Reinventing Customer Experience in the High Tech Industry through IoT and Analytics

Abstract

Digital technologies are rapidly reshaping businesses across multiple dimensions, including customer experience. High tech companies can obtain a competitive advantage by leveraging technologies such as the Internet of Things (IoT) and analytics to engage with customers better. In fact, as early adopters of new technologies, high tech companies are perfectly placed to leverage these technologies to transform core business processes and stay ahead of the competition.

This paper identifies areas where IoT and analytics can be applied to fill existing gaps in business processes and create new opportunities. It also highlights some of the ways in which high tech companies can leverage product usage insights to serve customers better and drive profitability.

Harnessing the potential of IoT and analytics

The number of devices connected to the internet is increasing at a remarkable rate, and is estimated to reach 50 billion by 2020, with a potential business opportunity valued at nearly USD 14.4 trillion.[1] Electronic components obeying Moore's law, and lower cost of technology will make IoT technology affordable, which will facilitate its adoption by customer appliance companies. To make the most of the opportunities offered by IoT, high tech companies will need to rethink existing business models, channel partner strategies, and delivery of services to end customers. They must leverage analytics to deepen operational, customer, and product insights. This will enable high tech companies to simplify processes, optimize costs, accelerate innovation, and increase sales by delivering more personalized offerings.

Strategies to differentiate high tech customer experience

In this section, we explore seven potential IoT and analytics applications that can help industry players increase revenue, reduce costs, and create a differentiated value proposition for enhanced customer experience:

1. Improve demand forecast accuracy: Inaccurate demand forecasting at high tech companies can result in large amounts of working capital and inaccurate inventory. The insights generated from IoT devices and analytics provide demand planners significant input to understand short-term demand, and plan resource requirements and investments accordingly. Data generated by IoT sensors can be analyzed to identify when a component or the product itself requires repair or replacement.

Leveraging sensor data, an input obtained directly from customer equipment, helps deepen the insights from the forecasting model. Demand planners can rely on both definite demand and historic forecasts to improve the accuracy of demand forecasting. As shown in Figure 1, this has a ripple effect on various aspects of the supply chain such as inventory management and logistics, simultaneously reducing supply chain costs and increasing customer satisfaction.

With an additional demand input, traditional time series exponential smoothing forecast model can be modified as follows:

New forecast = max $\{F_t, k F_t + P_i * Q\}$

$F_t = \alpha * (\text{actual demand}_{t-1}) + (1- \alpha) * (\text{forecast}_{t-1})$

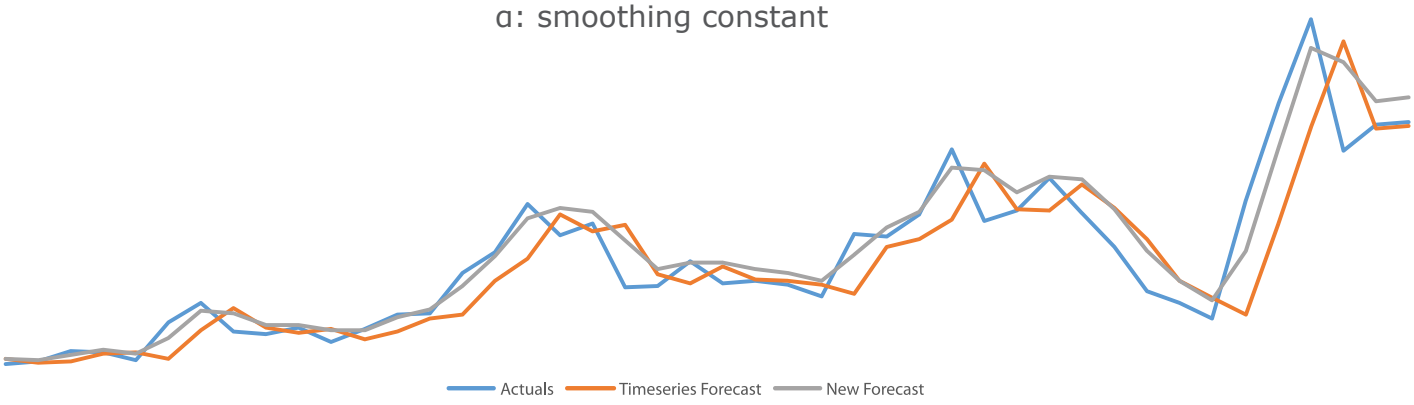
F_t: time series forecast for period 't'

k: factor for reduction of reliance on historic data

Pi: factor of conversion of quantities given by IoT sensors

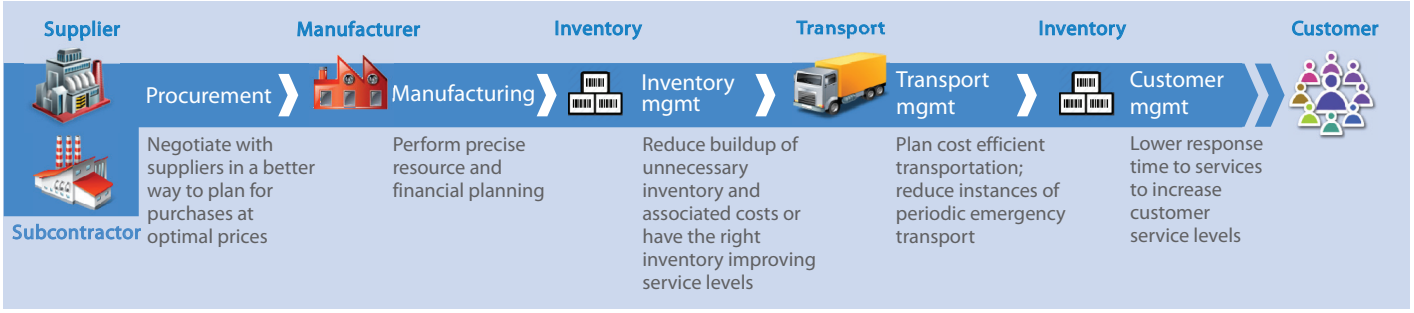
Q: quantity analyzed inputs from IoT devices

α: smoothing constant



When this formula was tested, with assumptions k = 0.6 and Pi = 0.5, the forecast was more closely aligned to the demand, decreasing the deviation from actual demand by a staggering 39.82%.

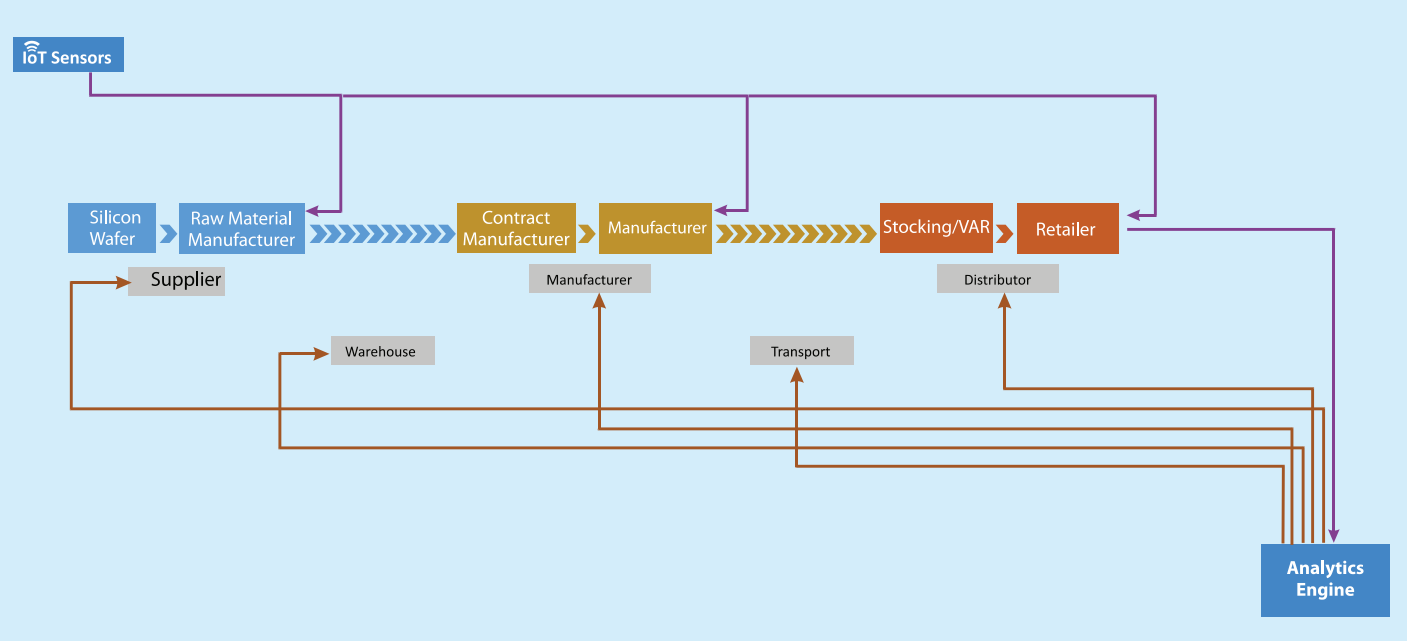
Figure 1: Impact of analytics on supply chain



2. Drill down to identify cause of component or product failure: Data about product and component status obtained periodically from connected devices can help companies understand when a product or a component is likely to fail or will need to be repaired. These status signals can be aggregated to identify the components responsible for the defects in the device, and help diagnose the root cause of those failures. It is also easy to track these devices backwards across the supply chain network (as shown in Figure 2) to identify processes that need to be improved to prevent disruptions in usage.

The sensors embedded in the components are capable of sampling the status signals. A periodic average of these samples indicates the number of times the status has crossed the predetermined control levels. By leveraging classification algorithms, an analytical engine can be used to analyze multiple signals from various sensors to understand the behavior of the particular component or the entire product. Time series data can also be analyzed to forecast the future behavior of the component or product.

Figure 2: Drilling down of component and product failure across the supply chain



3. Customize marketing efforts: Insights obtained from IoT-enabled product or device usage can be leveraged to create targeted marketing strategies. Understanding customer preferences helps create more opportunities, using the existing customer base. For example, a customer may use a laptop or mobile device predominantly for gaming. By analyzing signals such as temperature, display colors, and frequency of audio signals, the device manufacturer can market various other gaming-related products to the customer, thereby augmenting the revenue stream.

4. Collaborate with partners: Sharing product usage data helps companies enhance collaboration with partners, to create additional demand and serve the right customers. For example, a camera manufacturer may gain insights obtained from exposure data of the customer's camera lens. This data when shared with resellers, will help them provide discounts on related products or market other related offerings — which benefits both customers and companies. The data can be used to partner with manufacturers and suppliers for improving design of products.

5. Enhance new product development: Obtaining real-time insights on product usage and user interaction has the potential to transform the traditional product development process, bringing in greater transparency into usage. Accelerated product development process can improve customer satisfaction.

Sensor data helps predict common problems with existing products to plan the design and development of the next set of products better. Manufacturers may even use this type of data to classify customers based on feature usage patterns, and develop the product with limited features customized for each customer segment. In the above camera example, an OEM will be able to classify the consumers based on their photography habits. Additional services can be made available based on the need, thereby providing greater pricing flexibility.

6. Reduce service center costs: Most high tech companies have a large number of service personnel and service centers, resulting in significant costs. Many companies prefer

not to reduce the number of service centers or personnel in order to maintain their customer reach. IoT and analytics enable companies to predict what type of service would be required, and at what time in the future. This means only essential personnel need to be employed at the appropriate place and time.

7. Prevent counterfeits: The growing presence of counterfeit components and products is a mounting problem for high tech companies. Spurious and counterfeit products in areas such as home automation and medical technologies raise performance and security issues. IoT-enabled products allow OEMs to access information about components that go into the final product based on the digital identities of these products. These identities help downstream partners validate the authenticity at each stage of the distribution network. Any spurious product or component injected in the supply chain at a particular stage, can trigger alerts to the manufacturer for corrective action.

Taking Customer Experience to the Next Level

For a leap towards IoT-enabled digitization, companies should first form a vision for future processes, understand what could be improved, determine the kind of sensors required, and contextualize sensor data with business data. These basic things will address major concerns surrounding investments in new architecture, broadcasting of data, selection of the right analytical model, and streamlining of other processes. Organizations will find it increasingly challenging to process data amassed from a large number of sensors. Therefore, organizations must leverage technologies such as cloud computing and edge computing to address such concerns. SMEs and technical architects must come up with an infrastructure which could support multiple communication protocols, along with integration of data from multiple in house and third party sources for building a unique ecosystem of solutions and services.

References

1 CISCO, Embracing the Internet of Everything To Capture Your Share of $14.4 Trillion, Accessed April 2017, http://www.cisco.com/c/dam/en_us/about/ac79/docs/innov/IoE_Economy.pdf

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