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## Recommender Systems and Social Networks: What Are the Implications for Digital Marketing?

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Recommender systems have been used from the start by social networks. The most representative case is that of Facebook which currently integrates the preferences of the users' friends. The better known social networks add socio-geo-location-based graphs to the social graph (see Facebook's "graph search"). The set of these recommender systems are responsible for the creation of monetized advertising offers. Although they are vital to the economic models of networks such as Google Plus, YouTube, Twitter or Facebook, they raise a certain number of questions regarding the evolution of digital marketing and more specifically e-commerce. Furthermore, they represent only one type of recommendation and are being used increasingly in tandem with other types of recommendations including personalized recommendations.

The aim of this chapter is therefore to describe, first, the concept of social recommendation. We will show that its management is difficult for brands and that recommender systems help free them from a certain number of problems concerning, notably, the transmitter of the recommendation (consumer, expert, opinion leader, etc.). Second, we will point out the benefits of these recommender systems for the development of social commerce. We will measure their efficiency in terms of online sales,

operating principles, and usage principles. A presentation of social recommendation as it has been applied by Facebook will help us address its acceptance by consumers and more theoretical questions which aim to increase the amount of thought put into good practices for social recommendation as well as technological evolutions which will considerably increase the number of possibilities.

### **3.1. Social recommendations: an ancient practice revived by the digital age**

Social recommendation found a new life because of social networks. It distinguishes itself from three other main types of recommendation including:

1) item recommendation: this recommendation is based on an analysis of preferences in order to advise the consumer about a similar product. Preferences can be determined on the basis of the past purchasing behavior of the individual;

2) personalized recommendation: this recommendation uses an analysis of the Internet user's browsing behavior. It will take into account key words typed in, search history, navigation route within a Website, etc.;

3) hybrid recommendation: this recommendation combines item, personalized and social recommendation. It helps overcome data scarcity problems often encountered by recommendation algorithms.

Social recommendation identifies users with similar preferences. The idea is to consider that if A chose the same item X as B, then it is sensible to recommend product Y to B which A also purchased. This recommendation is generally based on a user-centric approach. The notion of similarity (A is similar to B) is thus based on social recommendation. It bases itself on the research-proven idea that we are more influenced by "ourselves" than by an individual who is perceived as different. Thus, the concept of social recommendation is widely used in marketing. It was first addressed from a word of mouth perspective. Herr *et al.* [HER 91] showed that consumers more voluntarily listen to advice from close relations regarding the purchase of brands and products rather than advertising. This interpersonal information can come from many sources: family, friends and entourage in the broader sense of the word. Despite the abundance in literature dedicated

to recommendation, researchers continue to raise structural questions on recommendation, its implications and the way in which brands can manage them.

### ***3.1.1. Recommendations: a difficult management for brands***

Consumers often attribute their acquired competencies to their entourage, competencies which are sometimes significantly overestimated. Thus, choices made from recommendations would be non-optimal and sometimes would lead to veritable errors in purchasing decisions. Finally, the more the product to be purchased is important, the more the buyer will prioritize recommendations in pairs over other sources of information. The digital age has multiplied the number of transmitters of recommendations. In addition to product-using consumers, there are “lead-users” [FRA 06] or experts. Nevertheless, this multiplication of sources will not necessarily lead to a better knowledge of the product or a choice that is better adapted to one’s needs. Bertrandias and Vernettes [BER 12] showed using a study on 634 consumers and their choice of a laptop computer that advice from friends and opinion leaders are the most sought after. Experts are less in demand, with their competence being underestimated. This research enables one to go against a preconceived idea: the consumer is an expert, and has the possibility of joining other experts on forums or in their entourage. In fact, the consumer is not in a position to distinguish the pseudo-opinion leader from the genuine leader. Furthermore, they follow the advice of friends more for emotional reasons than for objective ones. Brands are therefore forced to increase the number of communication campaigns in order to counter the false ideas spread by social networks or the close entourage of their buyers. This difficult management of recommendations is accentuated by the appearance of the Internet.

### ***3.1.2. Internet recommendations: social presence and personalized recommendations***

Internet recommendations are of interest to researchers regarding the acknowledgment of their importance in the choice of a product. [LAR 07] shows that Internet “buzz” stems from a high number of recommendations from Internet users and that this buzz can be responsible for a movie’s

success at the box office. Since 2000, Mann and Stewart [MAN 00] described recommendations as a participation in exchanges on common interests, thus creating a digital similarity between individuals. These recommendations can be considered as results of the decision of certain individuals to broadcast their opinion on their experience with the product. Verette [VER 07] describes them as independent and influential. Finally, [VER 04] emphasize Internet users, with the first buyers often those who can more easily share their impressions on the product as they feel more like experts. These results are increasingly more anticipated in the realm of social networks. Ardelet and Brial [ARD 11] show that social presence plays an instrumental role in the confidence that Internet users put into recommendations. Defined as “the subjective ability of a screen to render a speaker more prominent during a discussion broadcast over a screen [SHO 76], social presence is reproduced on social networks where speakers cannot see each other. Web recommendations, for the most part, are based on non-anthropomorphic vectors,<sup>1</sup> but this status is called into question by social networks. The transmitter of the recommendation is often identified by phrases such as “Within your circle, Alan also likes this product” or “Share your latest purchase with your friends”. According to Ardelet and Brial [ARD 11], this presence is subjective and depends on a certain psychological similarity between the influencer and the influenced. It would help reduce the spatial distance. After that, the recommendation must be social *and* personalized since this perceived similarity increases its recommending power. This similarity depends on relatively precise individual criteria: age or gender [GEF 97] and purchase motivations [HAS 06]. These similarities can be found in browsing habits, search history and visited websites. However, social presence and personalized recommendations are not the only two variables to be taken into account in a successful influence strategy. Ardelet and Brial [ARD 11] showed that certain digital mediums such as blogs benefit from recommender systems with very little social presence (no names of contributors, no photos or avatars). Nonetheless, their recommendations have an influential power which is greater than certain engines based on the use of many anthropomorphic vectors. Indeed, the trust put into the transmitter sometimes

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<sup>1</sup> In effect, the famous line by Amazon “those who bought this products also like this one” is typically non-anthropomorphic: no photos or descriptions of consumers having transmitted the recommendation and no use of these users’ geo-location.

surpasses the influence of recommendations. Another issue: how can consumers judge the value of recommendations by certain recommendation professionals (consumers benefiting from promotions and distinctive symbols recognizing them as better contributors<sup>2</sup>)?

Thus, questions pertaining to recommendation on the Internet and more specifically social networks are plentiful. They deal with:

- 1) the aptitudes of consumers to distinguish valuable interpersonal information which is genuinely useful when buying;
- 2) the abilities of algorithms to identify opinion leaders, experts or simply influential consumers. As highlighted by Vernet *et al.* [VER 12], an authentic research diary would be required on the subject, showing how badly managers as well as researchers are awaiting answers to questions which are being asked with increasing relevancy involving the management of communities, online brand presence and its reputation;
- 3) the form which these recommendations must take. Institutional transmitters (blogs, brand websites) have forfeited their influence capacity to forums. Social networks appear as the most adapted platforms for generating a recommendation which is both social and personalized. However, trust in the transmitter becomes an essential variable which must be taken into account. Finally, brands have also taken note of the importance of codifying recommendations in the form of stars [LAR 07]. This codification generates consumer purchases based on heuristics helping reduce procrastination linked to online purchases.

Because of the implementation of automated recommender systems, brands therefore rationalize recommendation processes which are far from obeying commonly established rules. Recommendations based on opinions are not the only types of recommendation which complicates the understanding of this concept which benefits from contributions from

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<sup>2</sup> We will use the example of Foursquare, a social network which gives real-time recommendations via mobile as soon as the consumer comes within the close proximity of a location recommended by the community. Foursquare relies on a recommendation system which values the contributor who becomes the “mayor” of a location and will be distinguished by a badge depending on the number of check-ins (visits notified to the community) completed.

computer science, psychology and marketing. Although the use of recommendation mechanics for marketing is far from being finalized, it is no longer necessary to prove the effects of recommendations on e-commerce.

### **3.2. Social recommendations: how is it used for e-commerce?**

According to a study carried out by the CCM Benchmark Institute<sup>3</sup> in 2013, recommender systems initiated by Amazon are constantly evolving. Since it is possible today to present a product to a consumer after having identified their browsing habits, their position regarding the brand (loyal, new, ready to abandon), content typed during browsing sessions and what brought them to the Website, the referrer Website, using personalized recommendations appears to be a new incentive of e-commerce. However, recommender systems would not abandon social recommendations. The hybridization of recommendations effectively improves the performance of e-commerce websites.

#### ***3.2.1. Efficiency of recommender systems with regard to the performance of e-commerce websites***

Recommendation engines are based on the hybridization of recommendations for over one-third of online sales websites<sup>4</sup>. The conversion rate (the ratio between the number of visitors who visit the Website and the number of buying Internet users) has barely increased. However, this small increase (from 2 to 2.22%) could represent thousands of euros on large sales websites<sup>4</sup>. Other sources have led to better performances<sup>5</sup>. Amazon has multiplied their ratio by two: 30% of its turnover was generated by its product recommendation tool. Faced with this success, start-ups specialized in the specification of personalized social recommender engines raised significant capital. We mention RichRelevance

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3 e-merchandising and performance personalization, available for consultation at: <http://www.slideshare.net/lesechos2/synthese-emerchandising-netwave2013>.

4 <http://business.lesechos.fr/directions-numeriques/le-e-commerce-cherche-un-nouveau-souffle-avec-la-recommandation-personnalisee-8071.php>.

5 <http://www.journaldunet.com/ebusiness/expert/54446/la-recommandation-sociale-personnalisee-nouvel-eldorado-des-e-commerçants.shtml>.

with 58 M\$ or Baynote with 55 M\$. Regarding good market practices, they consist of<sup>6</sup>:

1) avoiding the “coldstart” phenomenon. The coldstart consists of never being able to recommend a product due to the low availability of statistical data which prevents one from calculating relationship scores between this product and others. Algorithms will then take into account peripheral criteria (no longer the product itself, but its color or price). This technique is often used for seasonal sales or promotions;

2) integrating filtering rules adapted to the consumer lifecycle. A first-time visitor can benefit from social recommendations taken from their Facebook profile, but personalized or item recommendations would be more difficult;

3) implementing recommendations from the welcome page and not only on the basket page or product page. This implementation which happens well before any purchase is made helps reduce the conversion funnel and rebound probability (percentage of visitors leaving the Website at a given page);

4) ensuring that filtering rules are constantly evolving by going beyond the base rules of recommendation. It is advised to add filters for things such as promotional products, products to be cleared, higher-margin products and so on. Thus, recommendation is commoditized. It improves itself depending on the marketing plan or the selected commercial strategies of key performance indicators (KPIs).

### ***3.2.2. Recommender systems used by social networks: from e-commerce to social commerce***

Recommendation is at the heart of social networks. The latter are effectively based on social sharing (opinions, music, video, photos, etc.) within communities of friends. Furthermore, social recommender systems do not only function within the ecosystem of networks, but also with many digital mediums. According to Stenger and Coutant [STE 13], social

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<sup>6</sup> <http://www.journaldunet.com/ebusiness/expert/56252/recommandation-produit---les-bonnes-pratiques.shtml>.



networks are difficult to classify. They share six common characteristics with the set of these platforms:

- 1) social networks are based on user-generated content (UGC);
- 2) they allow Internet users to participate with simple usage tools and applications;
- 3) they are mostly free, but require compensation such as tracking, profiling and the use of user data;
- 4) they propose content which is constantly changing according to an evolving logic;
- 5) they are the byproduct of the combination of usage, technology, economic strategies and their evolution;
- 6) they encompass very diverse social practices and norms.

Among the increasingly vast typology of social networks which practice social recommendation, it is possible to identify:

- 1) search engines based on social recommendation. This is the case of Nomao<sup>7</sup> (see also Chapter 11, a search engine using geo-location which attempts to take into account the recommendations of Internet users when displaying results, such as similar businesses, restaurants, etc.). This search engine can also be synchronized with Facebook. Other engines are based on equivalent principles such as StumbleUpon;

- 2) e-commerce websites which integrate social sharing buttons on their product pages (generally for popular social networks such as Facebook, Google Plus or Twitter), but also search engines embedded within them. The particularity of these engines is to personalize the client relationship by integrating data from social networks, data from browsing cookies and also information from the customer relationship management (CRM) of the business and the data management platform<sup>8</sup> (DMP) which indexes all of the

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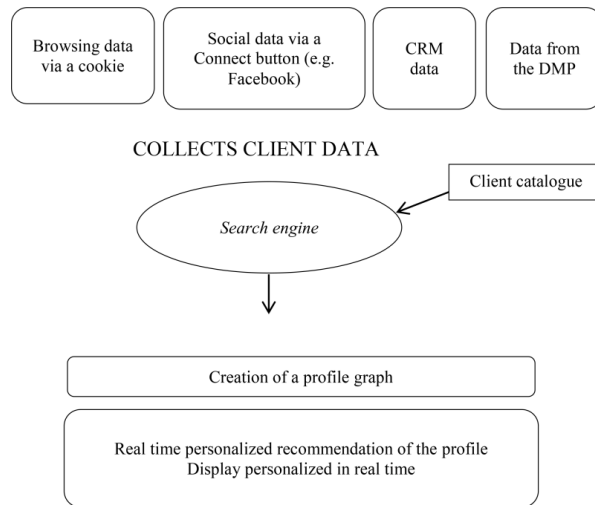
7 <http://www.commentcamarche.net/faq/29445-la-recommandation-sociale-nouveau-defi-pour-les-entreprises>.

8 Data management platforms (DMP) were initially created to improve the targeting of advertising campaigns on the Web. Today, they are used increasingly more to aggregate consumer data coming from different channels. Furthermore, they enable the multiplication of segmentations on extremely varied criteria, which will be used in different personalization strategies.

contact points of the client with the brand (opening of an e-mail, subscription to a newsletter, etc.). One of the more recent engines founded on this principle is Antvoice<sup>9</sup> which describes itself as a social recommendation engine which uses the history of the client and their social profile. The functionality of the engine is based on a social graph which helps display recommendations in real time which are adapted to the preferences of the clients (Figure 3.1);

3) social networks based on social recommendation such as Dismoioù or Yelp. These networks are not conversational networks and work solely with the recommendation of shops, services or restaurants. They have a very strong urban aspect revolving around geo-location. The Dismoioù community benefits from recommendations which accumulate Maximiles points which lead to gifts;

4) conversational social networks such as Twitter, Google Plus or Facebook. It is the latter which we will turn our attention to as we consider it the innovator of social recommendation.



**Figure 3.1.** *Functionality of the social recommendation search engine Antvoice*

<sup>9</sup> <http://lab.vente-privee.com/decouvrez-la-recommandation-sociale-avec-antvoice/>.

### 3.2.2.1. Facebook, innovator in its vision for social recommendation: Like, Edge Rank, Place, Social and Open Graph

Thus, Facebook's "Like" button is one of the most symbolic tools for social recommendation. It is based on an attitude (I like it) and has increasingly enriched itself with geo-location and the establishment of visibility within a Facebook user's newsfeed. Furthermore, Facebook's "Edge Rank" algorithm promotes the publications which are mostly likely to be the most appreciated. In a sense, these publications are recommendations which the network promotes in order to improve the user experience and the quality of the content. Edge Rank combines affinity, the reactions of Internet users to the publication and the recency of the publication. Edge Rank redefined social recommendation by promoting the affinity score, an old media-planning indicator which the digital world never really took advantage of.

$$\text{Edge Rank} = \sum (\text{affinity} \times \text{weight} \times \text{recency})$$

- Affinity: the number of interactions between the reader and the transmitter of the publication (comments, number of likes, etc.)
- Weight: the weight of the publication, in other words the number of comments, likes and shares which it generates.
- Recency: how recently it was published.

**Figure 3.2.** Facebook's Edge Rank, in other words the consideration of affinity in social recommendation.

In addition to Edge Rank, there is also the "Place" tool released in 2010. Consumers can, because of this service, identify themselves via their mobile phones in shops which they visit and share their purchases with their friends. This service combines the potential of Foursquare with shopping websites such as Groupon and LivingSocial. Recommendations benefit from "incentives" (giveaways or special offers) for customers who signal their presence among friends in shops of well-known brands which are partners of the programs: Starbucks, McDonald's, H&M or Gap.

With regard to the "Social Graph" (and its by-product the Open Graph), it represents one the most important relational graphs in the world. It links

individuals (knots) to their relationships or preferences and is open to e-commerce because of its API which allows it to add the profile pictures of users, and purchases made by friends directly on the Website visited by the Internet user. Thus, the plug-ins proposed to developers by Facebook are many: the Like button, the Share button, the Comments or Recommendations feed button (indicates the most recommended content on the Website) or even the Recommendation Bar button (lets the Internet user share what they read on the Website with their friends). Thus, the Open Graph opens up the Web to Facebook using its own data. The set of data which Facebook possesses (connections between people, liked pages, interactions, content liked on the Internet) is linked to the behavior of Internet users on e-commerce websites. The Open Graph offers the possibility of personalizing the browsing of members of the network because of the Facebook Connect application. Recommendations can use social and personalized data. The combination of Internet behavior (personalized recommendations) and the membership to a community (social recommendations) is one of Facebook's major strengths. This combination has led to the creation of certain social advertisements on the network. The most known being the "Sponsored Event<sup>10</sup>" used the profile of a friend having liked such-and-such brand page to better convince the user. The name of the friend and their profile picture were integrated into the advert.

Facebook's sponsored advert woes have not deterred them from social recommendation. The scoring of brand pages by Internet users is being increasingly pushed by the network. A new functionality "Trending" is displayed in the upper right corner of the newsfeed (right-side column dedicated to news items) and encompasses the most popular shared items on the social network.

Facebook has acted as a model for many social networks which are themselves taking up social recommendation. Among the many examples, the fusion of the recommendation engines of Google Plus and YouTube has been an interesting turning point in the market. YouTube at its core is not a social network, but the requirement of Google to establish themselves in social recommendation has pushed the latter to add a social layer to

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<sup>10</sup> The use of this type of advert was interrupted in 2014 after complaints from many users for intruding their privacy.

YouTube. The comments of Google Plus members on YouTube videos (many of which are product videos) offer interesting perspectives for the online research leader. Furthermore, the integration of Google Plus into the default referencing functions gives Internet users the possibility of clicking on the websites which are best rated by their friends.

### *3.2.2.2. Social recommendation, the cornerstone of an emerging social commerce*

Social recommendation is used, as we have seen, almost systematically on e-commerce websites. Collaborations are being established between both commercial and social networks. A purchase through a recommendation can be completed either on the Website of the seller or within an integrated store (F-stores on Facebook) within the network. Furthermore, websites based on recommendation become indispensable referrer websites (contributors of visitors) for travel or online hotel or restaurant booking websites. They are systematically integrated into certain digital tools, mainly affiliation and e-mailing. Social recommendation has thus made possible the emergence of a new concept: social commerce. The term social commerce (coined by Yahoo!) was used for the first time by information systems researchers in 2005. They can be defined as a form of commerce promoted by social networks and presenting convergences between the physical world of retail and the virtual world of online retailers [RUB 05]. It is based on social interactions centered around shopping. Yet, social commerce enabled through social recommendation involves many subject areas and many usages which could, over time, put its viability and acceptance by the consumer into question. Whang and Zhang [WAN 12] showed how social commerce is integrated into an extremely vast conceptual framework. Its modeling takes into account:

- information (lifecycle of products, organization of information, representation of information, classification and indexing, Big Data);
- the consumer and the determiners of their participation in social commerce (cognitive, emotional factors, level of experience, long-term psychological factors, etc.);
- technology (infrastructure, applications, services, etc.);
- organization (strategy, culture, management, procedures).

If we return to digital marketing, research dedicated to social commerce is still relatively limited. Harris and Dennis [HAR 11] mention the following research paths:

1) the concept of engagement is popularized by social networks such as Facebook and measured by interactions such as Likes/comments/shares. This concept could change the already rich literature on involvement and notably the involvement with regard to brands;

2) the concept of trust toward the transmitter (the network) and toward paired users. Trust seems stronger toward friends rather than experts or advertising discourses and brand campaigns;

3) the concept of social capital and its corollaries such as the need for recognition. The latter acts as a determining factor in the participation of the consumer in social sharing [REN 09];

4) the concept of shopping experience and satisfaction. Many researchers show that there exists a correlation between a successful shopping experience and the social link created through this purchase [DEN 10];

5) the concept of privacy and the perceived potential threat which the consumer can feel about displaying their purchase history on the network.

With regard to the efficiency of social commerce, it can only be ensured under certain conditions [MER 13]. This efficiency depends on the strength of the recommendations (very favorable), their number, and their position within the Website. Furthermore, they must involve characteristics which are not well known in order to be considered as real added value by consumers [BHA 10]. Finally, they must be recent and transparent (the transmitter must clearly identify themselves as a “true” consumer) and well justified. Besides, the notion of similarity is central to the positive aspect of recommendations for shopping [MIN 11]. The distance between individuals who recommend and individuals who follow these recommendations is instrumental. This distance can be conceptualized according to three aspects: temporal distance (is the purchase predicted to be completed soon or is it long term?), social distance (is the recommending individual part of my circle?) and spatial distance (is the recommending individual geographically far away?) [KIM 08]. With regard to temporal distance, it appears that recommendations are more efficient in the creation of consumer preferences when the purchase is predicted as short term. Similarly, when a purchase is near and with few

implications, the consumer will base their recommendations on individuals belonging to their social group. Inversely, for a complex and expensive product, consumers will trust individuals outside of their social group and who are more considered as experts. These results show that the long-term buying of a complex or technological product does not take much into account from the recommendations of close ones. Social influence therefore differs depending on the type of product. To conclude, here are the different further reading topics which help understand the mechanics which can explain the success of social commerce. This success depends on:

- operations circulated between friends in a purely relational context;
- an interpersonal influence and proximity with the Internet user experienced with this type of operation who plays a central role in persuasion.
- a multidimensional persuasion with an emotional, cognitive and conative component;
- mechanics based on games and interactivity which produce better attachment than more traditional mechanics;
- mechanics relevant to each target (age, areas of interest), but also different according to gender, with the literature showing large differences in behavior within networks between men and women [HOY 10].

### 3.3. Conclusion

Social recommendation strategies pushed by brands must therefore integrate the set of constraints set by the consumer themselves and sometimes institutions which aim to improve the respect of privacy of

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<sup>11</sup> Social influence is the influence exercised by a certain individual or a group on each of its members. Social influence theory encompasses an extremely elaborate literature. It is linked to the notion of behavioral norms (which are made obvious to individuals and are a sign of strong influence). In digital marketing, social influence is conceptualized from the aspect of communities and their activity in the service of brands. At the same time, consumer resistance theory is the subject of increasing interest among researchers perhaps assimilated with a certain type of social influence: that of individuals condemning brand discourses and exerting increasing pressure on civil society and its consumers. The Web is a ground for an increasing number of outcries of resistance.

Internet users. Thus, contributions from the literature allow us to take a step back from the astounding technological bond which e-commerce is profiting from. In the age of Big Data, real-time bidding (RTB) and the increasingly detailed tracking of the consumer, social recommendation systems cannot escape the individual, social, cultural characteristics of consumers. The modeling of certain usages and practices which remain impossible for the time being requires brands to listen to their customers, a practice which must extend beyond the analysis of cookies and the establishment of social graphs. With regard to future perspectives on social recommendation based on networks, we identify two directions which seem representative of the changes which social commerce is trying to implement. The first direction which we will refer to as the convergence direction has found a recent application with the *Figaro*. This content Website has many e-commerce websites (the insurance broker Cplussur, the video on demand platform Vodeo, the private selling Website Bazarchic and the events Website Ticketac). The *Figaro* wishes to establish a reading contract and a common experience for each visitor and each Website. It has therefore established with the help of the Antvoice search engine, a tool which allows for personalizing the display of each Website depending on the identified consumer. Thus, personalized recommendations of tickets and shows on Ticketac are created based on the browsing and shopping history, and also extended to parts of the Website such as the Theatre section of figaro.fr. Recommendations take into account not only the CRM of the group, but also data from social networks. Personalization is therefore extended from Bazarchic to Vodeo with knowledge of the customer which facilitates the display of visited pages in line with their profile.

The second direction is that of scoring and the improvement of the user experience due to “machine learning” as established by Facebook. The social network first carried out surveys in order to identify the content which satisfied its users and which they were prepared to share. The questions could have been the following: does this content come from a source which you consider to be credible? Would you share it with you friends or would you recommend it? Using the responses, Facebook integrated into its recommendation engine discriminant variables which help in the establishment of decision trees containing criteria for segmentations, branches and decision rules. These new systems referred to as machine learning reconcile the necessary awareness of consumer opinions and perpetually improving technology.



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