

# **Web Information Systems**

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**Business Information Systems**

# What are Web Information Systems (WIS)?

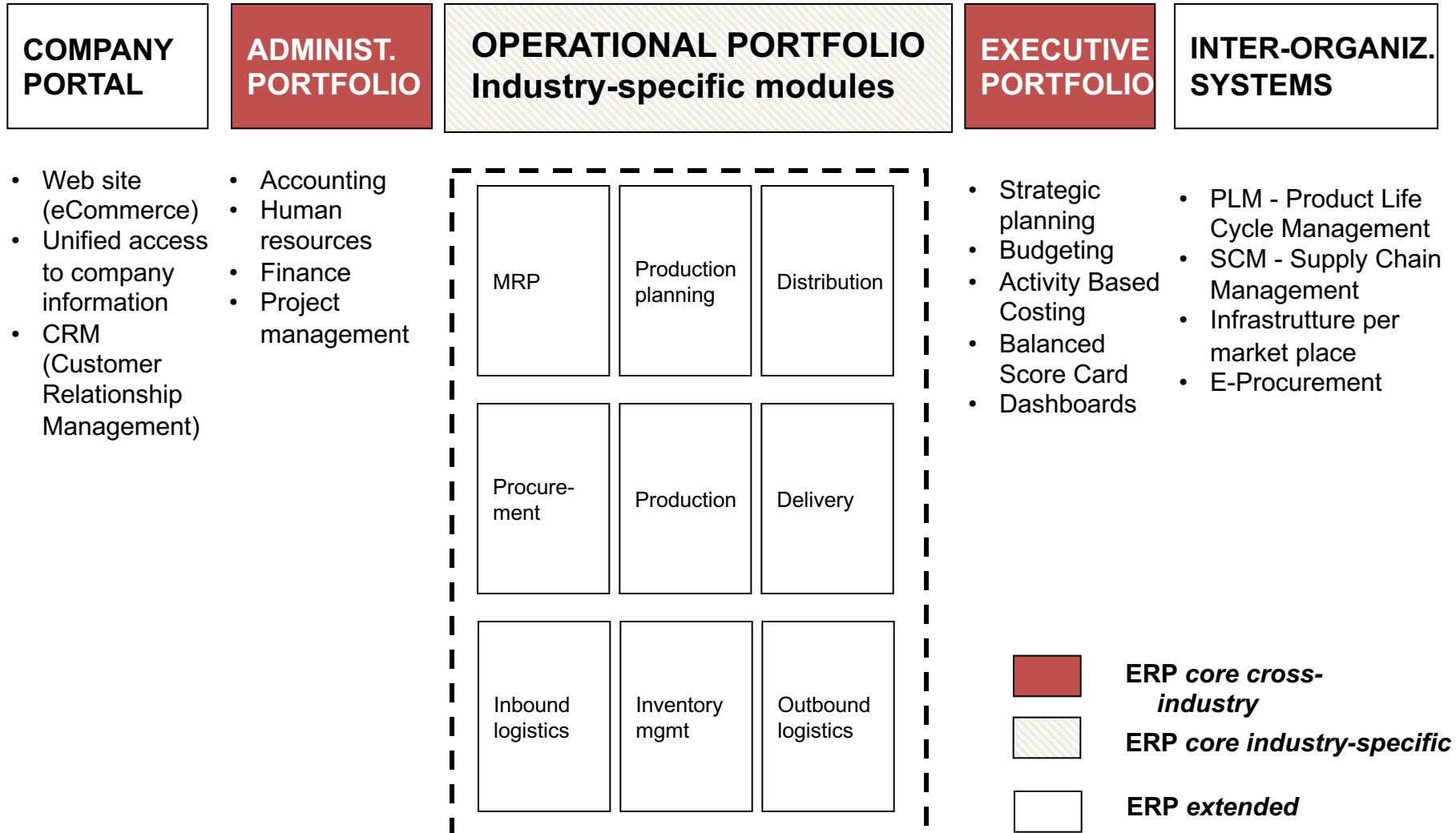
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- Definition of WIS as a system where:
  1. The communication among machines (servers and clients) uses the public Internet or an IP-based private VPN
  2. Users access functionalities through a browser



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.

# Functional architecture of ERP systems: overview



# Innovation with WIS

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- 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

# eCommerce – definition

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- 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.

# The starting point of eCommerce projects

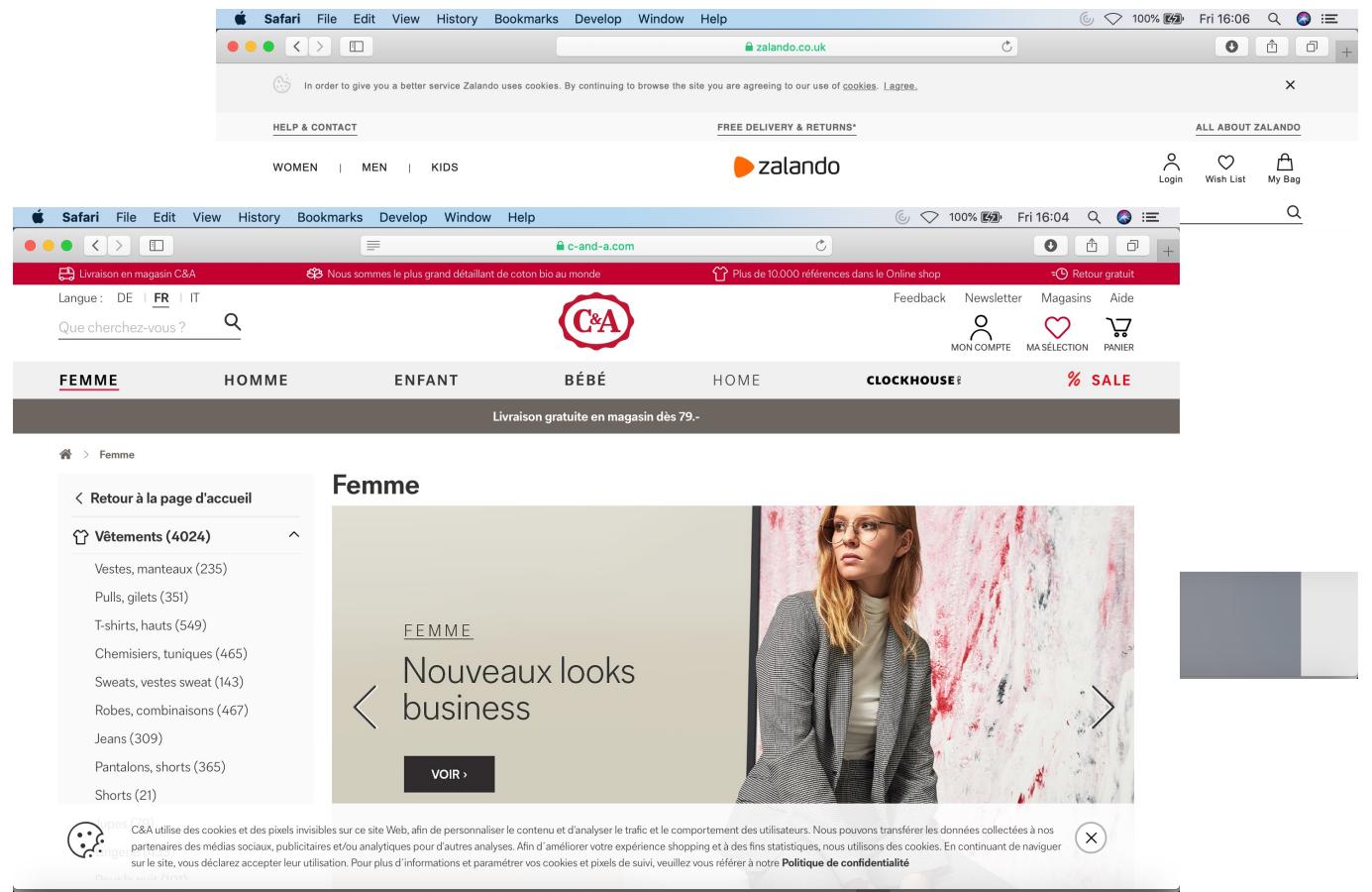
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- eCommerce sites have been often implemented by separate teams, often involved in rebranding initiatives (e.g. Bank24 - Deutsche Bank)
- The design of eCommerce sites involves a variety of competences (typically, IT + design + product innovation + 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

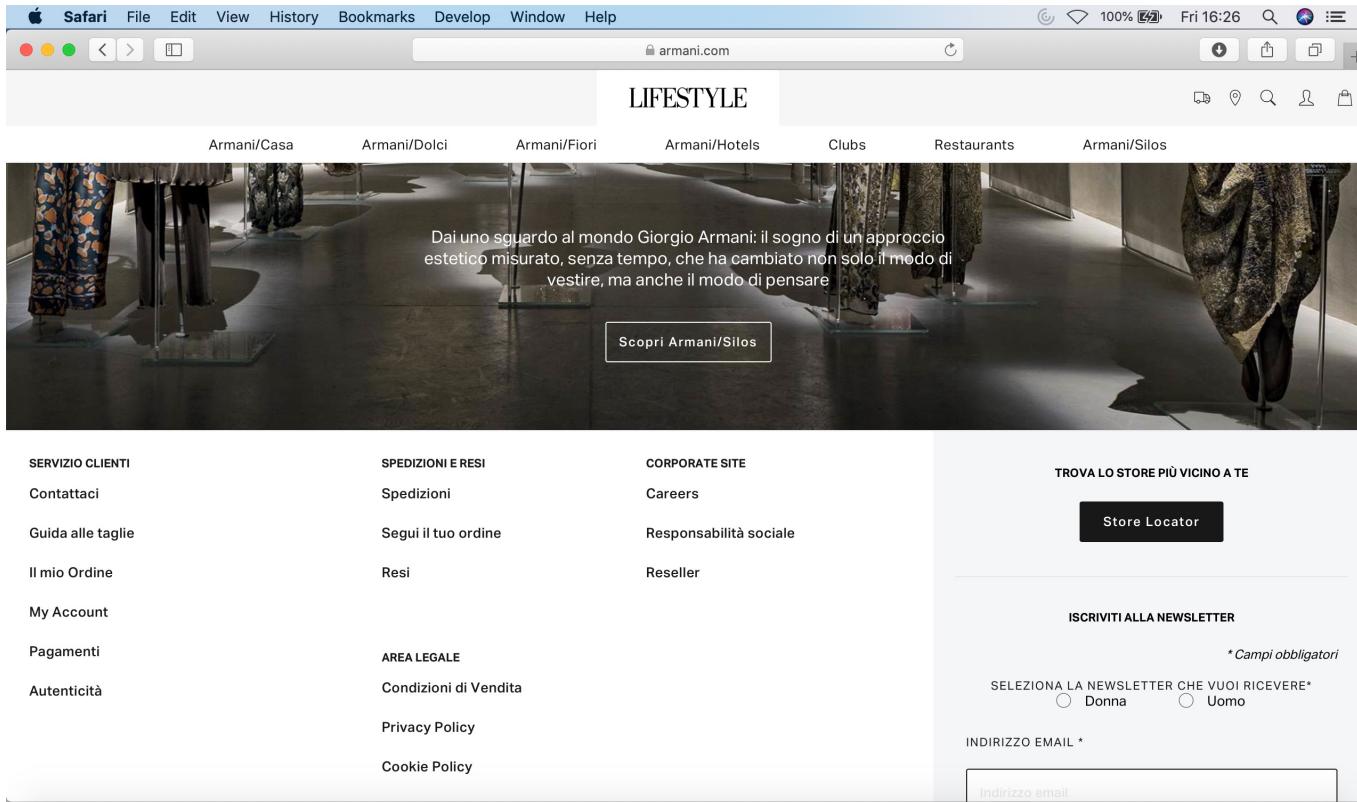
# eCommerce – examples

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- eFashion, fashion eCommerce, digital fashion
- eGrocery
- eTourism/eTravel
- eBanking
- eTrading
- eLearning, MOOCs
- eBooks
- eTicketing
- video/music streaming
- eGaming



# Company sites: information services



90 % of visits to a company site are aimed at getting information

- *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

# Company portal, eCommerce, organizational structure

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- 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.

# Quality criteria of an eCommerce site

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- **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)

# Search engines

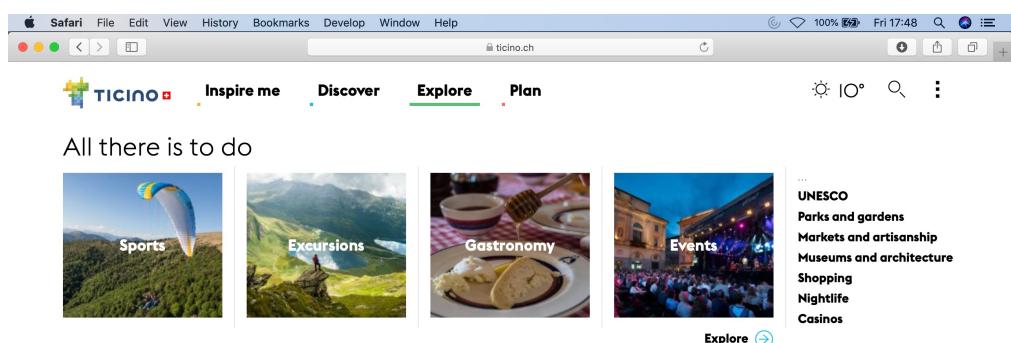
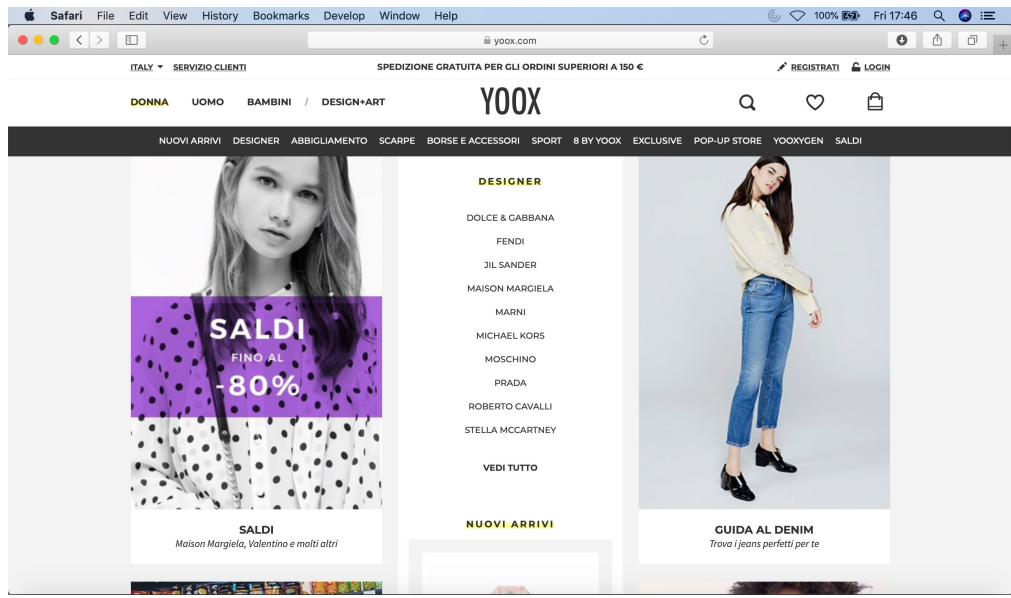
A screenshot of a Safari browser window displaying Google search results for the query "fashion ecommerce". The search bar at the top contains "fashion ecommerce". Below the search bar, there are navigation links for All, Images, News, Videos, Maps, and More. On the right side of the toolbar, there are icons for Settings, Tools, and SafeSearch on/off. The main content area shows search results for various fashion e-commerce websites, each with a title, URL, and a brief description.

Google search results for "fashion ecommerce":

- Top Ecommerce Fashion Websites in 2019 [18 Beautiful Examples]**  
https://www.bigcommerce.com/blog/fashion-apparel-e-commerce-design/ ▾  
Get a breakdown favorite **fashion ecommerce** website design examples from top online retailers around the world selling clothing and apparel online.  
Verge Girl. · Natori. · Olive Clothing. · Bohemian Traders.  
You visited this page on 2/21/19.
- 60 Amazing Online Fashion Stores and Their UX Tricks You Should ...**  
https://ecommerce-platforms.com › Ecommerce Websites ▾  
Jan 28, 2019 - Here are 60 amazing **fashion** stores that are killing it online. .... to discover more goodies like these check out our sister site **ecommerce** design.
- Top 5 Fashion E-commerce Websites That Change The Way You Shop**  
https://www.forbes.com/.../top-5-fashion-e-commerce-websites-that-change-the-way-y... ▾  
May 5, 2016 - The times have changed - **fashion** brands are appearing in the market so quickly, that sometimes it is pretty easy to miss something. .... That is why **e-commerce** aggregators are becoming so popular. .... Here is the list of TOP 5 **fashion e-commerce** websites, who are the first and biggest ones ...
- Fashion E-Commerce. How is it different? - Maven Ecommerce**  
https://www.mavencommerce.com/fashion-e-commerce/ ▾  
Fashion **e-commerce** is a brutally competitive online business. Standing out means knowing what your customers want.
- The Ecommerce Fashion Industry: Statistics, Trends & Strategy - Shopify**

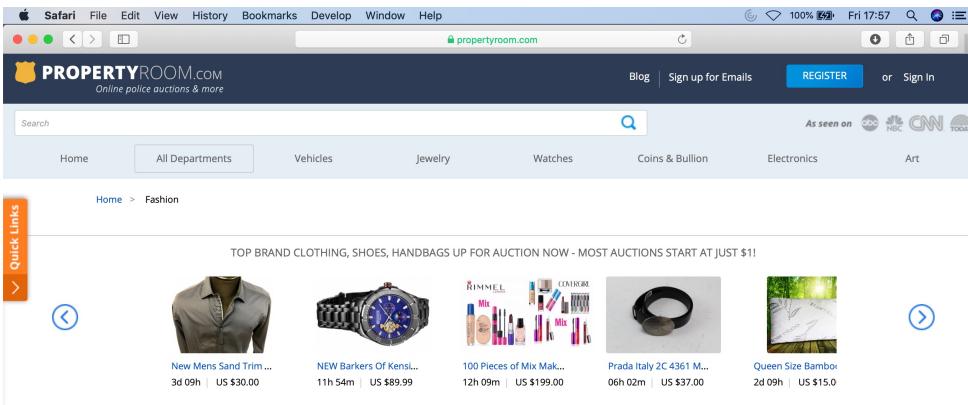
- Google, Bing, Yahoo!
- Differences: total number of Web pages in the directory of the search engine (between 1 and 3 billion pages).
- 60% to 90% of Web pages is not considered by search engines
- Ranking of results based on term similarity
- Pay for ranking (Google adwords)

# Marketplaces

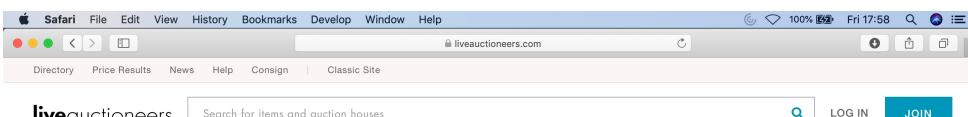


- They sell products and services from multiple companies, e.g.:
  - Geographical brands (e.g. «Franciacorta» or «Ticino»)
  - Users' needs (aggregators, e.g. Yoox).
- Companies should share order management and delivery processes.
- Common within districts for SMEs.
- Standard in mobile app market (App store, Play store).

# Online auctions



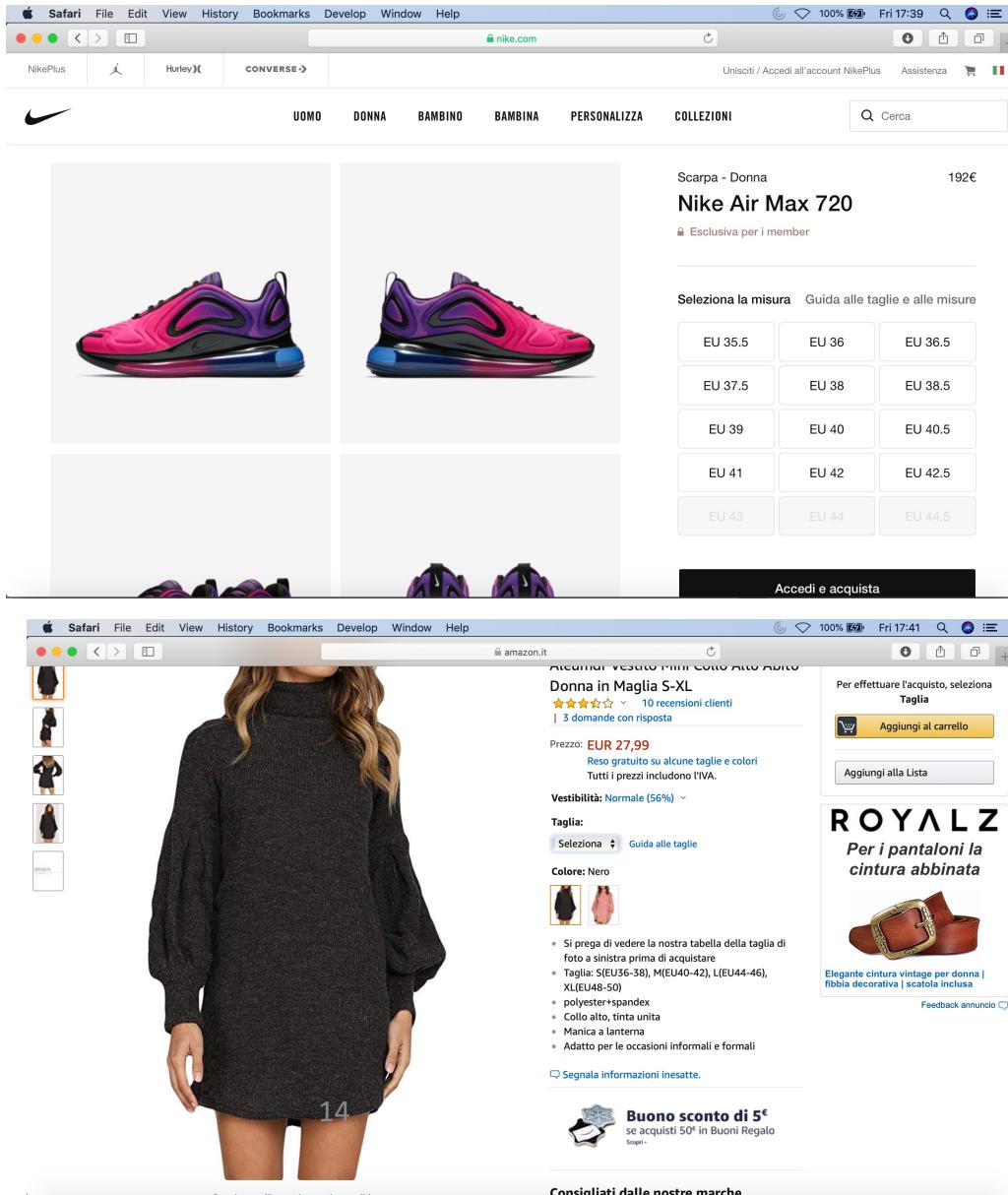
A screenshot of the PROPERTYROOM.COM website showing filtering options. The "FILTERS" section includes dropdown menus for "CATEGORIES" (Accessories, Clothing, Shoes), "ITEM TYPE" (Books, DVDs, CDs, Collectibles, Memorabilia, Home &amp; Garden, Fashion), and "AUCTION TYPE" (Live Auctions, Consignment). Below the filters is a "Sort results" section with a dropdown menu set to "Ending Soonest".



A screenshot of the liveauctioneers.com website showing the "Fashion" category. On the left is a sidebar with "All Categories" (Fashion, Accessories (914), Women's Clothing (427), Clothing (368), Women's Handbags, Accessories &amp; Shoes (297), Shoes (23), Men's Accessories &amp; Shoes (16), Men's Clothing (7)), "AUCTION TYPE" (Live Auctions, Consignment), and "CREATOR" (Feedback). The main content area shows a grid of three fashion items: a dark blue handbag, a rack of colorful patterned shirts, and a black jacket. Above the grid is a "FOLLOW SEARCH" button and a "SORT: Best Match" dropdown.

- Ascending (or English) auction. The vendor sets a minimum price. The product is sold to the last highest offer (with timeout).
- 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.
- Vickrey auction: all customers make an undisclosed offer within a given time frame. The product is sold to the second highest offer.

# eCommerce sites: advanced functionalities



- Product configuration
- Pricing
- Online orders (digital signature vs. login)
- Payment
  - Credit based (credit cards)
  - Debit based (Paypal)
  - Token based (Bitcoins)
- Order status
- Transaction log
- Online services
- Post sale services
- Customer profiling

# 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 catalog 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:

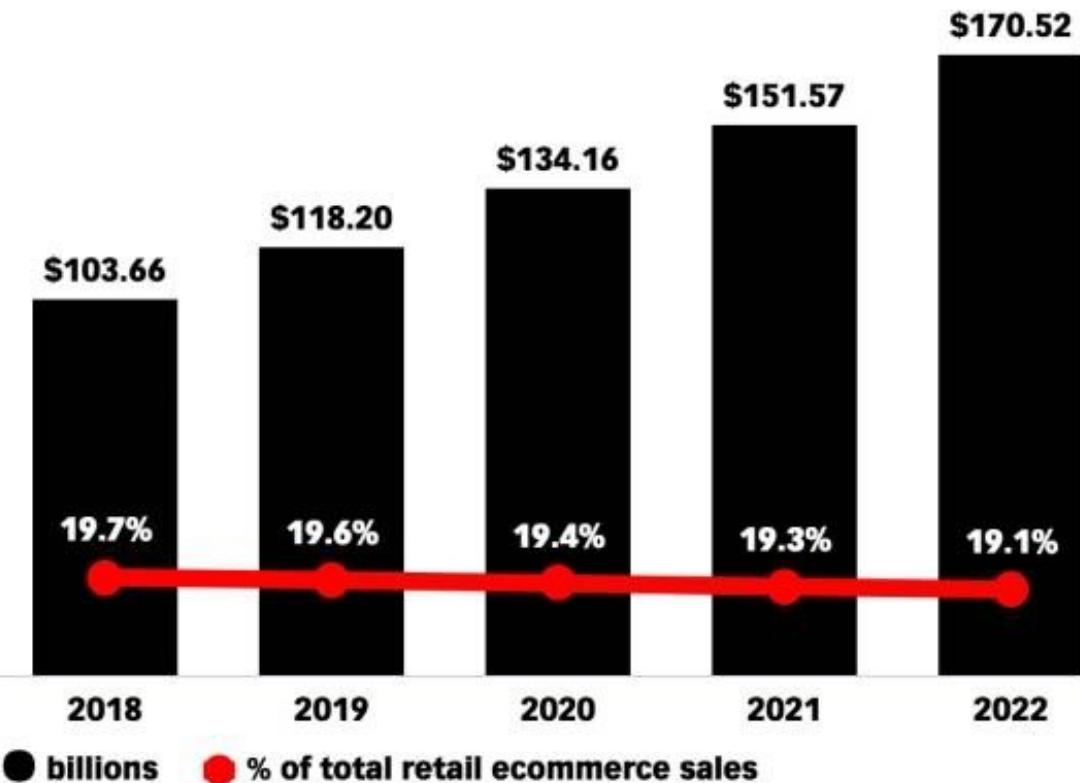
- Increasing sales for low-turnover or high-stock products
- Promote new products
- Prevent churn
- ...

# eFashion – growth trends

- eFashion is growing fast
- eFashion is growing comparatively less than other types of eCommerce
- The percentage of eCommerce sales varies markedly by product segment, from around 2% for grocery to more than 20% for apparel to the overwhelming majority of sales in categories where products can be digitally delivered, like music, books and games (source: Forbes).

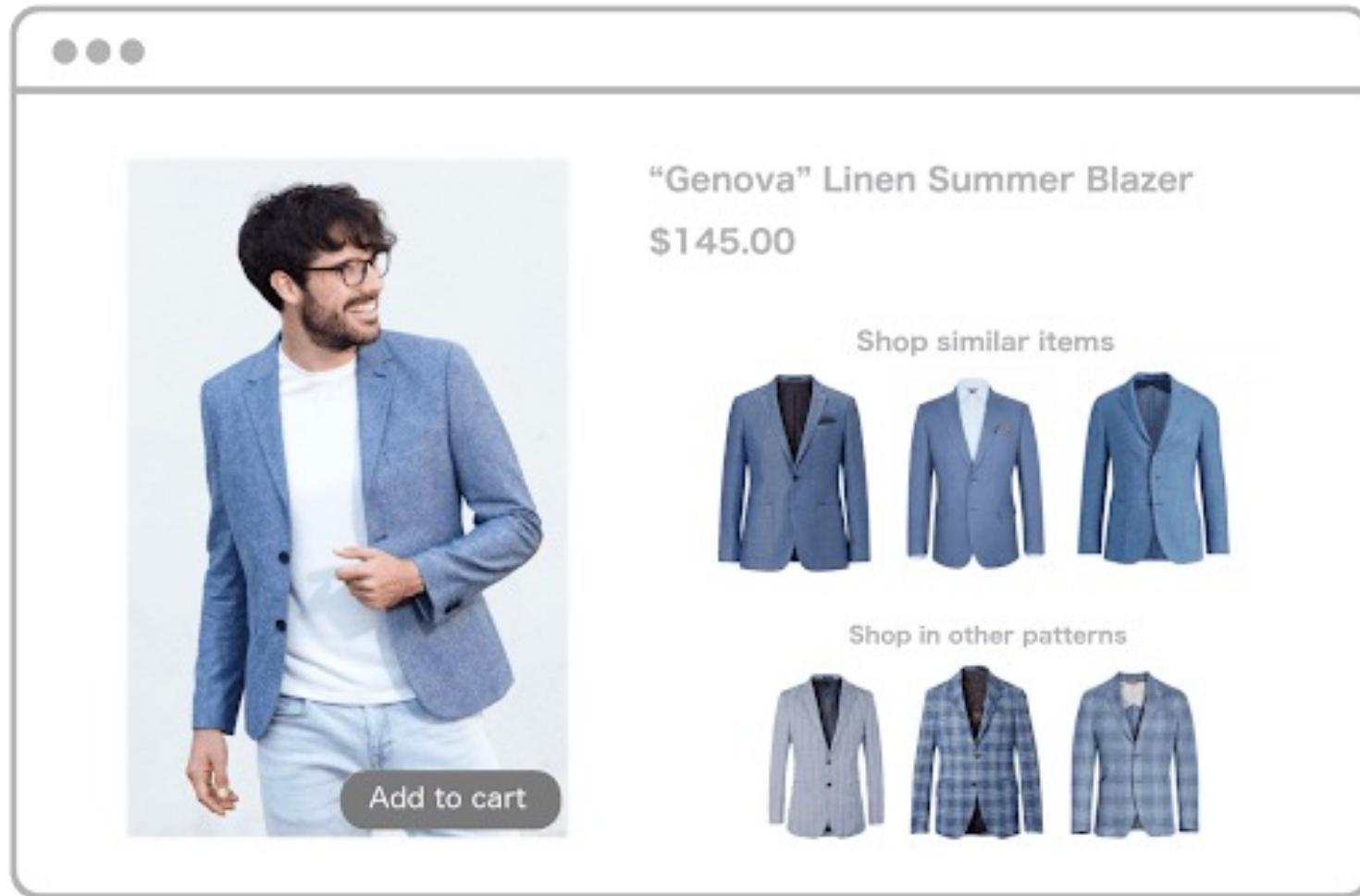
**Apparel & Accessories Retail Ecommerce Sales**

US, 2018-2022



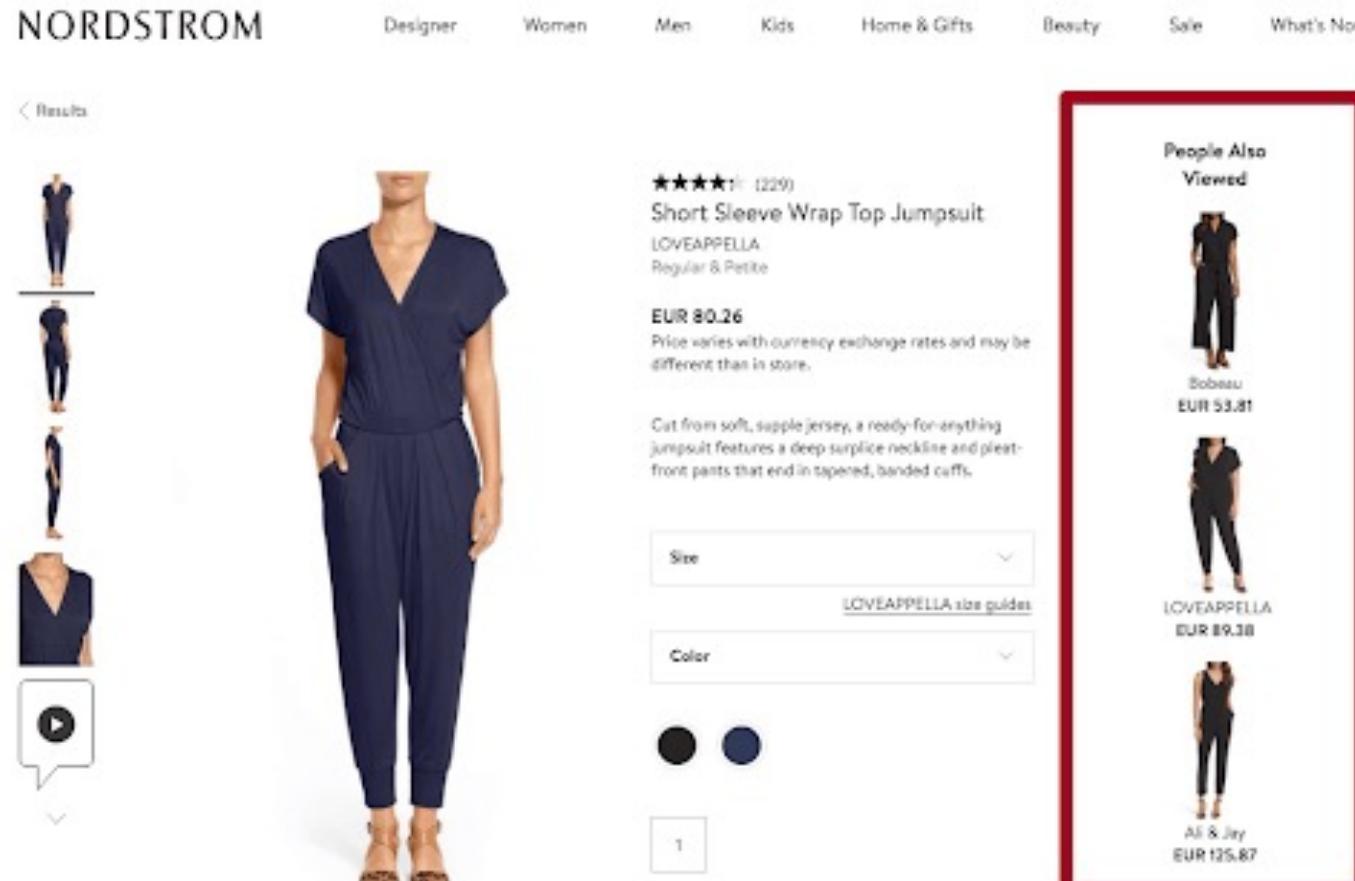
Source: eMarketer, February 2018

# Similar product recommendations



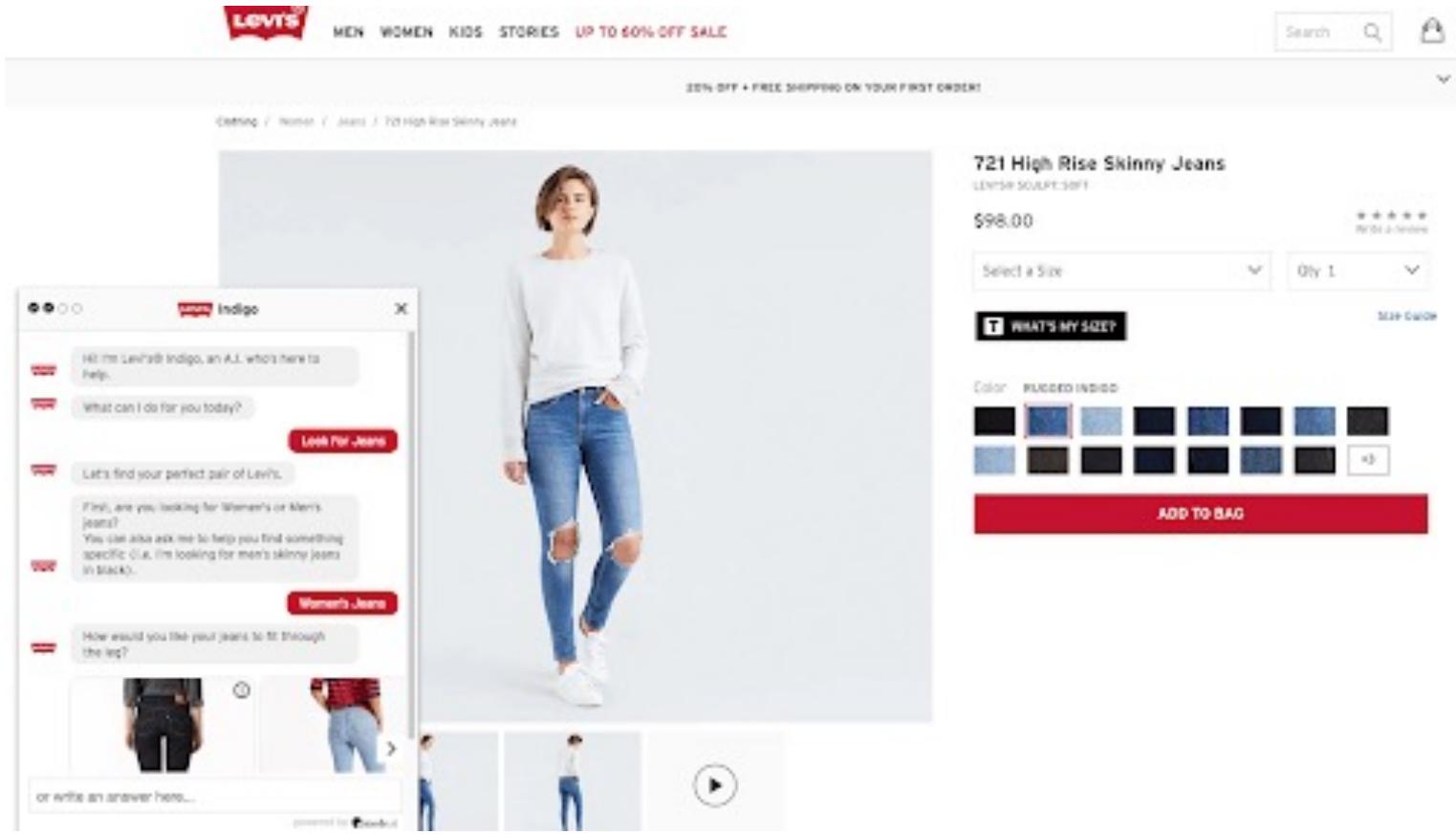
Webshop visitors often abandon the site when an item is **out of stock, not in their size or it is not exactly what they were looking for.** Through **computer vision** it is possible to automatically suggest similar items when a customer is taking a look at a specific garment or accessory, **reducing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

# Recommendation engines (based on customer segmentation)



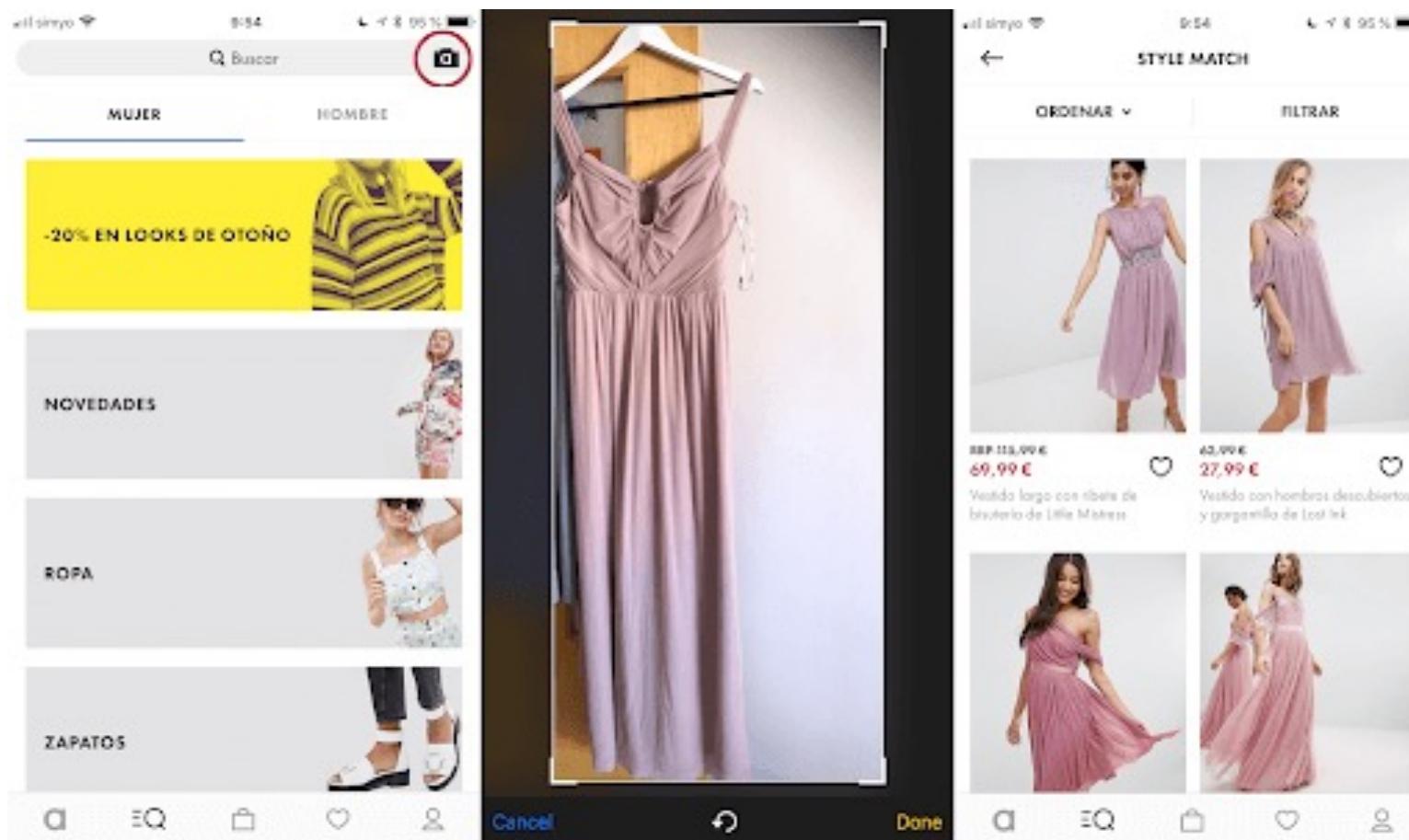
Retailers' goal has become to **personalize merchandising**, depending on their customers' taste. This is the main reason why AI-powered recommendation engines are quickly gaining ground in the eCommerce field. They provide personalized product recommendations based on user behavioral data and are often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

# 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**

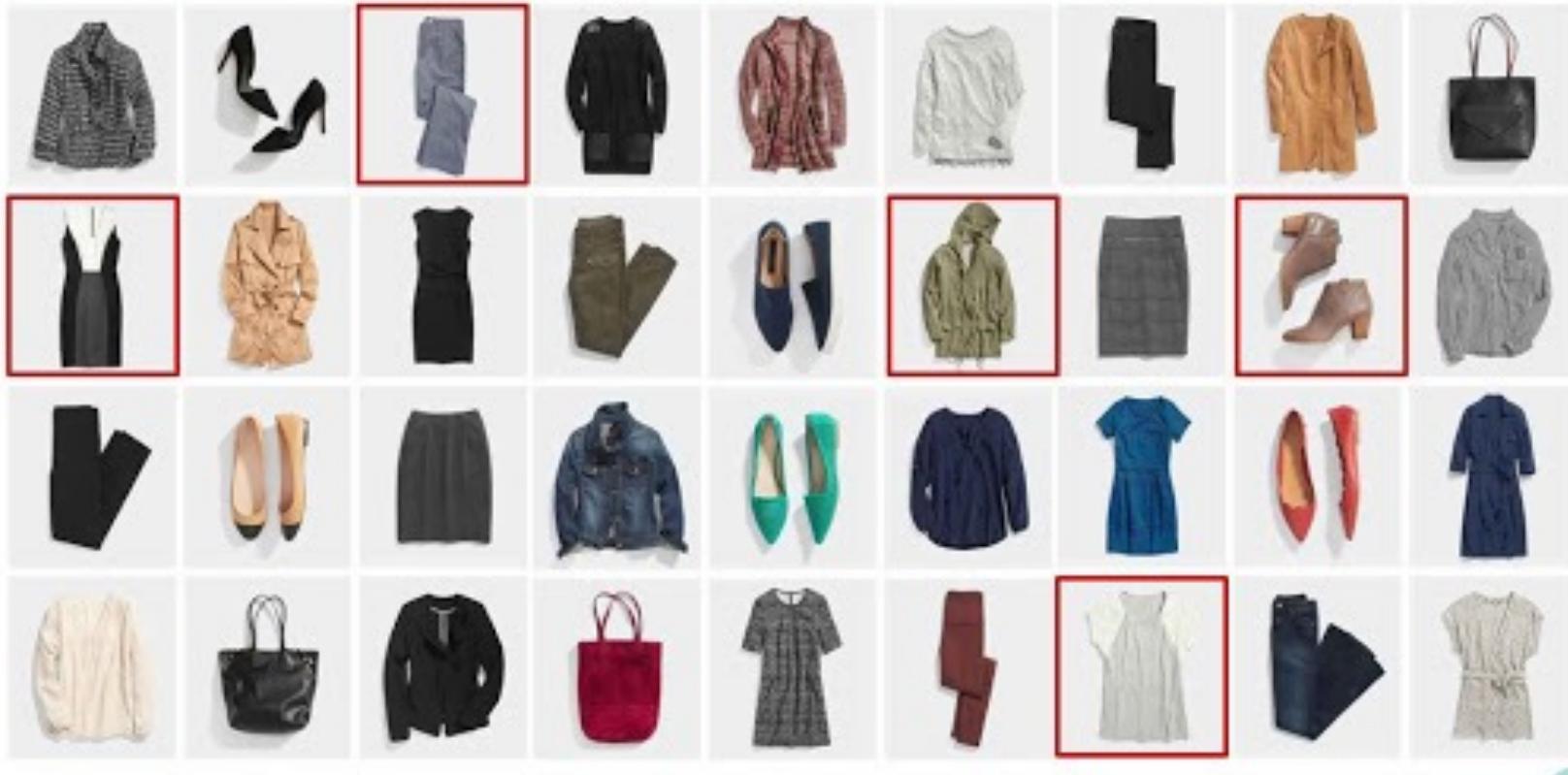
# Visual search



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)

Ranked styles recommended for client - which will the stylist choose to send?



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

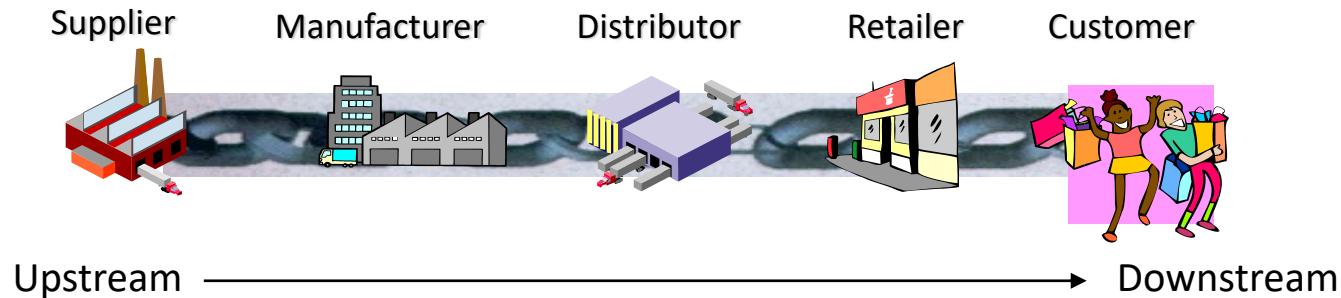
# Supply chain management: definition

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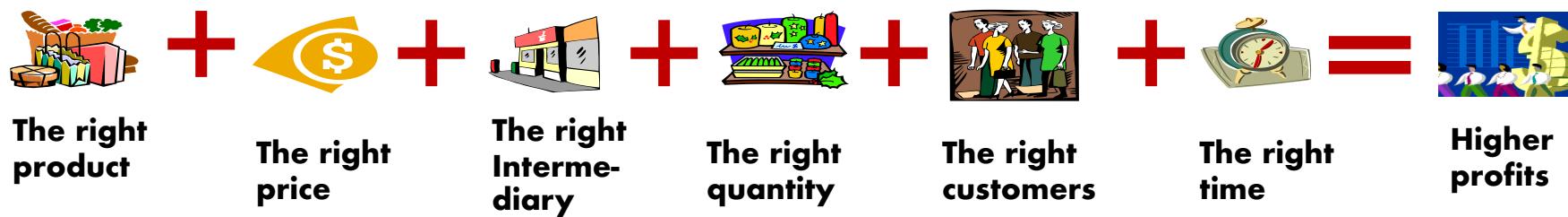
- Software supporting SCM coordinate and integrate all activites along a value chain involving multiple companies, from the downstream company that receives orders to the upstream suppliers working on base resources and materials.
- Fundamental benefits: cost reductions, service level improvement, flexibility.

# SCM: objectives

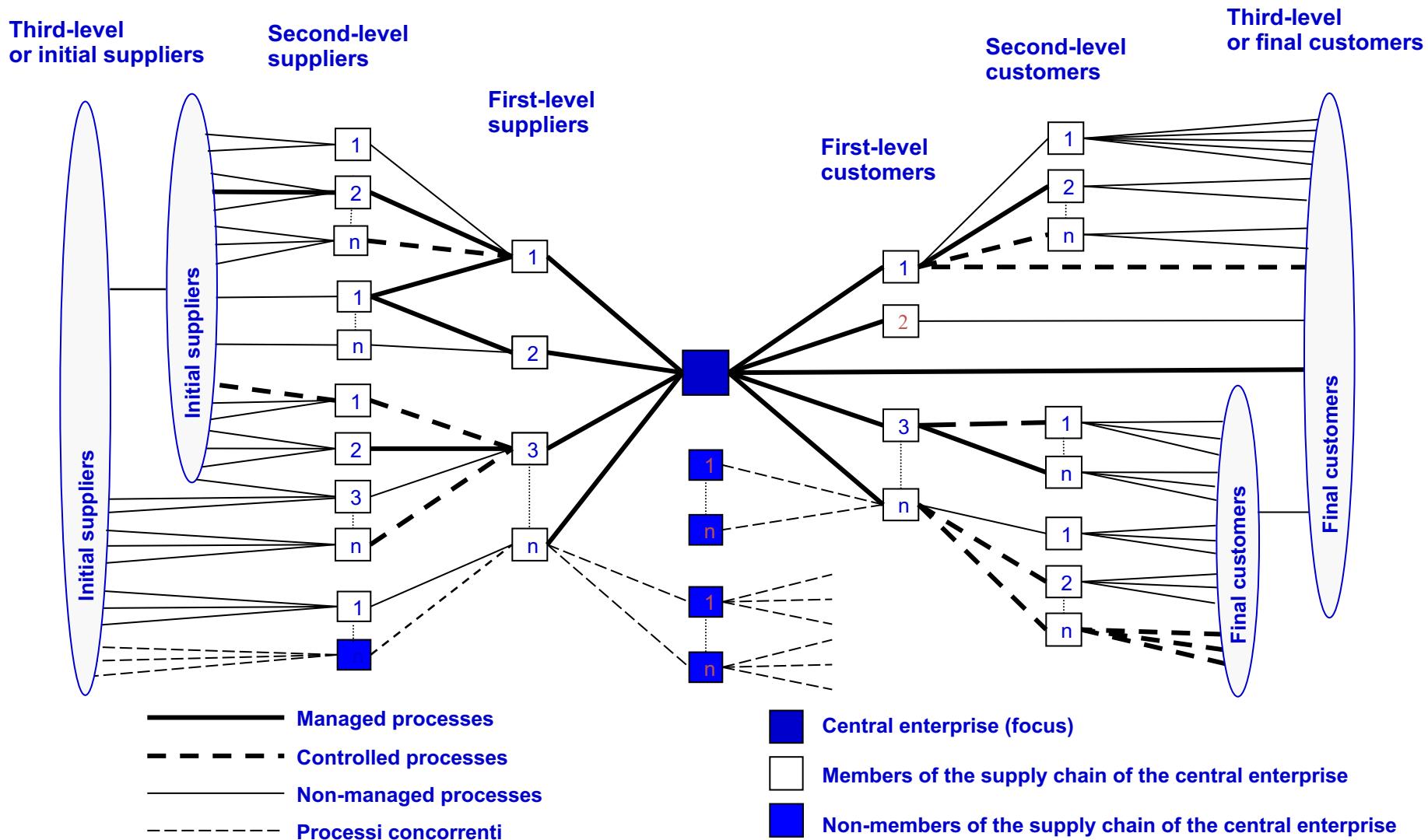
The supply chain is composed by:



Goal: adapt supply to demand

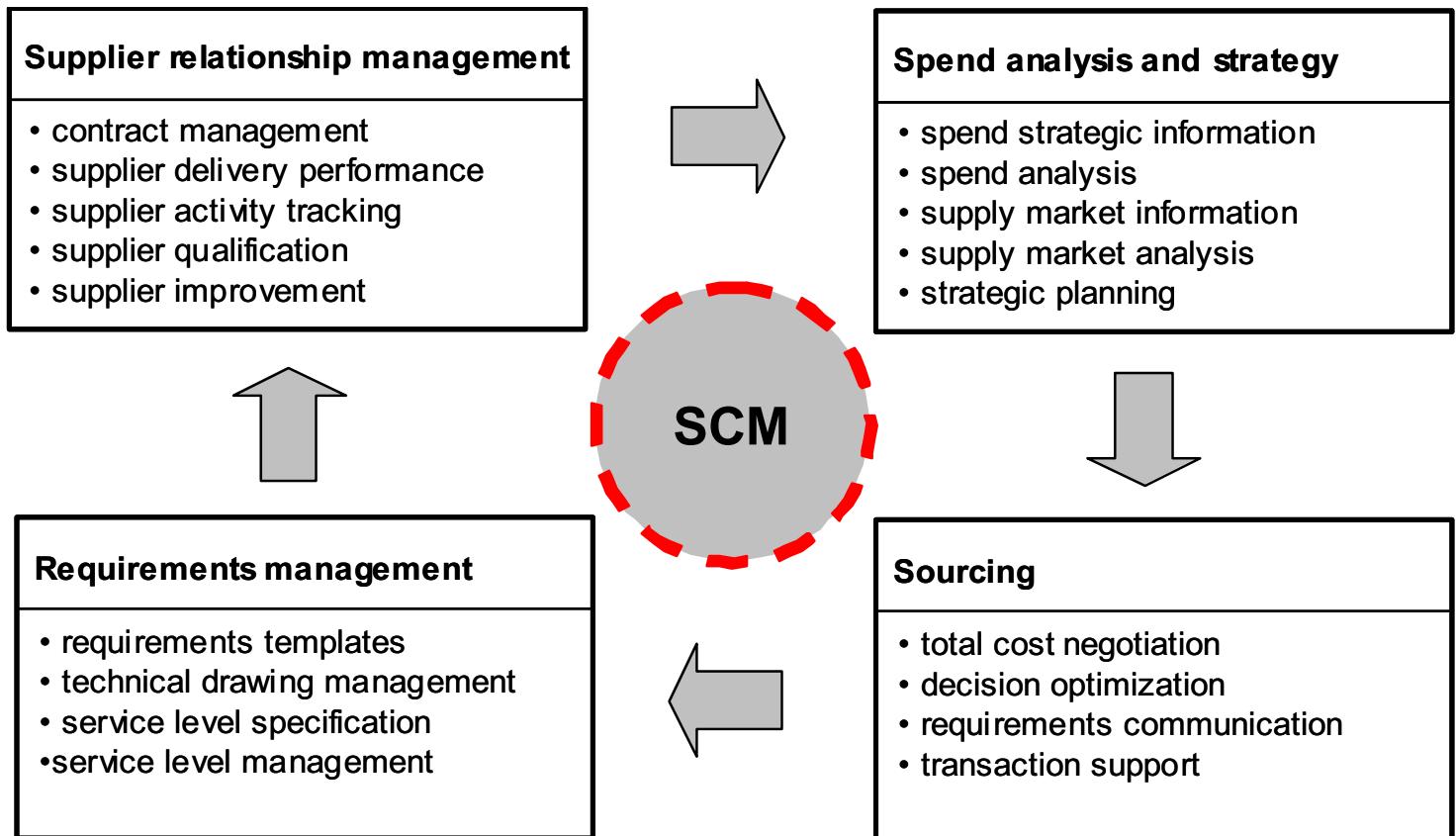


# SCM: relations among companies



# SCM: continuous learning process

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# Contacts

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