APTTUS®

ULTIMATE GUIDE TO

MACHINE LEARNING

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INTRODUCTION

What is Machine Learning?

Enterprises are struggling to find value in the massive amounts of data they generate, collect, and save every day. Machine learning relies on algorithms that leverage pattern recognition to provide insights resulting in greater understanding, predictive accuracy, and prescriptive intelligence of enterprise data that contributes to diverse strategic outcomes.

Machine learning is playing an increasing role in our daily lives. Automated assistants like Apple's Siri, or Microsoft's Cortana, pre-approved credit card offers, savings and investment offers from your bank, suggestions on Amazon, Expedia or Netflix are all examples of machine learning in action. An element that all the examples have in common is that each looks to create the highest quality predictive intelligence of future behavior based on historic data. Machine learning excels at solving complex problems that are based on creating accurate predictions without explicit computer programming.

MACHINE LEARNING'S STRATEGIC ROLE IN THE ENTERPRISE

Unlike advanced analytic techniques that seek out causalities first, machine learning techniques are designed to seek out opportunities to optimize decisions based on the predictive value of large-scale data sets. With the global proliferation of social networks fueling the growth of unstructured data, it is important to note that these optimized decisions must be made by analyzing structured data and unstructured data.

Nowhere is the challenge of bringing precision to predictive modeling and deep learning from data more evident than in search engine development and optimization, which is a core capability for businesses like Google. In search of higher machine learning performance, Google created custom-built Tensor Processing Units (TPU) chipsets that optimize per watt performance of machine learning tasks by seven years into the future according to Urs Hölzle, Senior Vice President for Technical Infrastructure[1] . TPUs have been in Google's data centers for a year, running Google's voice recognition services.

Today, machine learning has broad appeal across diverse industries and is powering applications as far ranging as gene mapping, biometric identification solutions, web-based content curation, autonomous driving automobiles, real-time speech translation, and it even beats humans in chess matches.

[1]Google built its own chips to expedite its machine learning algorithms, TechCrunch, May 18, 2016

"At least 40% of companies surveyed are already using machine learning to improve sales and marketing performance."

The Accenture Institute for High Performance, May 2016

TURNING MACHINE LEARNING INTO A GROWTH CATALYST FOR YOUR ENTERPRISE

In enterprise businesses, machine learning is proving to be effective at handling predictive and prescriptive tasks, including defining which behaviors have the highest propensity to drive desired outcomes. Enterprises eager to compete and win more customers are applying machine learning to sales and marketing challenges. The Accenture Institute for High Performance recently completed a study[2] that found the following key takeaways:

- ***At least 40% of companies surveyed are already using machine learning to improve sales and marketing performance.***

  Two out of five companies have already implemented machine learning based intelligence in sales and marketing.

- ***38% credited machine learning for improvements in sales performance metrics.***

  Metrics the study tracked include new leads, upsells, and sales cycle times by a factor of two or more while another 41% created improvements by a factor of five or more.

- ***76% say they are targeting higher sales growth with machine learning.***

  Gaining greater predictive accuracy by creating and optimizing propensity models to guide up-sell and cross-sell is where machine learning is making contributions to omni-channel selling strategies today.

- ***Several European banks are increasing new product sales by 10% while reducing churn 20% using machine learning intelligence.***

  A recent McKinsey study found that a dozen European banks are replacing statistical modeling techniques with machine learning. The banks are also increasing customer satisfaction scores and customer lifetime value as well.

[2] Sales Gets A Machine-Learning Makeover. MIT Sloan Management Review, May 17, 2016. H. James Wilson, Narendra Mulani, Allan Alter.

WHY MACHINE LEARNING ADOPTION IS ACCELERATING

For enterprises, machine learning has the ability to scale across a broad spectrum of business processes, those directly related to revenue-making, often called Quote-to-Cash,[3] are among the highest value applications including sales, contract management, customer service, finance, legal, quality, pricing and order fulfillment.

The economics of cloud computing, cloud storage, the proliferation of sensors driving Internet of Things (IoT) connected devices growth, pervasive use of mobile devices that consume gigabytes of data in minutes are a few of the several factors accelerating machine learning adoption. Add to these the many challenges of creating context in search engines and the complex problems companies face in optimizing operations while predicting most likely outcomes, and the perfect environment is in place for machine learning to dramatically proliferate.

[3] **Quote-to-Cash** connects a customer's intent to buy with a company's realization of revenue, and encompasses the entire sales, contract, and customer relationship lifecycles.

The following are the key factors enabling machine learning growth today:

- **Exponential data growth with unstructured data being over 80% of the data an enterprise relies on to make decisions daily.**
  Demand forecasts, CRM and ERP transaction data, transportation costs, barcode and inventory management data, historical pricing, service and support costs and accounting standard costing are just a few of the many sources of structured data enterprises make decisions with today. The exponential growth of unstructured data that includes social media posts, e-mail records, call logs, customer service and support records, connected devices sensing data, competitor and partner pricing and supply chain tracking data frequently has predictive patterns that enterprises are completely missing out on today. Enterprises looking to become competitive leaders are going after the insights in these unstructured data sources and turning them into an advantage.

- ***The Internet of Things (IoT) networks, embedded systems and connected devices are generating real-time data that is ideal for further optimizing supply chain networks and increasing demand forecast predictive accuracy.***
  As IoT platforms, systems, applications and sensors permeate value chains of businesses globally, there is an exponential increase of data generated. The availability and innate value of these large-scale datasets are an impetus further driving machine learning adoption.

- ***Generating massive data sets through synthetic means including extrapolation and projection of existing historical data to create realistic simulated data.***
  From weather forecasting to optimizing a supply chain network using advanced simulation techniques that generate terabytes of data, the ability to fine-tune forecasts and attain greater optimizing is also driving machine learning adoption. Simulated data sets of product launch and selling strategies is a nascent application today and one that shows promise in developing propensity models that predict purchase levels.

- ***The economics of secure digital storage and cloud computing are combining to put infrastructure costs into freefall, making machine learning more affordable for all businesses.***
  Online storage and public cloud instances can be purchased literally in minutes online with a credit card. Migrating legacy data off of databases where their accessibility is limited compared to cloud platforms is becoming more commonplace as greater trust in secure cloud storage increases. For many small businesses who lack IT expertise, the cloud provides a scalable, secure platform for managing their data across diverse geographic locations.

WHERE MACHINE LEARNING IS DELIVERING BUSINESS RESULTS TODAY

The good news for businesses is that all the data they have been saving for years can now be converted into a competitive advantage. Revenue and senior management teams are concentrating on how they can capitalize on machine learning's core strengths to transform the strategic vision of their businesses into reality. These teams are focusing on business outcomes first and are looking for machine learning to accelerate and simplify determining which factors most influence buying behavior and lead to goals fulfillment.

Sales, marketing, and channel management teams are using machine learning to optimize promotions, while compensation and rebates drive the desired behavior across selling channels. Machine learning solutions have the capability to predict propensity to buy across all channels, make personalized recommendations to customers, forecast long-term customer loyalty, and anticipate potential revenue and credit risks.

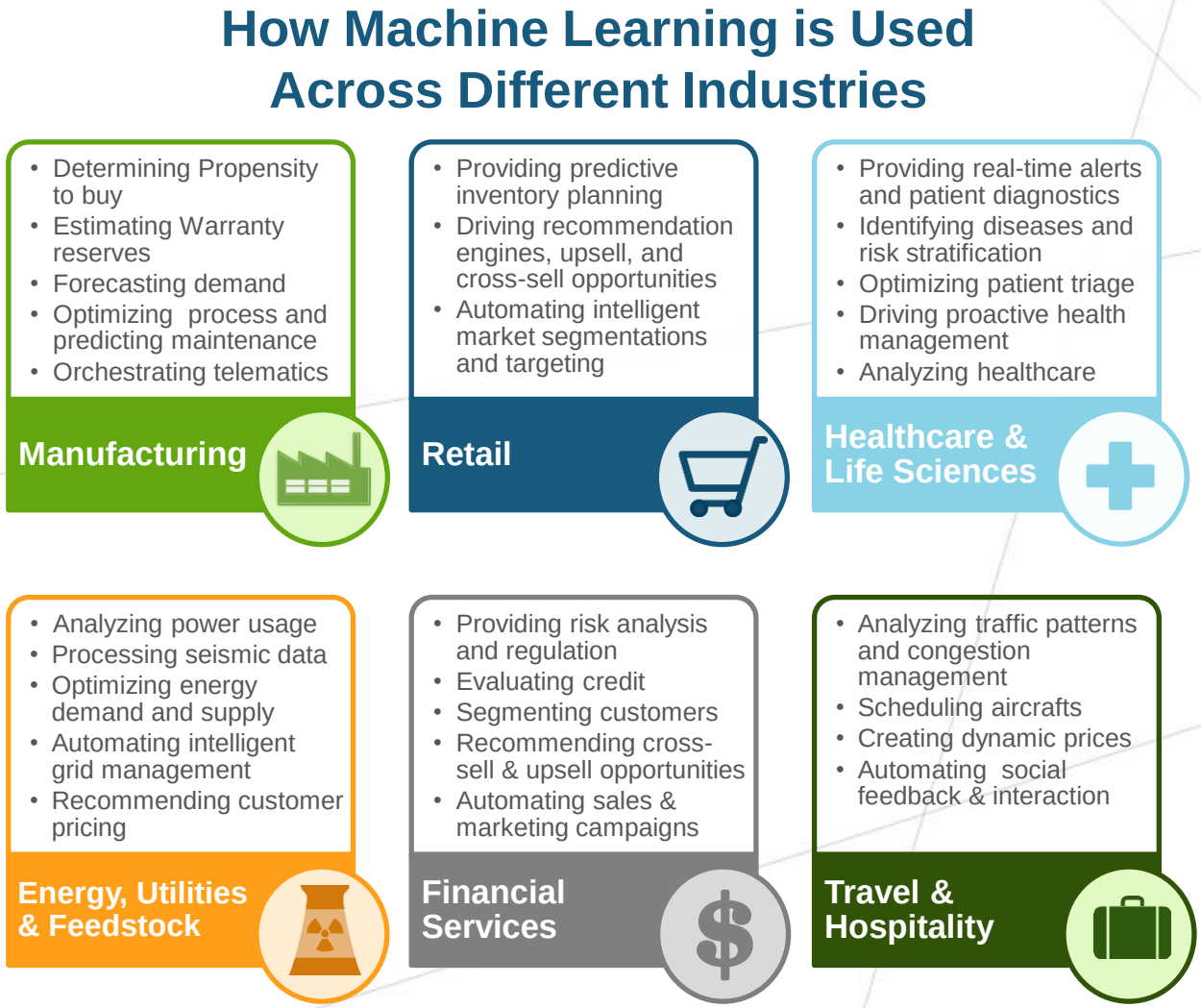

Figure 1: Machine Learning Powering Applications Across Different Industries. Source: Tata Consultancy Services, Using Big Data for Machine Learning Analytics in Manufacturing – TCS

MOVING BEYOND LEGACY ANALYTICS TO ACHIEVE COMPETITIVE ADVANTAGE

Historically, analytics in the enterprise were centered on reports and dashboards. These tools, created by business analysts for managers, were used to see what happened in the past. Their ability to improve business outcomes was limited by the amount of time (weeks or longer) required to create the report, the relatively narrow audience with access to the information, and the lack of value added insight derived from the data (i.e. no predictive or prescriptive intelligence is provided to decision makers). Today, the vast majority of enterprises have needs for descriptive analytics, which are necessary for effective management, but not sufficient to accelerate business performance. In order to scale to a higher level of responsiveness, enterprise organizations need to move beyond descriptive analytics and climb up the intelligence capability pyramid.

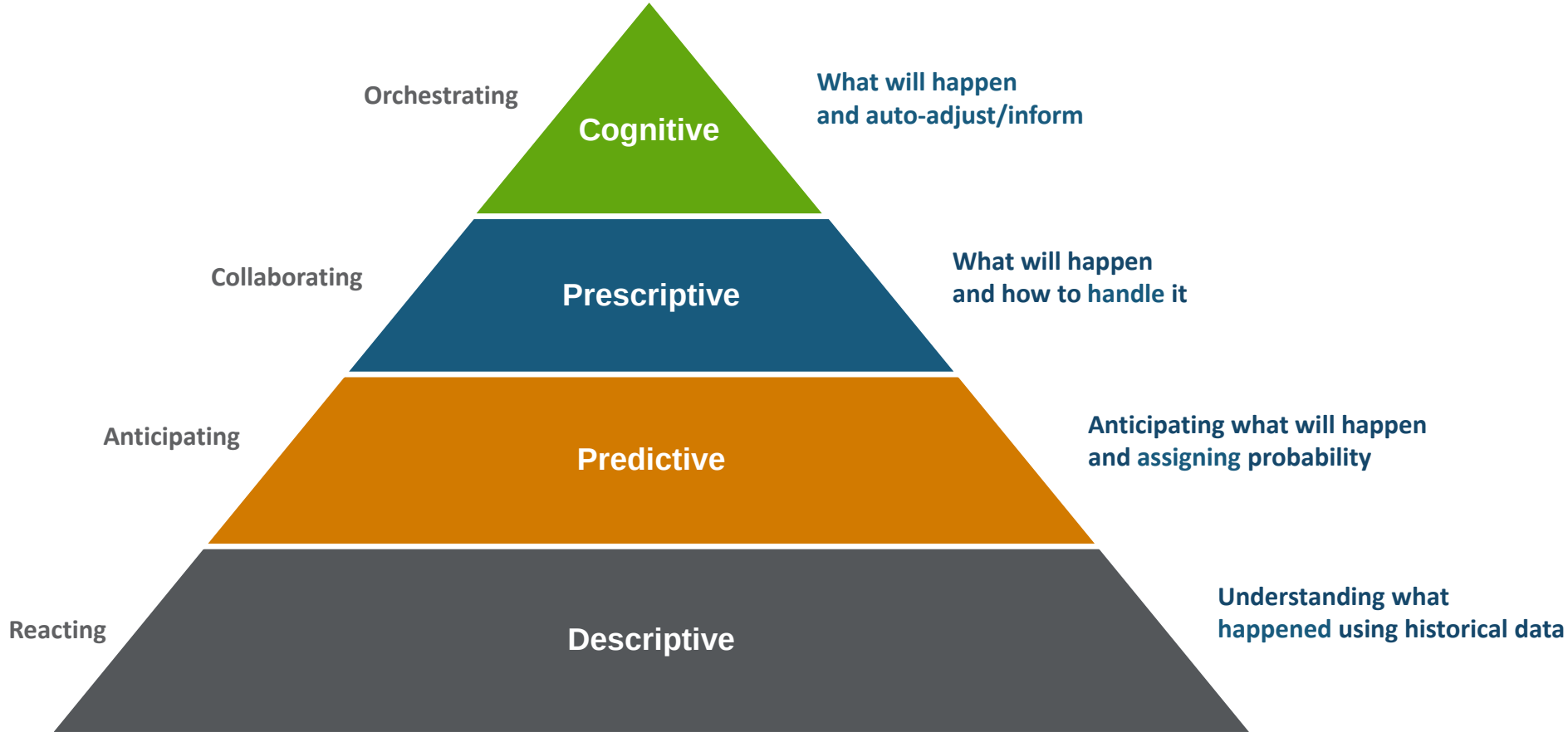

Figure 2. The Apttus Intelligence Capability Model summarizes the levels that enterprises need to scale to gain greater insights and to drive more profitable business outcomes

THE APTTUS INTELLIGENCE CAPABILITY MODEL™

1 DESCRIPTIVE ANALYTICS

Descriptive analytics is the foundation level that helps users understand what has already occurred by laying out relevant summaries and supporting data in formats that are easy to consume both by end-user staff and management.

How can you use this type of analytics? You can start with a big picture view of your metrics like booking, revenue, recurring revenue, margins, or revenue velocity and then drilldown for more granularity. For example, when it comes to pricing, your Quote-to-Cash system can analyze all of your sell-side contracts and provide a report on which pricing has been agreed to by different customer segments. Knowing this will allow you to decide which pricing to include in future deals of the same type.

2 PREDICTIVE ANALYTICS

Predictive analytics helps users recognize patterns and detect meaningful trends. More significantly, you'll be able to generate projections of different developments for different time horizons based on the output of the analysis.

How can you use this type of analytics? Your Quote-to-Cash system can analyze successful deals, along with attributes mined from your lead database. When this is matched with an internal product rank, you'll be able to predict which of your prospects will not only lead to a sale, but what products they will likely buy. This allows you to plan accordingly and prioritize specific accounts.

3 PRESCRIPTIVE ANALYTICS

Prescriptive analytics on the other hand delivers granular insights and forecasts showcasing what is likely to occur, accompanied by relevant, system-driven recommendations on next best actions and tactics to adopt.

How can you use this type of analytics? If your Quote-to-Cash system measures selling trends over an extended period of time, it will discern a spike in a particular product and provide certain recommendations. For instance, as opposed to the normal 15,000 you've committed, your system may tell you to allocate 25,000 extra units for a specific region. This is a perfect example of proactively reacting to the rapidly changing needs of the customer.

4 COGNITIVE ANALYTICS (MACHINE DRIVEN)

Cognitive analytics exploits machine learning to refine trend and pattern analyses on an on-going, unsupervised basis in order to constantly evaluate processes and associate data. It also leads to automatically initiating specific, suitable policies, actions and workflows.

How can you use this type of analytics? Your Quote-to-Cash system notices an influx of demand for a product in a certain region and automatically adjusts the price slightly to match demand, generating a greater profit. No more manual work to derive valuable insights. No more missed opportunities. Instead, your company can take action at the speed needed to be competitive.

ASCENDING THE INTELLIGENCE CAPABILITY PYRAMID

Despite the abundance of data, most companies still heavily rely on historical-based analytics. The ultimate goal for forward thinking companies is to move up the intelligence scale graduating from historical data to cognitive capabilities, to not only receive prescriptive insight but to enable automated actions. So what is preventing so many companies from starting the journey?

The common issue is the shortcoming of business intelligence tools. They use relatively simple data sets available from the marketing and sales processes to try to improve efficiency and conversion rates. This approach falls short of delivering the maximum value to enterprises for three main reasons:

1. **They do not incorporate the highest value, most complex data**
2. **They are not integrated into the diverse consumption stages in the Quote-to-Cash process**
3. **They do not modify behavior of the user because they are not used in conjunction with the measurement and reward systems that lead to desired outcomes**

On the next page, we'll dive deeper into each of these shortcomings, and then outline how to overcome them.

SHORT OF THE SUMMIT

1. Incorporate Complex Data

The sources and types of data used by these applications are related to the corresponding stage of the customer life cycle. Data on prospects, i.e., the top of the sales funnel, is used to predict marketing conversion rates. Data on customers is used to track product and service usage, to identify satisfaction levels, and to limit customer erosion. Analyzing complex data like asset and bundle composition, product configuration, pricing and discounting, and performance on contractual commitments is a source of high-value intelligence about customers and a foundation for actionable prescriptive guidance.

These data sets are the heart of the customer relationship and increase the value of insights about customer usage and satisfaction and, importantly, provide insights that lead to new revenue opportunities from cross-selling and up-selling strategies.

2. Drive Application Consumption

The trend in advanced analytics is increasingly seamless integration of intelligence in business process tools. This trend makes the integration invisible to the user and, quite simply, delivers insight at the right time, at the right place to the decision maker. Identifying the consumption stages is critical for knowing who, when, where, and how often intelligence can improve revenue-making activities.

Many applications fail to identify and to deliver effectively to the diverse set of users of intelligence that span the Quote-to-Cash process, and, as a result, fall short of automating how machine intelligence is created and delivered to users at the point of decision making.

3. Modify Behavior

Gaining value from prescriptive intelligence requires a user to take action from the guidance. Inspiring action is vitally important and a critical capability for any effective application.

Applications which fail to provide a rationale for how the guidance is relevant to the user miss an opportunity to gain adoption by the user, which is a first step. The rationale provides context about the recommendations which are meaningful to the user. The insight gained by the user is powerful, allowing them to be consultative to their customer when sharing the rationale.

Of equal importance is integrating the prescriptive intelligence with the enterprise systems for measurement and reward. This alignment is valuable because it provides the inspiration to the user to take action on the guidance. Incentive compensation, promotions, and gamification that introduces healthy competition are powerful motivators that drive desired business outcomes when paired with prescriptive intelligence.

Solutions missing any of these ingredients fall short of delivering true prescriptive insight to deliver strategic business outcomes and forms a dividing line between solutions in the upper and lower zones of the intelligence capability model.

DRIVING BUSINESS OUTCOMES WITH APTTUS QUOTE-TO-CASH INTELLIGENCE

Quote-to-Cash Intelligence extends the Apttus Quote-to-Cash suite of process automation applications, enabling companies to define, achieve and continually improve business outcomes. Combining the Apttus Quote-to-Cash suite with Promotions, Incentive Compensation, Rebates and X-Author provides companies with the solutions they need to motivate selling behaviors that lead to defined business outcomes. In addition, Quote-to-Cash Intelligence prescribes actions for improving the revenue process with machine learning.

Quote-to-Cash Intelligence is the only suite of enterprise-level applications incorporating machine learning that encompasses and enhances every facet of the revenue cycle, making it the end-to-end solution for companies of all sizes, including the largest and most complex sales operations in the world.

Apttus uses your entire sales and asset history, including every customer characteristic in your systems, and finds the patterns that link customers and the products they have purchased. Apttus then makes intelligent predictions about products that a customer, whether in the install base or new to you, may be likely to buy based on their characteristics and any purchase history. These predictions are served to your sales representatives, or E-Commerce customers, in Apttus as highly relevant options to consider. Apttus then auto-creates a new opportunity in your CRM system to alert your sellers to highly actionable sales events that they may not have uncovered in customer discussions.

Apttus Quote-to-Cash Intelligence moves the enterprise beyond descriptive and predictive analytics to provide data-driven prescriptive insights, intelligence and recommendations, unmatched in the industry.

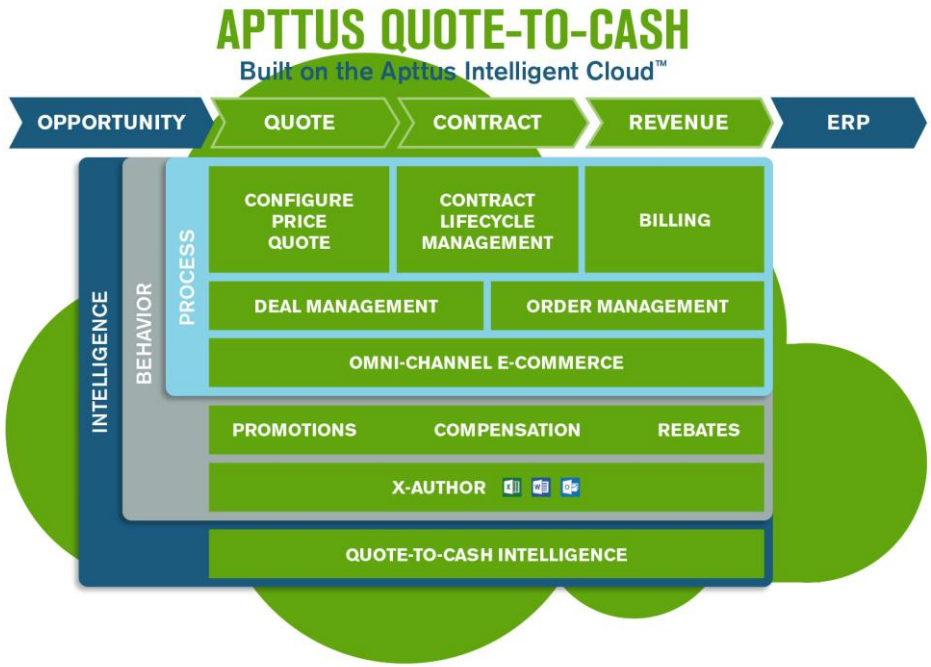

Figure 3. The Apttus Intelligent Cloud with Intelligence layer wrapped around the Quote-to-Cash process enables companies to define, achieve and continually improve business outcomes

CONCLUSION

With the rapid adoption of new technologies like IoT, the amount of data available for analysis has grown exponentially. With Machine learning there is an opportunity to how you sell and accelerate the growth of your enterprise. It promises to provide insights, to bring greater understanding, predictive accuracy and prescriptive intelligence to enterprises' data sets, and to contribute to diverse strategic outcomes. Descriptive analytics, with fixed reports and dashboards, are the mainstay of enterprises today, but to gain advantage in today's hyper-competitive business environment, companies will need to rapidly ascend the Intelligence Capability Pyramid.

Apttus Quote-to-Cash Intelligence incorporating machine learning delivers insights not previously available, based on real-time analysis of customer, sales, service, pricing and product data. It helps enterprises anticipate what will happen, auto-adjust to provide the most beneficial outcome, and share knowledge companywide.

For more details on how the Quote-to-Cash Intelligence with machine learning can boost your enterprise processes and contribute to strategic business outcomes, visit: apttus.com.

ABOUT QUOTE-TO-CASH

Quote-to-Cash is the vital business process that connects a customer's interest in a purchase to the realization of revenue. It includes creating a quote, responding to RFPs, submitting a proposal, negotiating and managing a contract, fulfilling orders, recognizing revenue, ensuring compliance and tracking payments – all within visible and controlled workflow. Quote-to-Cash solutions include Configure-Price-Quote (CPQ), Contract Lifecycle Management (CLM), and Revenue Management applications.

Quote-to-Cash is the single link between top-line results, bottom-line results and customer satisfaction. No other process is as critical for maximizing the value of capturing revenue in a profitable way as well as meeting the buying needs of customers. This process relies on the collective intelligence of the enterprise. The impact of accurate quotes, proposals, contracts and orders make the flow of all data and processes within an enterprise work smoothly, thus creating value for enterprises and their customers.

ABOUT APTTUS

Apttus, the category-defining Quote-to-Cash software company, drives the vital business process between the buyer's interest in a purchase and the realization of revenue. Utilizing a patented combination of SaaS-based applications, the Apttus Intelligent Cloud maximizes the entire revenue operation by driving behavior and providing prescriptive data to company decision-makers. Apttus offers enhanced Configure Price Quote (CPQ), E-Commerce, Contract Management, Renewals and Revenue Management solutions on the world's most trusted cloud platforms, including Salesforce and Microsoft Azure. Apttus is based in San Mateo, California, with additional offices located across the globe. For more information visit: **apttus.com**.