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# E commerce personalization using Big Data and challenges

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**ABSTRACT**

*Content personalization is one of the best ways to increase your ecommerce conversion rates. In fact, marketers report an average of 20% increase in sales when implementing it for their site. Content personalization is one of the best ways to increase your ecommerce conversion rates. In fact, marketers report an average of 20% increase in sales when implementing it for their site. There are various ways to implement ecommerce personalization including On-site content personalization, navigational personalization, Contextual messaging, personalized exit-intent popups.*

*The nexus of big data and machine learning in all its forms, including predictive analytics and even neural network deep learning, are the underpinnings of well informed, highly efficient and deeply satisfying interactions that benefit both customers and business."*

*Collecting data at each touchpoint is a key for companies seeking to create more relevant customer experiences. The challenge, of course, is for companies to manage all of their customer data and turn it into actionable insights. With Big Data, a company can combine all the insights about customers and prospects with other data sources like social media, location, and transaction data. The intersection of all of this data is where your true customer insights lie, and where you'll be able to determine your next move with content to enhance and ultimately personalize your customers' experiences with your company.*

*Some of the Strategies to improve the customer experience with Big Data including Learning which data is most useful, Aligning Big Data with business, sales, and marketing goals, Focusing on the customer journey, rather than single interactions, Analyzing usage data to better understand the customer experience etc. can be implemented . While there is no one hard-and-fast rule for creating more relevant experiences for your customers, capitalizing on data is a smart strategy. At the end of the day, you need to remember that all of your data represents people who have expectations, desires, and concerns. By treating your customers like people, rather than numbers, you more likely will meet their expectations and achieve higher levels of customer satisfaction through relevant experiences. At the same time there are various Challenges of Personalization. If you tackle personalization in a one-off fashion, such as targeting just one banner to one persona, the process is relatively easy. However, once the analytics prove this has been successful and there is a big opportunity for you in persona based targeting, one can think about how to scale. This can bring certain challenges. This paper explores the relationship between Big Data and the ecommerce personalization and throws light on the typically encountered challenges while personalization of ecommerce like Technology, Process, Scale, Privacy & Compliance, and Data.*

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## I. INTRODUCTION

In the past, common practices of companies was mass production, consumption, and marketing. Nowadays, companies focus on niche markets, customization, and personalization. Catering to individual's needs has become so common that customers expect companies to meet their specific needs and get frustrated if they don't. The Personalization tool satisfies this rising need of individualization. Personalization in e-commerce is the real-time tailoring of online customer experience to each specific shopper.

An e-commerce software generates personalization automatically and in real-time. Personalization in eCommerce has many applications, including the website, product recommendations, social proof notifications, and emails.

Why should you personalize?

Personalization creates a sense of individuality and uniqueness. Customers feel special and important, as though the company is paying particular attention to them. Moreover, by segmenting and targeting different shoppers, personalization answers each customer's different needs, thereby optimizing customer experiences rather the same average experience to all.

Shopper value personalization. According to a study by Invesp, 53% of shoppers believe that e-tailers who personalize the shopping experience provide a valuable service.

Aberdeen found that 75% of shoppers favor brands who personalize their messages and offers. According to Smart Insights, 48% of consumers spend more when their experience is personalized. Janrain found that 74% become frustrated when brands provide irrelevant content to them. E-marketers enjoy personalization's benefits. Invesp found that 59% of marketers experiencing good ROI after personalizing their online store. According to Marketing Week, providing a personalized experience can improve conversions by nearly 8%.

Which data is collected and used?

- General data about the user – their demographics, geo-location, the number of visits, etc.
- The intent of the customer – data collected about the visitor's recent activity, overall shopping behaviors, past purchases and browsing history. This information indicates on the shopper's preferences, affinities, and price-sensitivity.
- The wisdom of the crowd – aggregated data that makes correlations between people who bought similar items and the individual shopper, to create predictions based on big data.
- Customized set of variables – rules the company manually sets. For example, preferable categories to present, such as top sellers, items with a good click-through-rate and manually selected items.

What are the bases for segmenting?

- Demographics.
- Geo-location (country, weather, holidays).
- Time (of the month, week, day of browsing).
- Browsing device.

- New vs. Returning visitor.
- Social media attributes.
- Real-time shopper engagement

## II. WAYS TO USE BIG DATA FOR E-COMMERCE PERSONALIZATION

Looking at the sales funnel there are several ways to employ Big Data in increasing online sales and boosting long-term customer loyalty. Data can help answer questions related to future trends, stocking, pricing, creating a customized experience and ultimately selling more.

### 2.1 360 degrees view of the client

What if you knew your client as a friend? How would you sell to a person knowing their age, family status, income, likes, and fears? Big Data allows you to do this without taking them out for coffee on a regular basis, just by collecting the cookies in their browser, social media interactions and transaction history.

### 2.2 Dynamic pages

Once you have built the complete profile of your customers, you can use it to tweak what each visitor sees and make it relevant to their situation. A simple example is the news feed displayed by Facebook, a tailor-made filtration of what is available online. Dynamic content can take other forms, that are easier to manage without changing the entire content of the site. These include pop-ups, calls to action and retargeting in other circumstances, like remarketing an abandoned product in the cart.

### 2.3 Recommendation engines

Studies show that 92% of shoppers are influenced by recommendations, and half of them want to receive such information to help them choose faster and wiser. This is such a widely known application that for some companies it is almost synonymous with Big Data for e-commerce.

The power of the recommendation engines relies on the fact that they uncover unnoticeable dependencies. A great recommendation tool is also integrated with inventory and logistics to be able to highlight only those products that are available to be shipped to the location of the customer. It wouldn't make any sense in recommending discontinued products that are not shipped to the indicated address.

### 2.4 Customer care

Almost 9 out of 10 customers stop doing business with a company that has disappointed them in the client service department. On top of that, 96% of unhappy customers don't complain, they just leave. Getting a new customer costs 6-7 times more than keeping an existing one. Having said that, not investing in a CRM based on Big Data that acts as an assistant to your customer care team is equivalent to intentionally wasting money.

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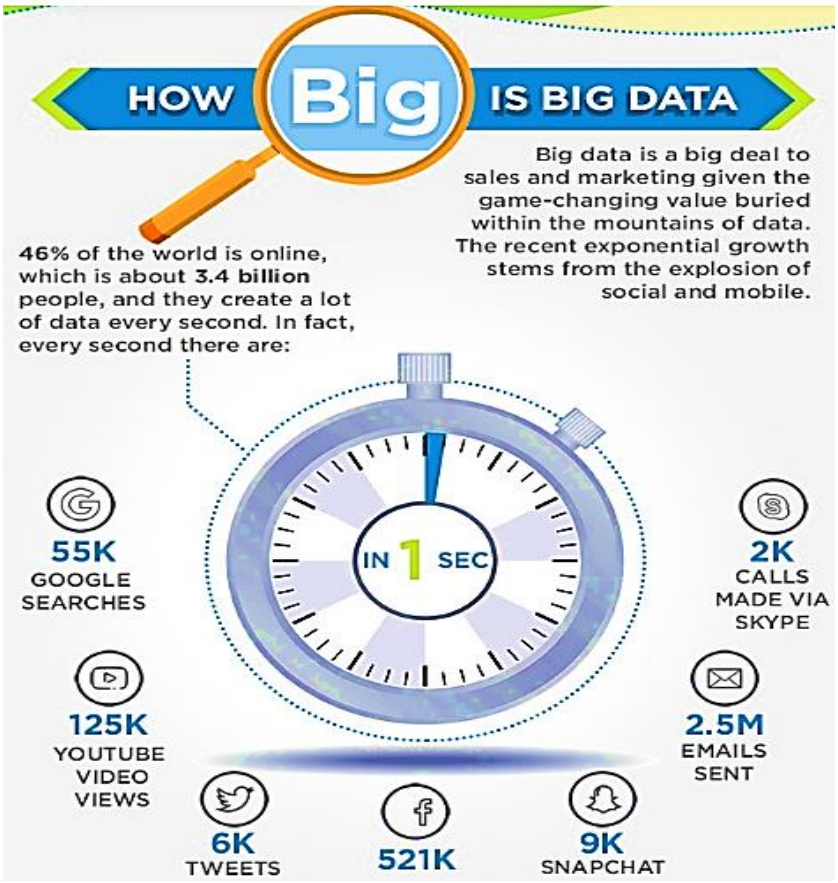



### 2.5 The Incredible Opportunities of Merging Blockchain and Big Data in Emerging Markets

Having such a system in place can help in two ways. First, it can offer the agent some background information such as the type of product the client has and frequent problems with that product. Secondly, it can build a retention and cross-selling system based on previous purchases. To be effective, data needs to be readily available in a simple form to those who might need it. Design the sales support's dashboards in a user-friendly and intuitive manner and fill it with data in real time.

### 2.6 e-Commerce determinants and future directions

When incorporating Big Data into your e-Commerce, you need to know that results will be just as good as the data fed into the system and the subsequent calibration. Therefore, aim for a solution that is regularly updated and preferably for live-streaming of data, to be able to react on the spot to customer's input.

Most clients are not against sharing personal information that helps a company offer them a better experience, but are afraid of data selling, identity theft, and associated problems, therefore, make sure you have end-to-end security in place. Be sure to check for the safety of third party applications and integrated devices, as these could be possible hacking gateways as specialists in big data consulting from InData Labs advise.

Don't just choose the best solution for this moment, keep in mind the requirements for the next 3-5 years and build in some scalability as your business grows.

The best Big Data solutions work with an omnichannel approach since the clients are now used to switching between different devices and between online and off-line almost seamlessly. Mobile-first is no longer an option, but a requirement and if you also have a physical location, the experience should be continuous.

## III. WAYS TO USE BIG DATA TO THE ADVANTAGE OF ECOMMERCE PERSONALIZATION

Personalization is beginning to be applied to customer relationship management, electronic commerce and information portal services. As these application areas are fairly new, there are lots of technical challenges facing personalization

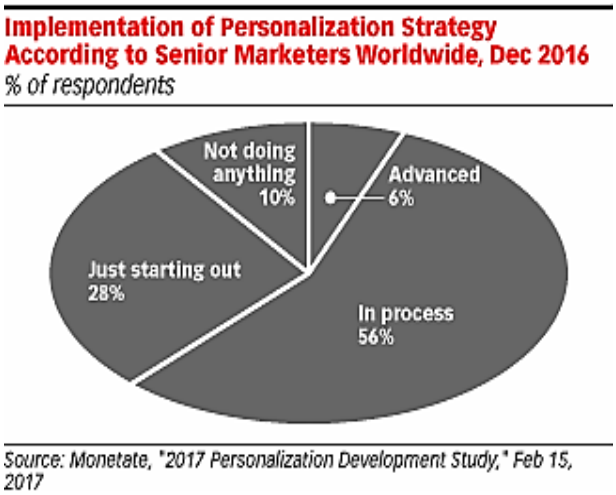
- Predict Trends
- Optimistic pricing can be done to tailor products of specific user group.
- Forecast demand.
- Creating personalized stores.
- Optimize customer services.
- Generate more sales.

## IV. CHALLENGES

Computerized personalization is beginning to be applied to customer relationship management, electronic commerce and information portal services. As these application areas are fairly new, there are lots of technical challenges facing personalization. Let us examine them.

### 4.1 Technical Challenges

- Minimizing the number of irrelevant "hits" returned in searches. One of the most serious problems in delivering personal information today is the inability of the technology to allow people to easily and precisely specify the information they want.
- It is necessary to further enrich the weblog data by linking a weblog record with related demographic, lifestyle, or transaction history data stored in a data warehouse (or a database) and/or to the actual web pages involved. The types of information captured in a weblog are rather limited, and the usefulness of the results of analyzing weblog data too is limited. Once weblog data can be linked to related records in a data warehouse, and/or the contents of the web pages that are referenced in a weblog can be meaningfully understood, a complete base for segmenting website visitors, and predicting their behavior will have been formed.




- One of the most important enabling technologies for personalization is data mining and text mining. Despite some successes it has demonstrated (e.g., in detecting frauds in credit card or phone card uses, medical insurance claims, even discovering stars in a galaxy and new chemicals, etc.), data mining technology needs significant advances in ease of use, predictive accuracy, and performance and scalability. Further, technology for creating a subject hierarchy remains a key challenge to classifying texts by text mining tools. The depth, breadth, and structure of a subject hierarchy are difficult even for humans to consistently and appropriately define.
- Performance and scalability issues are always key technical challenges when processing a large volume of data that may be accessed by a large number of simultaneous users. The need for real-time recommendations in certain commerce situations (e.g., when a visitor visits a website, display several products of potential interest to that visitor) and the need to process very large volumes of customer data to determine a categorization for an individual are two of the factors that make timely delivery of personalization information difficult. Customer demographic and lifestyle data, and customer transaction data are typically large. In order to be able to offer personalized recommendations in real-time to electronic commerce website visitors, or to analyze huge volumes of data in time to reflect the results to business decisions, all of the techniques developed to address performance and scalability issues in relational database systems and other data-processing systems must be brought to bear. The techniques include parallel processing, indexing and hashing, use of a fast sorting package, pre-fetching of data from secondary storage, tuning of performance parameters, etc. In particular, parallel processing includes pipelined processing, partitioned database, symmetric multiprocessing, etc.
- It is necessary to generalize the "search keyword" to a "general object", including a free-form text, an HTML or XML document, and eventually a multimedia object such as an image, video clip, or a speech fragment. Web search engines will then retrieve "general objects" on the Internet that exactly match a query object (e.g., a sample text, or a sample image) or that are "similar" to the query object. Measures of "similarity" between a query object and objects on the Internet differ depending on the types of object. For free-form texts, measures of similarity may include the subject category for the text, weighted sum of the

matching keywords in the texts, etc. For XML documents, measures of similarity may include similarity of the structure of the documents, weighted sum of the matching terms, etc.

- Further advances in detecting and correcting dirty data are necessary. If personalization for one-to-one marketing is done using dirty data, the result can range from wrong recommendations that may alienate customers to real damages to people.

### 1.2 Non-Technical Challenges

- Personalized marketing efforts may turn off customers if they are excessive or irrelevant. Excessive marketing includes offering too many recommendations
- Personalization for one-to-one marketing by businesses may sometimes backfire on the businesses. This may happen if personalized marketing efforts end up turning customers off, or if the use of customer data violates or appears to violate customers' privacy. Let us examine these two non-technical challenges to personalization in turn.
- There is an often over-looked aspect of one-to-one marketing based on personalization. It is the psychology of the individual who is the target of one-to-one marketing. Unless done properly, all the efforts
- A great deal of concerns has been voiced over increased opportunities for invasion of privacy that increased use of the Internet and spread of electronic commerce may cause. The Internet has already proven to be a great means of disseminating information instantly worldwide and obtaining all sorts of information instantly from anywhere in the world. Sensitive information about an individual (e.g., bank records, medical records, school records, employment records, court records, income and tax records, purchase records of big-ticket items, even compromising photographs etc.), stored in lots of places (e.g., banks, hospitals, schools, employers, courts, accounting firms, department stores, etc.), may be placed on a website for instant distribution worldwide.
- Concern over privacy will (and should) curve unbridled efforts for personalization for one-to -one marketing by businesses. There should be laws regarding whether businesses may distribute (for money or for free) their customer data (to other businesses, government agencies, individuals, etc.) without authorization by the customers, and, where they may, what types of customer data they may distribute.

## V. CONCLUSION

This paper examined the term e-commerce personalization, and provided a definition of the same. Then it reviewed techniques in use to support personalization, and examined both technological and non-technological challenges that face personalization. In view of the huge and growing volumes of computerized information, on the World Wide Web and in corporate and government data warehouses, the need to be able to deliver only information of direct relevance to an individual for a specific purpose at any point in time is clear. Further, from the need for a business to reach a large customer base across a large geographical territory, and the need to tailor marketing and business practices to different categories of customers are also clear. For these two reasons, personalization is one of the clear trends in data processing

in this era of the Internet and electronic commerce. If the challenges reviewed in this article can be met, the full potential of personalization can be realized for the benefit of businesses and consumers alike.

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