherwise the client would be scared.

Dumping: behaviour where the technical document contains everything the company can do and the financial document offers an heavy discount. This is done to buy out the market share. Done a lot in SW as the client can be locked in and then increase the price later when the client wouldn't bother to change. This lead to the auction to choose the second best offer to avoid this behaviour as companies need to balance price and services to be competitive but not so low to feel cheating (this is not done a lot as it is not the best solution).

Private corporation apply Vickrey auction with their suppliers when they aren't 100% satisfied with them. The company could also do this to stimulate the supplier to be more financial efficient. Usually the old supplier is the one that wins as this mechanism is only used to rebump the supplier, so other suppliers participate in these behaviour to gain favour with the company in case other non Vickrey auctions can happens.

eCommerce sites: advanced functionalities

A website could be only information (easy website, not useful for ecommerce).

Advanced features:

- Product configuration
- Pricing: sum of the price of the products or there is a request of the needs for the product and then the price is created taking these needs in consideration. This is custom pricing. Complex pricing usually include a Q&A session and a negotiation process.
- Online orders (digital signature vs. login), can check the status of the order (depending on the quality of the checking process the granularity and accuracy can vary). Can also access transaction logs.
- Payment
 1. Credit based (credit cards)
 2. Debit based (Paypal)
 3. Token based (Bitcoins)
- Order status
- Transaction log
- Online services
- Post sale services

- Customer profiling: use the information to customize the recommendation to the customer, the outcome of the recommendation systems goes in a CRM and reach the client on a multiple channels, it is fully automated.

Recommendation systems

Collaborative filtering:

- Recommendations are based on each customer's past purchasing behaviour
- Recommendations are based on past purchasing behaviour of customer segments (that is subsets of customers similar by either static characteristics from catalogue information, such as age, location, etc., or dynamic behavioural characteristics)

Content based

- Recommendations are based on the similarity of products or product categories (up-selling)
- Recommendations are based on the complementarity of products or product categories (cross-selling)

Hybrid: a combination of collaborative filtering and content based

Recommendation strategies should be consistent with business objectives:

- Increasing sales for low-turnover or high-stock products
- Promote new products
- Prevent churn
- ...

Based on upsell and crosssell.

- Upselling: buy something from a company and then rebuy from the same company the same product at an higher price. Usually is done by giving a better version of the product. Clients usually doesn't always want to spend as little as possible on some products. If a client is already inclined to spend more you can offer higher quality products at a similar higher price and the client usually will buy these products
- Crossselling: if the client already buy an high quality product you can offer them high quality products that can match/relate to the first product at a discount to incentive the client to buy both of them

Usually you have to choose the right recommendation system to enhance your products market. For example Esselunga cannot use a mass/mid market recommendation to sell wine otherwise you end up doing downselling(really bad).

Usually crossselling is done more as it can better enhance the selling as the expected customer behaviour is to buy what they already would buy and then add the recommended product.

Recommendation system should lead the customer to change with the company, otherwise the customer will loose interest in the company products and this lead to loss in revenues.

Similar product recommendations

Webshop visitors often abandon the site when an item is out of stock, not in their size or it is not exactly what they were looking for. Through computer vision it is possible to automatically suggest similar items when a customer is taking a look at a specific garment or accessory, reducing the chances of abandonment. Web is trying to design product around the customers to enable a better selling.

Recommendation engines (based on customer segmentation)

Retailers' goal has become to personalize merchandising, depending on their customers' taste. This is the main reason why AI-powered recommendation engines are quickly gaining ground in the eCommerce field. They provide personalized product recommendations based on user behavioural data and are often presented in the form of "You may also buy this".

Virtual assistants, chatbots

Chatbots or virtual assistants are virtual machines that recommend garments and accessories that best suit a specific customer via chat as if they were actual shopping assistants working around-the-clock. These services are fed with data and learn from each customer interaction to increase the buying rate.

Visual Search

Visual search aims at enabling consumers to take a picture of a product in order to search for it online. With the use of computer vision and image recognition, visual search solutions match the image uploaded by the consumer and with the retailer's closest image in their catalog.

Virtual personal stylists (body types)

The same piece of clothing usually fits certain body types differently. This is the main reason why consumers find it hard to be confident that the apparel they buy online will suit them. In fact, retailers in the US report a return rate of between 20% and 40% for online sales, poor fit being the number one reason. Some companies like Stitch Fix are starting to use algorithms that learn what suits each person best according to their body type. Customers need to fill out their profile then the system can suggest the best product for them.

Supply chain management: definition

Software supporting SCM coordinate and integrate all activities along a value chain involving multiple companies, from the downstream company that receives orders to the upstream suppliers working on base resources and materials. Fundamental benefits: cost reductions, service level improvement, flexibility.

Difficulties to integrate information systems between companies.

Possibly there is the need to insert data manually inside the system and this can be a problem for someone, this responsibility can be relegated to the customer as it can be a benefit but it is also a barrier to access the service (Buying stocks is not done in self service mode, inserting data to buy something online is done in self service money).

It is a matter of language as, for example, company A has an ERP and company B has another ERP. Company A has in the ERP some cloth material with their own coding. Usually they are Codici Parlanti, identifying every characteristic of the product (hash of the feature). For the sake of shortness the ID is set as Codice Parlante.

Effectiveness is standardization, error limitation, cost limitation. But if having a standard naming convention is difficult we can just have customers doing things in self service mode and then put these data through an integration process so we can do the order in our system with our coding.

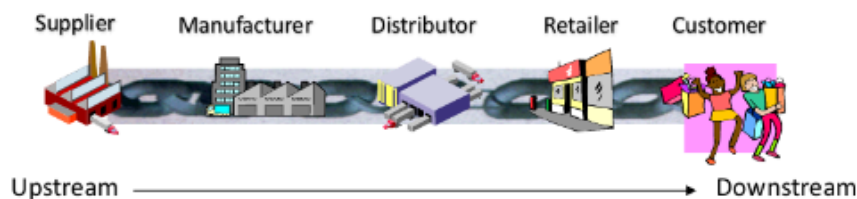
This cannot be done by a small company as you are pushing the supplier to go through the pain of adapting to your own standard and being small you don't have enough contractual power.

Sometimes suppliers are big enough that the customers adapt to their standard.

Strong players will set the standard and the weak players will adapt to the standard.

SCM: objectives

The supply chain is composed by:



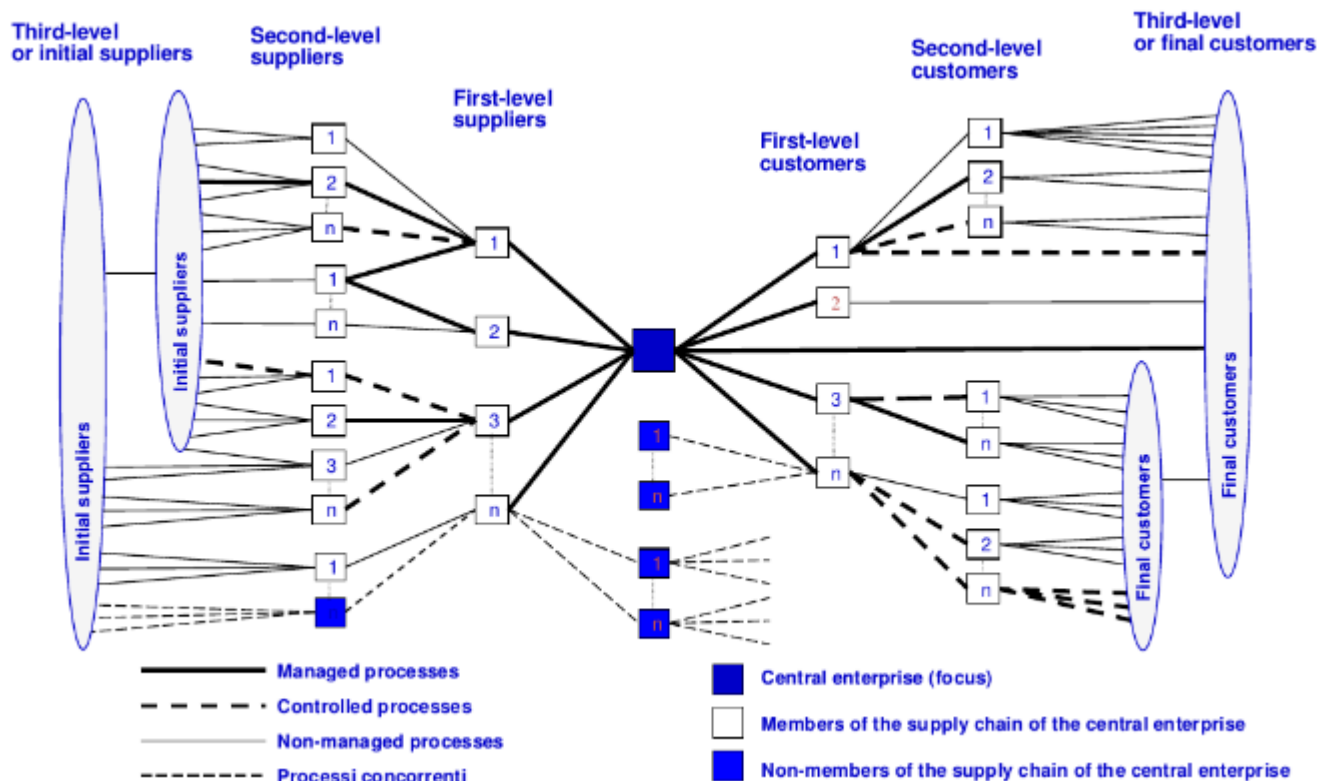
Goal: adapt supply to demand



Transaction processes can be automated in a fully automated processes. To adapt the supply and demand we should adapt to the curve to satisfy the demand. If you overestimate demand you waste money on products that will no sell. The issues is that if I underestimate I need supplier to be fast and respond quickly to my demand and if I overestimate I do not want to pay for what I ordered (cancelling order). This can be done only with planning ahead.

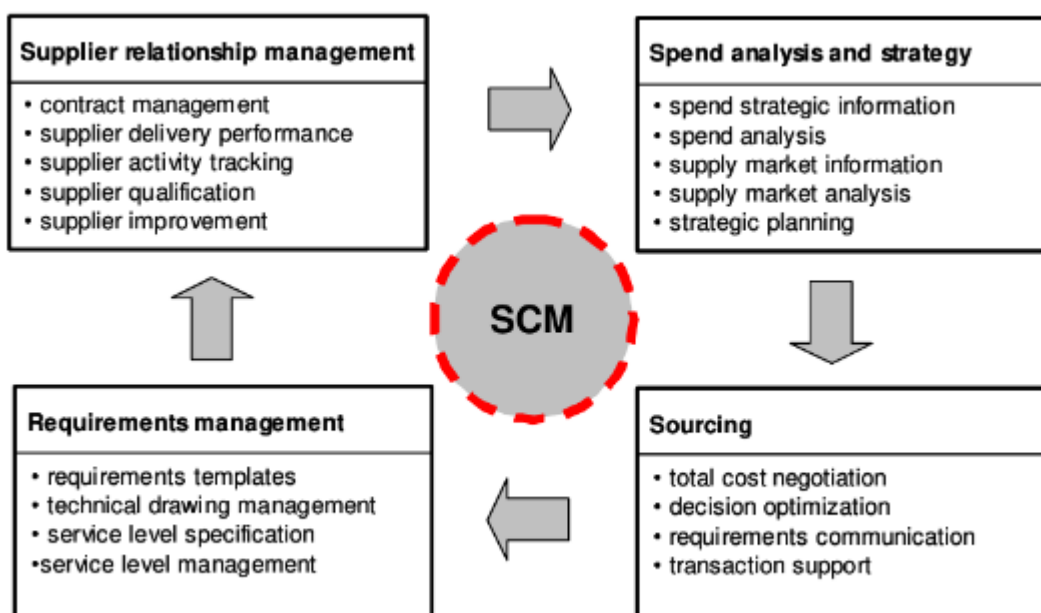
Extend the core ERP incorporating the process of your supplier. The value proposition is much stronger and incorporate the supplier in your planning to enhance your flexibility even if the supplier is not flexible.

SCM: relations among companies



Until you place an order in an application, after picking the products in a drop down menu, you can have errors in data inputting.

SCM: continuous learning process



You want that the production is planned on your planning, even if it is done by a supplier that also have multiple customers. If a supplier is good you want to have them work for you only. Supply manager is useful for the big players as they can incorporate the supplier in their processes and the customers will adapt to their standard. But a big player should use multiple

supplier, as small player usually are more adaptable and works more armonously.

The first step is spend analysis. We start thinking which supplier we optimize first. This is such that if we order the products by decreasing yearly spending through a Pareto curve. You have a great part of product that cost little, meanwhile you have few product that cost a lot and there is where you should focus your energy first.

So you negotiate with the supplier to have better prices, even change supplier to have better price, inject them in your processes and see how it goes, starting evaluating your supplier. The performance of a supplier are time of satisfaction of the order(the shorter the better), cost(the lower the better), quality(the better is a product, not needing return or maintenance the better), effectiveness(depends on what they sell, keep track of maintenance and the spare parts used and track the supplier that delivered them, usually starting from the parts with the higher cost on the goods).

Requirements management is the passage where we handle relationships with suppliers not limited to the transaction but we also start the cooperation from research and development. The supplier gains the fact that is hooked to a growing trend. If you have to change supplier you have to teach the same lessons to the new supplier. But we want to have the supplier ready more quickly, so you have training programs to teach the new suppliers how to behave even before starting to effectively work with you. With a new company is easier to adapt as there is flexibility and adaptation and the reaching of a goal may be faster than a big corporation, this is a good way to let companies know you.

It is not only a question of Software, you need to change the behaviour of your company and of your suppliers.