

# Reimagining Utilities with Predictive Analytics

New-age business intelligence models enhance customer satisfaction and ensure retention



# Abstract

Customers today expect innovative and personalized service offerings from their utility providers. Factors such as stricter regulations around customer satisfaction, smart networks, and advanced technologies are also contributing to a customer-centric, personalized, and non-commoditized service industry. With competition outpacing market growth in the utilities industry, the need to retain existing market share is greater than ever. Consequently, utility companies are becoming more aggressive and innovative in engaging customers and adopting technologies that can help them provide contextual services.

Traditional business intelligence (BI) lacks the ability to anticipate customer expectations and drive best-in-class services. This paper highlights why it is imperative for utility service providers to adopt new-age models and predictive analytics to understand customer needs better and enable proactive, contextual communication and services. It also showcases the business benefits of using predictive analytics through illustrative use cases.

## The Journey from Consumer to Customer

The business paradigm in the utilities industry is being revolutionized by the emergence of intelligent networks with smart appliances, meters, transformers, pumps, and other network assets that are capable of capturing customer data in near real time. In such a world, it is crucial for utility companies to attune themselves to customer needs and proactively engage them to not only increase satisfaction but also retain them in this highly competitive market.

With smart networks, whenever a customer performs a task, such as switching on the lights or turning up the heat, it generates data in the network. However, only a few utility providers are entirely prepared to manage the data influx from customers. As the move to smart networks puts pressure on utility companies to innovate their business models, they must now look for insights within their operational and customer data for creating differentiation. Utility service providers must begin offering personalized and non-commoditized services to their customers, while allowing them to make informed decisions about their consumption. Regulators are also increasingly calling upon utility companies to improve their relationships with customers and incorporate efficiency measures within the existing infrastructure.

To make the change from traditional transactional models to new-generation customer-centric services, utility providers must pay attention to:

- **Technology gaps:** Upgrade and adapt to appropriate technologies to foster a customer-centric orientation that relies on forecasting and analytical capabilities.

- **Operational processes:** Integrate operational and data systems into a single, coherent approach to managing demand effectively.
- **Corporate culture:** Foster a culture that is sensitive to customer demands and responds quickly with the required operational and product changes.

# Extracting Returns with Advanced Analytics

Optimized customer-centric interactions and improved intelligence offer tremendous business value to utility service providers. They increase outage responsiveness with focused service and targeted marketing by rolling out new products and services to those most likely to enroll. Utility companies can also improve their cash flow through optimized collections by predicting customer payment patterns to gain a higher return on their investments. Studies show that it is possible to earn as much as \$9.01 for every \$1 spent on analytics<sup>1</sup>.

Predictive analytics can ensure service reliability with customizable programs designed for comfort, cost, and efficiency. Utility companies can also use predictive analytics to support sustainability and energy efficiency initiatives by delivering regulator-friendly programs based on customer interest.

With the help of predictive analytics, utility service providers can:

- Perform predictive maintenance by coupling sensor data with machine learning engines.
- Adapt production to fluctuating demands as the dramatic influence of electric vehicles, backyard solar companies, and private wind farms increases.
- Manage asset risks better to conserve costs, streamline operations, and avoid unplanned outages.
- Categorize customers based on demand pattern, payment history, COVID-19-related payment challenges, satisfaction level, etc., and use AI-based messaging for personalized notifications and plans.

On the marketing side, utility companies can predict customer churn and perform root-cause analysis to identify reasons such as reduced interaction, increased number of unresolved complaints, and negative sentiment in social networks. Utility providers can also predict customer response to pricing changes, market energy efficient offerings, detect early warning signs of irregularities in a household's consumption, and provide useful information to the customer as part of proactive engagement initiatives. On the operational side, utility companies can proactively maintain their assets and reduce outages by using predictive analytics. This enhances the reliability of services and ultimately improves customer satisfaction.

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[1] Nucleus Research; *Investing in Analytics returns \$9.01 per dollar spent; January 28, 2019;*  
<https://nucleusresearch.com/research/single/investing-in-analytics-returns-9-01-per-dollar-spent/>

# Enhancing Customer Satisfaction through Predictive Apps

The term ‘predictive app,’ coined by Forrester Research, describes a combination of predictive analytics and customer engagement applications. These apps leverage big data and predictive analytics to provide the right functionality and the right content on the right device, at just the right moment for the right person<sup>2</sup>. By discovering appropriate data from multiple sources – be it enterprise applications, social networks, or third parties – predictive apps can assist in developing insights and generate actionable information.

A predictive model (see Figure 1) can be based on a big data platform and use tools such as R, KNIME, SAS, Predixion, SPSS, RapidMiner, or Alteryx for advanced analytics. This model treats predictive analytics for customer engagement as a cycle with the following steps:

- **Source:** The model discovers and sources data from within enterprise applications and from external sources.
- **Analyze:** It then analyzes the data to develop insights.
- **Improve:** Next, it improves these insights by using various standard modeling techniques. This information allows the utility provider to take an informed decision, establish contextual discussion, perform targeted campaigns, and improve customer relationship.
- **Deliver:** Information is sent to the customer through appropriate communication channels and devices. It is again fed back to the sourcing phase of the model for subsequent analysis.

According to the proposed model, this cycle should continue through the lifetime of the customer, enabling the utility service provider to generate valuable insights from both new and old information. Utility companies can also embrace gamification as a delivery mechanism, to enhance customer engagement and loyalty.

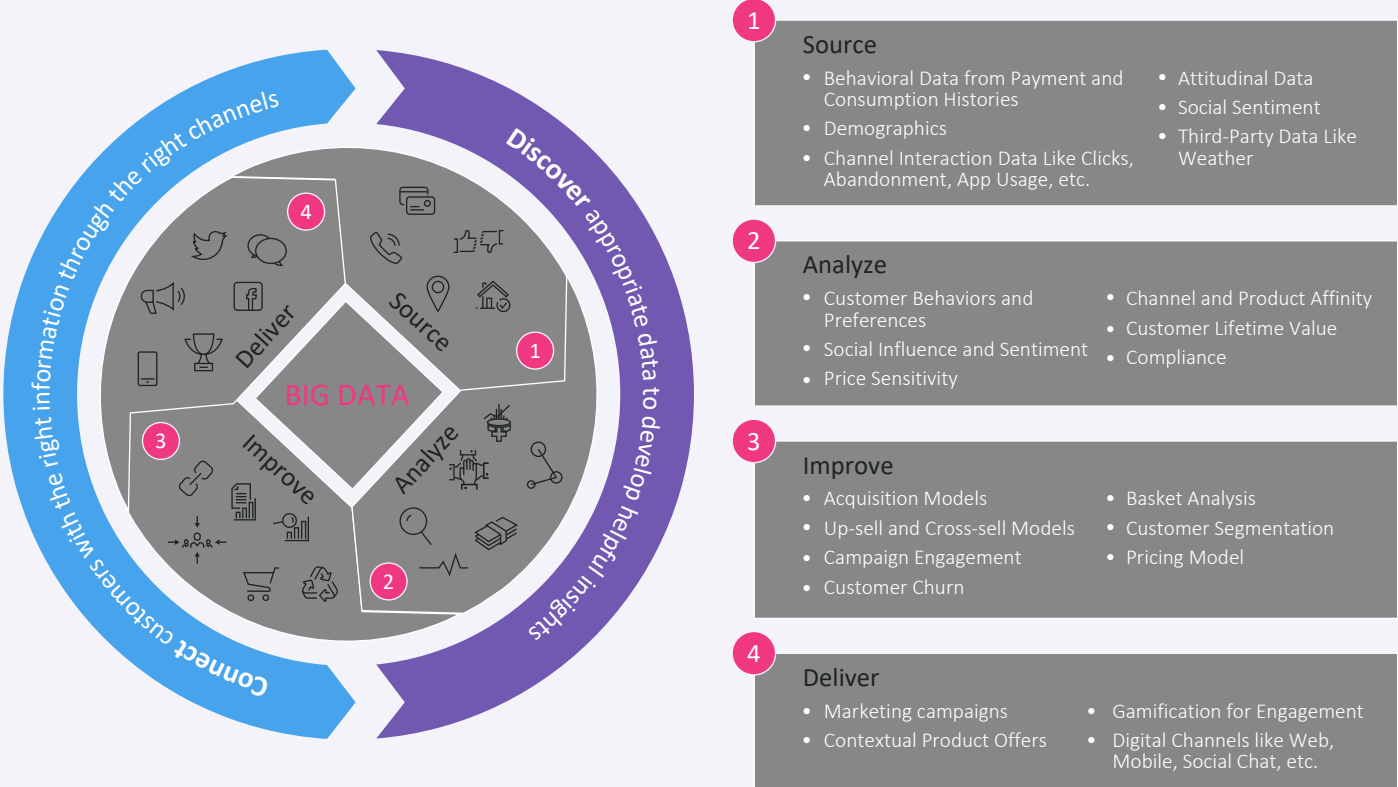


Figure 1: A proposed model for predictive apps

[2] Forrester; Predictive Apps Are The Next Big Thing In App Development; August 28, 2013; [https://go.forrester.com/blogs/13-08-28-predictive\\_apps\\_are\\_the\\_next\\_big\\_thing\\_in\\_app\\_development/](https://go.forrester.com/blogs/13-08-28-predictive_apps_are_the_next_big_thing_in_app_development/)

# Leveraging Predictive Analytics for Competitive Advantage

The challenges facing utility companies have increased due to the recent pandemic: Power demands fluctuated more frequently than ever due to lockdowns and restrictions. In the US alone, power demand fell by 6.1% in April 2020 as compared to 2019<sup>3</sup>. Usage patterns also changed, as commercial consumption decreased due to the shuttering down of industrial facilities, while residential consumption increased. Daily ramp-up delays shifted system loads. The revenue stream for utility companies was further impacted due to shut off deferrals, non-payment, and delayed payment schemes. Maintenance activities were disrupted due to field force health and safety risks and travel restrictions.

A robust predictive analytics model can help utilities improve the resiliency of their service and meet demand changes introduced by natural or unnatural situations. The ability of utilities to maintain service quality and customer satisfaction while meeting demand changes even during difficult situations will provide them competitive edge over others. Besides this resilience, what can also give utility firm an edge is flexible and scalable services. They can achieve this by hosting their predictive analytics models on the cloud or opting for business process-as-a-service (BPaaS). This reduces the total expenditure.

Predictive analytics is not a traditional plug-and-play solution. Even in the case of BPaaS, it is necessary to identify appropriate sources, analyze the correct set of data, use the right model to improve the data, and finally, establish appropriate delivery channels. It is also important to change IT and business processes to support the objectives of using predictive analytics. Once it is set up, the model will be the central predictive analytics engine that will churn all data generated by the utility company and provide input to all systems. It ensures data accuracy, output consistency, and customization flexibility. The predictive analytics models can provide a wide range of functionality to utilities across its entire value chain, as highlighted in the figure below:

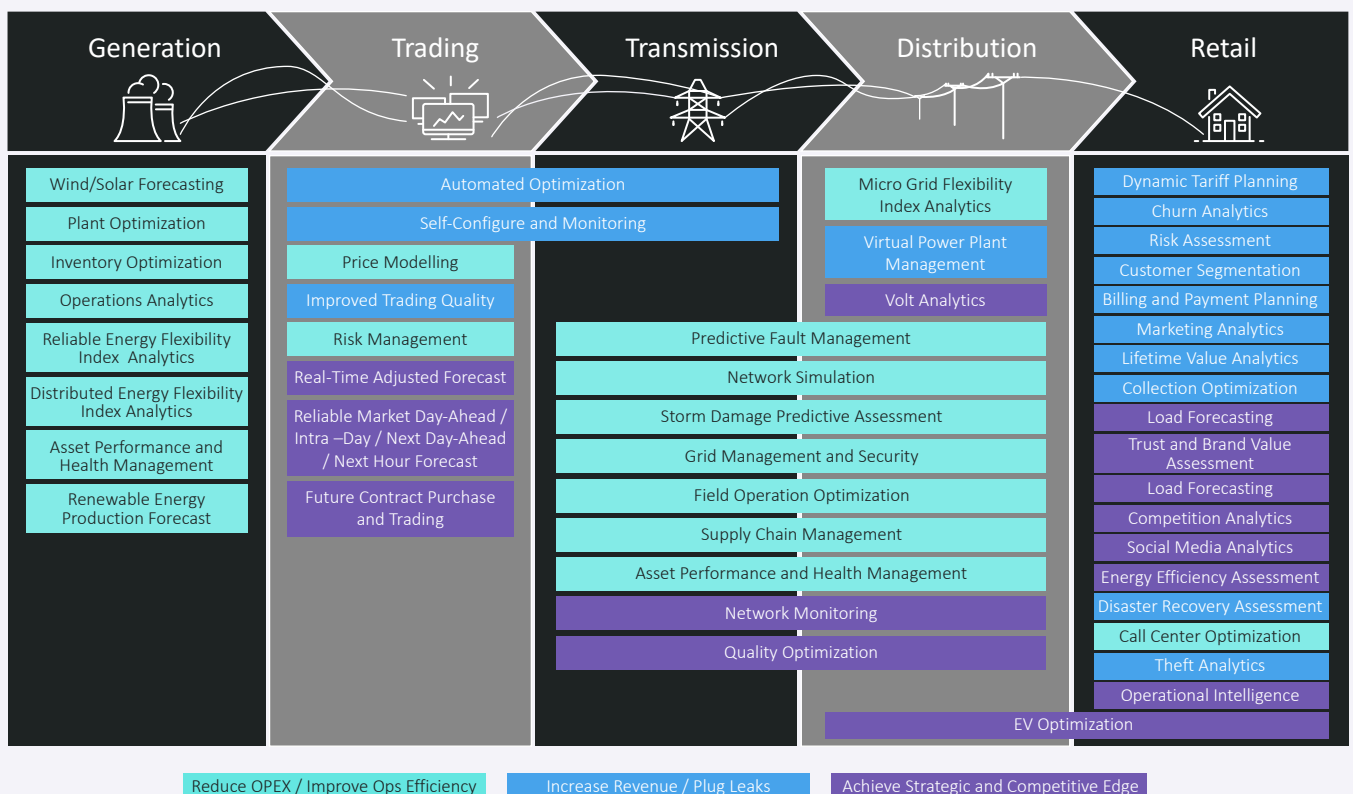


Figure 2: Predictive analytics use cases in utilities

[3] Nasdaq; Utility Stocks Aren't Immune to COVID-19's Impact; April 19, 2020; <https://www.nasdaq.com/articles/utility-stocks-arent-immune-to-covid-19s-impact-2020-04-19>

In a competitive market, such resilient, flexible, and scalable facets will help utility service providers to not only retain customers but also acquire more of them. The ability to predict demand will also enable utilities to effectively plan generation capabilities and field force movements.

Overall, predictive analytics can enable utilities to gain advantage by providing opportunities to offer contextual and personalized customer services, reduce service costs, increase service reliability, improve efficiency, reduce the carbon footprint, optimize their operational expenses, improve asset life, avoid revenue leakage, lower downtime, and safeguard employee health and safety

## The Road Ahead

As the economy is gradually reopening, utility service providers must prepare for another change in energy demand and customer expectations. These changes will vary by location and the resumption of commercial and industrial operations will add further impacts. Predictive analytics will play a major role here. Simulation, based on scenarios, can provide insights to utility companies for planning production and maintenance activities.

The success of predictive analytics models depends on various factors. These include the availability of customer data from internal or external sources as well as integration with digital technologies such as mobility, social media, big data, and cloud.

Utility service providers usually tend to be risk-averse, watching and learning from other industry players that are subject to new technological dynamics. However, with increasing digitalization and competition, all utility companies need to embrace technology and business processes that are focused on proactive and contextual customer interaction.

# About the author

## Anirban Banerjee

Anirban Banerjee (Anir) leads research and innovation initiatives for Utilities in North America for TCS. He has more than 15 years of experience in TCS, of which around 10 years have been in the utilities domain, with focus on digital technologies. He has held various roles in sales and delivery, and worked with different accounts in the UK, US, and Australia. He works closely with technology groups, subject matter experts, and delivery teams in TCS to develop domain-based solutions, products and services. He holds a bachelor's degree in computer science.

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