TDWI CHECKLIST REPORT

Applying Analytics with Big Data for Customer Intelligence
Seven Steps to Success

By David Stodder

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APPLYING ANALYTICS WITH BIG DATA FOR CUSTOMER INTELLIGENCE
Seven Steps to Success

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Customers do not conform to one data type, one channel, or one-size-fits-all styles of marketing. Customers are empowered. Unhappy customers will go to a competitor—and as social influencers, they will take potential customers with them. Organizations cannot afford to be complacent about how well they know their customers. Competitors who are adept at quickly turning data and information into knowledge will have a leg up in the race to attract and retain their customers.

Leading organizations are tapping both traditional and newer "big data" resources to run advanced analytics programs to discover trends, patterns, and other insights. These can fuel new products and services or guide more efficient and effective operations. Although the term *big data* is often defined inconsistently, it generally refers to new sources of non-transactional, semi-structured, or unstructured data that includes Web clickstreams and logs, machine data, location data, and text. These sources have the potential to deliver what transaction data alone cannot: contextual insights drawn from behavior across channels. These sources help organizations understand and anticipate what behavior leads to a purchase, what types of engagement will keep customers loyal, and how customers influence each other in social networks.

Big data is not exclusive to large organizations. Even small to midsize organizations are confronted with more data volume, variety, and velocity than they can handle with traditional systems. In response, many enterprises today are expanding their customer data architectures to include cloud data services, Hadoop, pre-configured analytic appliances, and data virtualization.

Advanced analytics is essential for deriving maximum value from customer data. Advanced analytics methods and technologies include predictive analytics, statistics, data mining, machine learning, and natural language processing. They enable users to get beyond standard business intelligence (BI) or online analytical processing (OLAP) querying and reporting to explore data for patterns, trends, and correlations. Big data analytics is about applying advanced methods and technologies to derive insights from very large and diverse data sets that often include varied data types and streaming data.

This TDWI Checklist Report discusses steps for realizing value from big data and analytics for better customer intelligence.

☑ NUMBER ONE

GAIN A COMPREHENSIVE VIEW OF CUSTOMERS AND PROSPECTS ACROSS MULTIPLE CHANNELS

Data is the foundation of any customer intelligence strategy. Today's empowered customers and prospects generate voluminous and diverse data through activity across channels. These include physical stores, kiosks, field-sales offices, and call centers as well as newer channels such as mobile, e-commerce, and social media. In addition, many organizations want to tap customer or prospect data from activity generated through reseller and indirect channels such as advertising networks. Organizations can gain insight by integrating views of these data sources with demographic information.

Thus, an important first step is to develop a strategy for accessing and integrating customer data. Performing analytics on data drawn from one channel or touchpoint source can be helpful, but you can gain significant insights by analyzing multiple sources. Indeed, a key objective is to gain a single, holistic view of customers and customer segments by integrating data from all relevant sources. This "360-degree" view of a customer's interactions and experiences across channels allows you to respond intelligently when a customer engages your organization at any touchpoint; in real time, organizations can use advanced analytics to determine the appropriate marketing approach and offer relevant products and services.

Business leadership should identify relevant sources and work with IT to determine which users and functions need to view which data sources. The classic approach is to consolidate customer data into an enterprise data warehouse (EDW) that serves multiple users or functions. Although often the best approach, it is not the only one, nor is it easy; TDWI Research finds that organizations regard EDW consolidation as challenging, not just technically but also for people and budget sponsorship reasons. Fortunately, data warehouse automation and pre-configured analytic platforms are making the technology for consolidation easier.

Options today allow organizations to expand their data architecture to include technology approaches that complement the classic, on-premises EDW but require less data movement and transformation. Choices include data virtualization, which reduces data movement, as well as cloud data services and Hadoop file systems. Such emerging "hybrid" data architectures can support a greater variety of analytics. Organizations should evaluate the spectrum of approaches to determine which ones fit current and future analytic needs.

☑ **NUMBER TWO**

IMPLEMENT PREDICTIVE ANALYTICS TO BECOME
MORE EFFECTIVE AND PROACTIVE

Predictive analytics is an advanced solution that can help
organizations anticipate customer and market behavior and respond
proactively. Predictive analytics consists of statistical or data mining
methods and tools that enable you to develop and score predictive
models based on combinations of variables. With BI and OLAP, users
are able to slice and dice data to answer questions about what
happened or what is happening, but with predictive analytics the focus
is on estimating outcomes or "targets" of interest. Data scientists,
analysts, and advanced business users can employ methods and tools
to test hypotheses or explore trends and patterns in data for answers
to "what will happen if" questions, such as factors that, if present,
may be driving higher churn. They can also use predictive analytics to
"let the data speak"—that is, to explore data to determine the right
questions to ask.

Predictive analytics solutions exploit software automation and
computing power to derive insights faster. Solutions enable
organizations to score models and run algorithms on big data sources
and real-time event streams. High-powered algorithms enable
organizations to mine data and spot trends, patterns, affinities, and
correlations rapidly. In addition, the combination of the solutions'
software automation and big data access allow organizations to
evaluate the performance of predictive models sooner. Traditionally,
organizations have had to wait much longer to evaluate model
performance, which has meant that models become out of date and
produce erroneous analysis long before analysts can change them.

Big data is important, but many organizations have had success
implementing predictive analytics against less than "big" data
sources, including transactions or other business application data.
Organizations have been able to operationalize predictive insights so
that personnel in contact centers, stores, or heading up e-commerce
sites can be proactive in adjusting marketing offers or refining
customer-facing processes.

At this step, organizations should define desired business outcomes
and evaluate which processes could benefit from predictive analytics
to achieve those outcomes. Along with building models, organizations
should focus on streamlining data preparation by providing integrated
data views and utilizing tools to reduce manual effort.

☑ **NUMBER THREE**

DEPLOY ADVANCED ANALYTICS TO ENABLE
PERSONALIZED MARKETING AND ENGAGEMENT

Organizations are often motivated to deploy advanced analytics
on customer data because they seek a greater intimacy with
customers and prospects. Having grown in size and diversity as a
result of acquisitions, business reorganization, or the introduction
of new products and services, organizations find that they struggle
to retain focus on individual customer preferences, which is critical
for ensuring loyalty. The virtues of growth can come at the cost
of intimacy. Although it may not be possible to replicate the tight
customer connection once enjoyed by mom-and-pop stores where
customers were neighbors and known by name and reputation,
organizations can improve intimacy through personalization guided
by data-driven customer insight and engagement.

Strategic initiatives for personalization—including one-to-one
marketing, micro-marketing, finer segmentation, and mass
customization—depend on data insights. Predictive and big data
analytics enable organizations to explore how customers in defined
segments spend over time; organizations can model customers'
propensity to buy additional or more expensive products. They can
use analytics to sharpen customer targeting and determine the
best time to deliver cross-sell and up-sell offers.

Non-transactional big data sources that capture behavior
data from online (and potentially real-time) event streams and
clickstreams, page views, and logs—as well as records collected
from contact centers and other touchpoints—can be valuable
for advanced analytics aimed at increasing personalization. With
a 360-degree view of customers' behavioral and transactional
activity across channels, organizations can gain a better
understanding of customer preferences as well as the effectiveness
of marketing campaigns on customer behavior. They can use this
knowledge to create a 360-degree customer experience: that is, an
intelligent and unified experience no matter which touchpoint the
customer prefers for interaction.

Organizations should determine how they can employ advanced
analytics to get beyond simple demographic segmentation and use
behavioral insights to improve personalization. Behavior-based
segmentation can give organizations a different view of customers
based on actions and preferences over time. Operationally,
organizations can begin learning how to personalize engagements
from the first contact—during "onboarding"—and later through
successive engagements. Then, organizations can personalize
interactions at each step in the customer life cycle.

☑ **NUMBER FOUR**

LEVERAGE BIG DATA ANALYTICS TO SHARPEN SOCIAL MEDIA STRATEGIES

☑ **NUMBER FIVE**

REDUCE LATENCY IN ANALYTICS PROCESSES TO IMPROVE REAL-TIME INSIGHT

Social media networks provide exciting channels for marketing and customer engagement. Although Facebook, Twitter, and other major sites have been active for about a decade, most organizations still view these channels as the new frontier for customer and prospect interaction. Thus, they are the land of experimentation; organizations must try different types of analysis and consider the results as part of a learning exercise.

Traditionally, experimentation with a new channel might take years. However, by deploying the software and computing power of advanced analytics on big data, organizations can shorten the cycle. The objective is to listen and learn from social media activity and apply the insights operationally, at the right time, to support marketing and engagement strategies both for the activity overall and in the social media channel itself.

Analytics of social media data can give organizations an external perspective on their brands, operations, and strategies that they do not get from internal sources. One example is the ability to discover and measure influence; leading organizations are analyzing social media data to identify the most influential participants in that channel and how these "influencers" impact their networks of contacts, friends, and followers. By analyzing links between influencers and their networks, organizations can learn the ripple effects of their and their competitors' messaging. Organizations can also turn findings from tracking and measuring influence into a new and valuable source for determining the value of a customer or prospect. Looking beyond individuals, organizations can refine customer segmentation by examining what topics are prominent in social networks.

Text analytics methods and technologies are the most critical for analyzing social media data. Statistical and linguistic techniques can be employed to interpret sentiments. Using algorithms to filter out noise and factor in common uses of irony, sarcasm, double negatives, and other linguistic elements, text analytics can help organizations more quickly understand the reaction to marketing campaigns, product introductions, events, and competitors' strategies.

In this step, organizations should determine objectives for taking advantage of the unique qualities of social media data. Keep in mind that most social media interaction is less about making sales and more about building reputation and influencing the influencers.

Speed plus intelligence can add up to a competitive advantage in customer-facing processes. Organizations should be vigilant in identifying and reducing latency at every stage in their flow of customer data and information, from its capture and analysis to presentation and sharing. Reduced latency leads to more satisfied customers; sales and service personnel have current information during engagements and can resolve problems quickly. When sales, service, and contact-center agents have at their fingertips not only routine data about a customer's interaction history but also actionable insights based on real- or right-time analytics, cross-sell and up-sell offers will be more relevant.

Marketing benefits accrue when organizations can analyze data faster and discover insights to users' applications more frequently. Many organizations seek to get past the limits of seasonal campaigns, which can fall out of sync with what the organization is learning through behavior-based segmentation and social media analytics. Organizations also want to understand marketing attribution in near real time to determine which campaigns are having the most influence in triggering customer purchases.

TDWI Research finds that a priority among many marketing business users is to view real-time data and analytics. To develop solutions, however, data professionals need a clear understanding of what users mean by *real time*. In some cases, users truly need insights from real-time, streaming analytics: that is, advanced, predictive models and scoring algorithms to observe and interpret patterns in data or event streams as they flow in online behavior, gaming, mobile device use, or sensors embedded in growing "Internet of things" environments. In such cases, analysis of real-time data flows can be superior to that of historical data.

For other objectives, the most important capability is to capture data in real time and then run and refine analytic models and algorithms running against it on a daily or hourly basis. Still other users simply require timely notification of data changes as they are relevant to decisions. Thus, at this step, organizations seeking to reduce or eliminate latency should gain a detailed understanding of user requirements so they can deploy appropriate methods and technology solutions.

☑ NUMBER SIX

IMPROVE DATA VISUALIZATION AND VISUAL ANALYSIS FOR NONTECHNICAL USERS

Advances in data visualization form one of today's most exciting technology developments. BI and analytics application developers are under pressure to keep up with users' expectations set by visualization experiences with gaming, mobile, e-commerce, and other consumer interfaces. Dashboards have made data visualization a mainstream element of BI applications. More advanced visualization is needed in the era of big data; as data volume, variety, and velocity increase, critical nuggets of information can go unnoticed in standard tabular representations of data.

Users implementing analytics to explore customer data for trends, patterns, or anomalies need visualizations to gain actionable, operational insight. As expressions of meaning, visualizations are vital for improving how users collaborate on data. Users can share visualizations linked to text annotations as well as other content such as pictures, audio files, and maps to "tell a story" with data through comprehensive, shared views. Visualizations such as call-to-action buttons, checklists, or gauges featuring different colors can help frontline users connect insights to actions they might take during customer engagements.

Many analytics tools now offer diverse libraries of visualizations beyond standard line and bar charts. Users can choose from scatterplots, heat maps, tree maps, variance charts, 3-D visualizations, and, for text analytics, visualizations such as word clouds. Some tools allow users to easily drag and drop visualizations into workspaces or dashboards, leaving the data integration "plumbing" to go on automatically, behind the scenes. Many tools enable users to shift perspective by viewing data relationships and comparisons across multiple visualizations. Leading BI, analytics, and data discovery tools enable users to consume big data from within familiar workspaces and dashboards rather than have to drop out into separate tools. Users can also export visualizations from analytics tools into other applications such as sales force management.

In this step, organizations should evaluate tools and platforms to support users' data visualization needs in their analysis of customer data. Organizations should guide users to avoid cluttering their workspaces with too many visual objects or selecting those that are not appropriate for their needs. Guidance is essential via software wizards or by hands-on visualization experts.

☑ NUMBER SEVEN

DEVELOP AN ARCHITECTURE THAT BALANCES FLEXIBILITY WITH GOVERNANCE

As organizations become more intelligent about customers' behavior—and as they increase the quantity of customer data to gain insights—they need to revise their information strategy. Organizations deploying advanced analytics on big data for improving customer insight must also make improvements in data architecture, in particular to more effectively protect and govern customer data.

Ultimately, organizations need an information strategy that balances flexibility and governance. Architectures and policies that are too restrictive will impinge upon marketing functions that must be flexible in how they work with customer data. However, too little structure and oversight could expose the organization to chaos, penalties, and damage to its reputation. Here are three points to consider in developing a balanced strategy:

- **Hybrid data architecture**. Many organizations seeking to analyze a variety of data types and meet broader user requirements find they need to build out beyond their data warehouse. Hadoop systems and cloud services have potential for adding flexibility. The growing maturity of NoSQL technologies such as graph databases makes it clear that architectures must be open to diversity. Emerging "hybrid" or logical data architectures can give organizations a blueprint for how they can unify diverse technologies. Organizations should evaluate hybrid architectural approaches to determine how they might help serve the variety of analytics requirements.

- **Customer data privacy**. Data breaches are unfortunately becoming commonplace. As more technology solutions are deployed, it can be difficult to oversee how (or whether) users are protecting sensitive customer data. Organizations need to establish enterprise-level management of customer data policies. Business and IT should collaborate to define customer data privacy policies and monitor how data is used and shared. Managing data privacy by using a well-documented hybrid architecture could be an effective strategy.

- **Data governance and center of excellence (CoE)**. Data governance and/or center of excellence committees can help business and IT leadership work together more effectively. Many organizations are successfully employing such committees to encourage best practices and guide technology adoption. Business and IT work can together within a data governance or CoE committee to direct adoption of hybrid data architectures and oversee customer data privacy.

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David Stodder is director of TDWI Research for business intelligence. He focuses on providing research-based insight and best practices for organizations implementing BI, analytics, performance management, data discovery, data visualization, and related technologies and methods. He is the author of TDWI Best Practices Reports on mobile BI and customer analytics in the age of social media, as well as TDWI Checklist Reports on data discovery and information management. He has chaired TDWI conferences on BI agility and big data analytics. Stodder has provided thought leadership on BI, information management, and IT management for over two decades. He has served as vice president and research director with Ventana Research, and he was the founding chief editor of *Intelligent Enterprise*, where he served as editorial director for nine years. You can reach him at dstodder@tdwi.org.

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TDWI Research provides research and advice for business intelligence, data warehousing, and analytics professionals worldwide. TDWI Research focuses exclusively on BI, DW, and analytics issues and teams up with industry thought leaders and practitioners to deliver both broad and deep understanding of the business and technical challenges surrounding the deployment and use of business intelligence, data warehousing, and analytics solutions. TDWI Research offers in-depth research reports, commentary, inquiry services, and topical conferences as well as strategic planning services to user and vendor organizations.

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