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Big data analytics

Application in the banking industry

In recent years, big data analytics has been a topic of great interest among financial organizations. Big data in banking refers to the vast amount of data banks generate, including their customer's financial transactions, payment records, credit history, website or app usage, interaction with customer service, to name a few. Big data analytics involves examining this large volume of customer data to extract valuable insights (e.g. trends, insights, patterns) that enable banks to make informed decisions. Big data analytics offers firms numerous benefits, including the ability to gain a holistic view of their customers, customize offerings and reduce the risk of fraudulent behavior.

Challenges with big data analytics

Despite its potential, the adoption of big data analytics is hindered by numerous challenges. Financial consideration and human resources are the two main factors obstructing its implementation. Studies suggest many banks are yet to realize the full benefits and returns of leveraging big data. Most organizations also lack adequate managerial and technical skills to gain value from big data usage. Indeed, many banks unfamiliar with this new practice lack the capabilities to embed big data analytics into their operations and processes. A difficulty firms face is reducing a large and diverse dataset derived from several sources into easy-to-interpret results that can support decision-making. It becomes critical for firms to employ experienced data scientists who can uncover insights that can help improve the bank's operation and performance. Banks also face many non-technical challenges in big data applications. Organizations need the buy-in from organizational members from all ranks-from senior management to lower levels across various functions. The adoption of new technologies necessitates changes in operating practices which may result in organizational resistance. Security, privacy and government regulations can also impact big data applications.

Banks have a long history of storing and leveraging data compared to other industries. This practice makes the sector highly conducive to the application of big data analytics. However, the high dimensionality of banking data (i.e. with numerous variables) can make analysis and interpretation very difficult. Without meaningful analytics results, it is challenging for data scientists to realize the potential benefits of big data use.

This paper aims to guide managers on leveraging big data analytics to improve decision-making and performance. The authors examine how a Taiwanese commercial bank (Bank A) adopted big data analytics to support customer relationship management initiatives. Bank A had over 100 branches with 6000 employees and specialized in corporate finance. The organization had ambitions to scale up its digital banking. The data was collected during a consulting project, where external consultants guided Bank A on their transition. The consultants proposed that the bank use big data to carry out customer segmentation and construct product affinity models to make personalized recommendations.

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Customer clustering analysis

Customer clustering involves classifying customers based on their similarities. However, this was challenging for Bank A as they had over 2.5 million customers and 700 variables relevant to them. The consultants recommended a two-stage clustering approach to generate meaningful insights. In the first stage, the firm was expected to carry out strategic clustering using two characteristics, the customer's assets under management and contributions to develop macro-level clusters. Following cluster generation, the firm would use 50 additional variables to identify the characteristics of the individual clusters. During the second stage, Bank A needed to implement operational clustering. Here the clusters from the first stage were to be broken into smaller clusters (i.e. by incorporating additional variables) to make them suitable for marketing and CRM activities. Customer profiling techniques would then be used to identify and differentiate between the various clusters. For instance, a large cluster for Bank A could be elite VIP customers. However, the elite VIP customers could include individuals who were high-end, aggressive, or conservative.

Product affinity prediction model

Product affinity models predict a customer's preference for the seller's personalized product recommendation. Such models are widely used in retail and e-commerce. In the banking industry, a product affinity model assumes that customers' purchase decisions are based on their long-term and short-term affinities. Long-term affinity is tracked using the customer's historical transaction data. For Bank A, select target variables would be used to calculate a customer's long-term affinity scores for products such as mutual funds, credit cards, gold, etc. In contrast, short-term product affinity is tracked by analyzing the customer's browsing behavior (e.g. bank website, mobile app) and recent transactions.

Impact of big data analytics in bank A

Using insights from customer clustering and product affinity models, Bank A was able to adapt its offerings across channels. For example, the organization used cluster affinity scores to target specific marketing campaigns for those customers. Bank A implemented these changes in three waves across ten months. The results showed that the different divisions (e.g. wealth management and personal finance) improved their response rates using the two data analytics methods.

Based on their findings, the authors offer the following practical implications:

- firms must have a big data analytics team to help decision-makers understand and interpret results.
- firms' internal stakeholders may lack confidence in the efficacy of big data and exhibit resistance to change. The analytics team should alleviate these negative perceptions by demonstrating the effectiveness of the models.

Big data analytics offers firms numerous benefits, including the ability to gain a holistic view of their customers, customize offerings and reduce the risk of fraudulent behavior.

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Most organizations also lack adequate managerial and technical skills to gain value from big data usage.

- it is recommended that big data analytics is launched on a small scale or through multiple waves by incrementally implementing within new functions or branches.
- multi-wave launch enables firms to tap into the learnings of managers from previous rounds, build familiarity and increase the confidence of the later adopters.
- a high response rate does not necessarily correspond to high returns. Instead, firms should optimize marketing according to profit margins. For instance, use low-cost channels (e.g., website, mobile app push ads) for low-margin products and personal advisors for high-margin products.

Comment

The review is based on "Impact of big data analytics on banking: a case study" by He *et al.* (2022) and was published in the *Journal of Enterprise Information Management*.

Keywords:
Big data,
Banking industry,
Big data analytics

Reference

He, W., Hung, J.-L. and Liu, L. (2022), "Impact of big data analytics on banking: a case study", *Journal of Enterprise Information Management*, doi: 10.1108/JEIM-05-2020-0176.

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