CPA
Practice **Advisor**
Focus on Big Data

Wolters Kluwer

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UNDERSTANDING THE DATA YOU COLLECT

3 STEPS TO PREVENTING DATA-ANALYTICS OVERLOAD

By Hillarie Diaz

From the tax advisor who provides guidance that will help ensure clients are in the most advantageous position next tax season to the fractional CFO who advises on expected cash flows, and everywhere in between, everywhere you look today in the accounting profession data drives insights and decisions.

But the concept isn't a new one for accountants. Descriptive and diagnostic analytics ranging from inventory availability to variance analysis have been performed since Luca Pacioli created double-entry accounting. Long before user-friendly dashboards existed, we used Excel spreadsheets and charts. And before Excel? We did it by hand.

Thankfully modern accountants can leverage advanced technologies to perform analysis at scale and speed, dramatically increasing the amount of accounting and non-accounting data available to shape our analysis.

Our biggest challenge today with accounting data analytics isn't a lack of data—it's how quickly the sheer amount of data available can become overwhelming. As the utilization of big data in accounting continues to grow, and more and more data becomes available for analysis, it's becoming a challenge to determine which data is relevant, let alone leverage the data to make more informed decisions.

So how do you find and separate the relevant data? You need to know your audience, what you're trying to accomplish, and utilize technology to prevent information overload.

IDENTIFY YOUR AUDIENCE

Why does the audience matter? Because while the data doesn't change, the story that the data tells may change from person to person. That's not to say that the data tells one stakeholder the sky is blue and another that the sky is yellow. But different stakeholders may have very different questions. Knowing who will be asking questions is just as important as the question itself.

Let's consider time and billing data. The most common application of this data is to determine utilization. Staff and seniors would be interested in the details of how they compare to their peers, such as details about where they are exceeding expectations (or falling behind). Managers probably don't want quite that level of detail, preferring a summary view that highlights only those who fall outside the first or second standard deviation.

However, managers and partners may be interested in learning more about staff efficiency and would benefit from an analysis of which staff members are most effective at various types of engagements. For example, highlighting that a particular staff member spends 25% more time on a complicated audit in the pharmacy space compared to an audit of similar complexity in the restaurant or construction space is useful information.

Even if the audience is just you, there is data that is important to know. All too often, when we are the only audience, the question becomes secondary, and analysis becomes the purpose—which is not the best use of your time.

KNOW WHAT YOU'RE TRYING TO ACCOMPLISH

To perform an effective analysis, you need to have a question, purpose, or objective. Data analysis for the sake of analysis, while fun, isn't productive. A poorly constructed question can lead to costly and time-intensive data reviews that don't accomplish anything.

Before diving into the data, determine what you're trying to discover. What is the goal of this analysis? What decision-making will it facilitate? What outcome would be considered a success or a failure? Remember, data analytics results will only be as good as the questions you ask—when preparing your questions, consider factors such as your audience, strategic goals, and budget.

If you're struggling with understanding what questions to ask, start broad. Don't stop there, though. While it's often helpful to start broad, the question needs to be specific to get valuable (and actionable) insights.

For example, let's say that your goal is to increase profits. Driving data analysis with the question, "How do we increase profits?" might not provide useful results. A better place to start might be to ask, "Where are there opportunities to increase capacity with my existing staff?" or, "What engagements were the most profitable last quarter, and how can we replicate that success?"

With a clear understanding of what you are trying to accomplish, the analysis is more focused, and it's easier to determine which data is relevant.

UNDERSTAND THE DATA YOU HAVE, THE DATA YOU NEED, AND WHERE IT CAME FROM

Consider the data that accounting firms track, often without thinking about it.

There's **internal data**, from time tracking and how clients are served to practice management data such as billing, collections, and business development. Internal data also includes reports about training topics and CPE hours, staff productivity from an overview to detailed to variations in productivity between staff members.

There's also **client data**, information about the client that is collected during the engagement process. Any document or piece of information from a client falls into this category and goes beyond to include transcripts and notes.

Then there's **dark data**, which is data that's created or acquired through various means but not used to derive insights or for decision-making. This data takes many forms and often is a combination of internal and client data. Think client and prospect interactions mixed in with internal content such as emails, webinars, websites, and social media, not to mention engagement by-products such as interviews, workpapers, and notes.

IMPLEMENT AUTOMATION TO PREVENT INFORMATION OVERLOAD

Technology has allowed us to collect the data listed above and so much more. Technology has also allowed us to perform our data analysis faster and at a much larger scale. But there are downsides to all advances—and for data analytics, information overload is one of them.

Technology created the problem of too much data. It can also help us find relevant data. Advanced technologies such as machine learning and AI can automate the base data analysis, giving structure to unstructured data and providing accountants with the most relevant information. With automation sifting through the available data to identify information relevant to the question and the audience, we gain back the capacity to focus on other things.

With that additional capacity, we can perform higher-level data analysis, find the answer to the question, and understand how to shape the answer for the intended audience.

Complex data manipulation and analysis is critical to any business strategy, regardless of firm or practice size. Knowing which data is relevant—and having the tools to assist in that determination—is even more critical. With the right questions, an understanding of who the audience is, and automation to help perform base analysis at scale and speed, accountants can more easily guide their clients—and their business—towards success.

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HOW TO USE DATA FROM YOUR TECH STACK TO DRIVE FIRM BUDGET AND PLANNING DECISIONS

By Mark McAndrew

Let's be honest; no one (well, almost no one) likes the budgeting and planning process. But what if there was a way to leverage the data that your accounting workflow solution already collects to draw a direct line from daily activities and engagements to budgeting and planning decisions? And what if you could leverage that data without creating additional workload for your staff?

With the sheer amount of data that your tech stack collects today, leveraging can be done. The same software your firm is already using to determine staff capacity and track the status of an engagement can also help you make data-based decisions about everything from tax season staffing levels to advisory services revenue targets.

HOW IT WORKS

The same data that your accounting firm is collecting to support daily activities also drives the accounting data analytics you need to better budget and plan.

Your tech stack already collects and utilizes a wide range of data, ranging from engagement status and staff capacity to daily actions taken by staff at all levels.

Since the data being collected is already tracked by the firm as part of your staff's regular duties, there is little to no additional work for core users or leadership.

Let's walk through two critical parts of an accounting firm's budgeting and planning process—revenue target and revenue capacity—to demonstrate how you can take your existing data and obtain the data you need to budget and plan successfully, without adding another solution to your tech stack.

EXAMPLE: IDENTIFYING A REVENUE TARGET

Consider the basic revenue formula: Existing Business - Lost Business + New Business = Revenue Target

Visually the equation may look something like this:
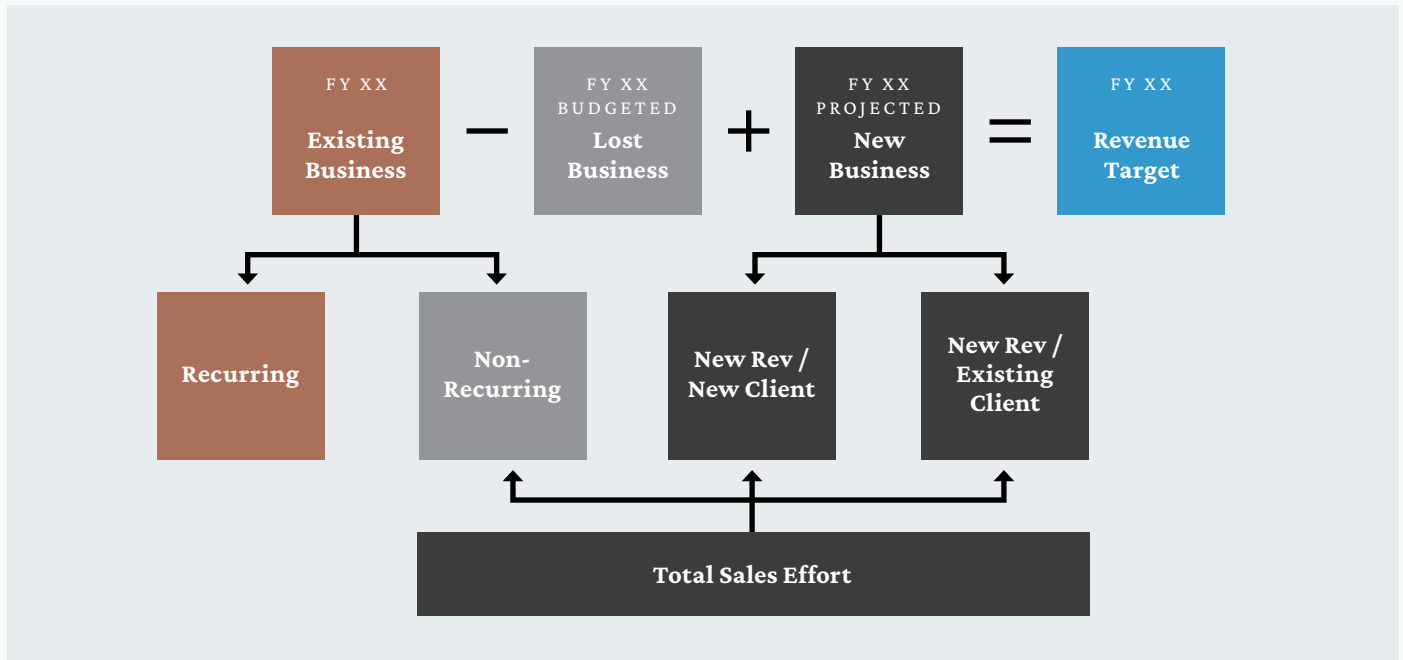
Part one of the formula is straightforward. The process becomes complicated when you get to part two and start asking detailed questions about recurring versus annual engagements, where you lost business, and so on.

Keeping that equation in mind, think about the data that your practice management and workflow solutions collect.

Also, with the equation in mind, consider where your solution can provide plug-in value. Ask yourself what pieces of information the tech solutions hold that can help you more accurately define your revenue target. How can you utilize the data points populated from daily use to better understand prior year revenue and more accurately define your revenue target?

Information commonly utilized includes:

- **How much of your existing business is recurring versus non-recurring**

- **Hours and revenue allocated to existing recurring business**

- **Hours and revenue allocated to existing non-recurring business**

- **Hours and revenue related to what is now lost business**

- **Staffing levels and which projects various staff worked on**

- **Where there are role-based budgets in place**

The daily actions taken by your staff members feed the answers to each of these questions. Their information plugs into the formula above, building a fact-based budget that other leadership won't have to spend time deciphering.

Identifying your revenue target, though essential to the budgeting process, is merely the first step. Once you've chosen the target, you have to be able to execute to meet or exceed that target. That's where determining your existing capacity comes into play.

EXAMPLE: DETERMINING EXISTING REVENUE CAPACITY

Now that you've established your revenue target through data-based decision-making, it's time to figure out how to meet that target. Yes, it's time to determine your revenue capacity, or more simply, how much revenue your accounting firm can produce at current firm staffing and staff capacity levels.

To figure this out, ask these questions:

- What is our current staff capacity?
- Can we, at current state and staffing levels, successfully execute upon and reach our revenue target?
- If not, what steps do we need to take to increase our capacity and reach our goals?

Even if you can't answer these questions off the top of your head, your firm management solutions should be able to provide the necessary data. For example, your staff members are no doubt using a workflow and/or practice management solution to create efficiency and increase productivity in their daily functions. Meanwhile, those solutions have been capturing data points like these, potentially without you realizing it:

- Task types connected to a specific category
- Each task established maintains a budget by role
- Budget hours calculated to total actual spend
- Each role unique to a specific function/level
- Each level producing a standard rate
- Each user maintaining a bill rate per employee
- Each user calculated to the user's standard hourly rate
- Task dollars at role level compared to staff dollars at the user level

Each data point gives you the tools necessary to determine the revenue capacity of your current staff and compare that to your revenue target.

As you calculate your accounting staff capacity, make sure to ground your calculations in realism. For example, it's not feasible to assume that revenue producers will spend 100% of their time in revenue-generating activities. Everyone has downtime. If you've been encouraging staff members to utilize the solution to its fullest, you should be able to track that downtime, as well.

While it's easy to get lost in the analysis, remember to take the step beyond crunching numbers and into strategic planning. With this type of data, you can identify where to shift resources between divisions, where hiring may need to occur, and what divisions are over (or under) performing. Use the historical data your tech stack already collects to build a data-driven budget.

CONCLUSION

While I used the annual budgeting and planning process to demonstrate how your data provides additional strategic value, these analyses can easily be ad hoc. So when you're working on budgets and planning next year, don't make everyone else guess how you got that number. Use the data that your firm is collecting to back up projections and set the firm up to achieve its revenue targets, utilizing data you've been collecting all along.

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UNLOCKING AUDIT POTENTIAL

HOW BIG DATA AND DATA ANALYSIS EMPOWERS THE MODERN AUDITOR

By Colleen Knuff and Stefan Davis

As accounting and auditing continue to be impacted by technology, auditors are able to access and leverage amounts of data they could previously only dream of. This unprecedented opportunity—to leverage big data for more efficient and effective financial statement audits—has the potential to transform how auditors do their jobs.

For auditors, the power of big data lies in its ability to empower the auditor by unlocking valuable insights, detecting anomalies, and enhancing audit quality.

DATA-DRIVEN AUDITING

Traditionally, auditing financial statements has meant relying on largely manual processes, limited sample sizes, and subjective judgment. In the world of big data, modern auditors can easily and quickly harness vast amounts of structured and unstructured data from multiple sources, enabling a consistent, data-driven approach to audits. They can identify trends, anomalies, and potential risks using data analytics and continuous monitoring; and they can distill greater insight from financial systems, databases, and spreadsheets.

Some have postulated that technology and data may reduce the demand for and importance of auditors. On the contrary, the data-driven audit empowers auditors with meaningful insights and evidence-based decisions that result in more robust and reliable audits and auditors who have more time to review and make the judgment calls the client relies on them for. With the well-publicized decline in new entrants to the profession, that's exactly what audit firms need to get through this workforce crisis and possibly entice new entrants as work becomes more intriguing.

ENHANCING AUDIT EFFICIENCY THROUGH BIG DATA AND ANALYTICS

Whether it's analyzing financial and non-financial data; detecting errors, fraud, and inconsistencies; or identifying outliers and unusual patterns in financial transactions, it's hard to understate the role that data analysis can have in auditing. But when we consider efficiency, the role of big data can be transformative.

Automating the data collection, cleansing, and transformation of data saves valuable time and resources. Rather than spending hours gathering and wrangling data from disparate systems, reports, and exports, auditors can streamline the capture and processing into industry-standard formats that are ready for use, shifting the auditor's focus from data wrangling to analysis.

Analyzing complete data sets or larger samples allows for a fuller representation of the underlying population, resulting in reduction or elimination of sampling risks, and enhanced audit quality. Comprehensive analytics-based testing means the scope of what can be audited with the same or less effort dramatically increases, increasing the accuracy and robustness of audit conclusions while also being more likely to uncover valuable insights for the client being audited.

Applying advanced data mining techniques and statistical methods helps auditors to identify irregularities, outliers, and potential risks more efficiently, supporting both risk assessment and testing in specific audit areas. For example, auditors can detect unusual trends or discrepancies in revenue recognition practices, inventory valuation, or expense categorization by analyzing large volumes of transactional data.

With big data analytics, auditors can employ more sophisticated analytics procedures such as predictive modeling, anomaly detection, and correlation analysis, each of which helps auditors to identify potential risks, financial statement errors, or fraud indicators.

UNLEASHING THE POTENTIAL OF BIG DATA TOOLS AND TECHNIQUES

It's easy to say that big data offers many benefits for the modern auditor. However, demonstrating that these tools and techniques won't diminish the auditor's role can sometimes be more difficult.

Let's look at a few examples of how big data and big data analytics can make the audit better and more valuable for stakeholders, including clients.

TRANSACTIONAL DATA ANALYSIS

One of the established applications of big data analytics in auditing is processing and analyzing large volumes of transactional data. Data mining based on predefined rules, anomaly detection algorithms, and other machine learning models can identify unusual sales transactions, expense claims, purchasing transactions, payroll payments, and other transactions. Transactional analyses such as these help auditors detect potentially fraudulent activities, irregularities, or errors while tailoring their response to identified risks.

CONTINUOUS AUDITING

With big data analytics and a direct data feed or regular extraction, auditors can move from a year-end or interim plus year-end approach to a more continuous audit, which means running automated procedures—and calculating and monitoring key metrics and ratios—more frequently. The additional data helps auditors detect anomalies or deviations from expected trends earlier and more frequently, allows clients to take corrective action, and lessens the massive time crunch firms experience in the first few months of each year.

INDUSTRY BENCHMARKING AND COMPARATIVE ANALYSIS

Big data analytics, along with standardization and centralization of data across clients, makes it possible to benchmark an organization's financial performance and ratios against industry peers or competitors. An 'apples-to-apples' comparative analysis helps auditors contextualize their client's performance against the market, more easily identify potential areas of concern, evaluate business performance, and provide meaningful insights to clients.

NATURAL LANGUAGE PROCESSING FOR UNSTRUCTURED DATA ANALYSIS

Another big data analytics tool—Natural Language Processing (NLP)—is particularly well-suited to analyze text in documents such as contracts, board minutes, and client meetings. NLP algorithms can review contracts and extract key terms, obligations, or financial clauses to help an auditor determine whether a lease agreement should be disclosed as a financial or operating lease. Board minutes can be run through an NLP algorithm to highlight potential items of interest, while client meetings can be transcribed and summarized to aid with documentation.

THE CHALLENGES OF BIG DATA IN AUDITING

Big data presents almost innumerable opportunities, but for those opportunities to be fully realized for auditors, several challenges must be overcome.

First and foremost is **ensuring data quality and reliability.** Garbage in, garbage out is as true here as anywhere else. An auditor cannot rely on the results of an analytic if the data is unreliable—auditors familiar with the concepts of Completeness and Accuracy need to apply these same principles to their clients' data. Auditors must implement data governance, embed data validation into audit workflows, and collaborate closely with clients to ensure the data extracted and provided is what the auditor needs and is expecting.

Second, **data privacy and security concerns** must be considered. Complying with all legal and regulatory requirements—including protecting sensitive and personally identifiable information and meeting requirements of regulations such as GDPR (General Data Protection Regulation)—is the bare minimum for auditors looking to leverage big data. The way data is handled, transmitted, and stored is critical, and auditors must consider their technology vendors to be partners and collaborators to ensure security.

Third, **strike a balance between technology and professional judgment** to ensure that audit decisions remain sound and objective. The auditor will always have the ultimate responsibility for the audit opinion and conclusions made. While big data analysis can expedite the process of getting to those conclusions, the buck stops with the auditor. Auditors need to understand what their analytics are doing—and what they are not doing—and how they generate the analysis that is being presented.

Fourth, **accept that technology will result in change and manage that change** in a way that achieves a balance between the effort to implement new technology and the benefits achieved from it. Technology is an ever-evolving landscape that will require auditors to adapt, acquire new skills, and understand not only the strengths of the tech available but also the limitations. It's impossible to implement everything; rather, auditors should focus on building a deeply integrated audit tech stack that leverages big data and analytics, incorporates best practices throughout an efficient workflow, and is capable of delivering a high-quality, data-driven audit.

THE PROMISE OF BIG DATA

The future of auditing is intertwined with big data and analytics; over time, collaboration between auditors, data analysts, and data scientists will deepen. Better integration of big data storage and analysis tools with audit-specific tooling will enhance data security and transparency, providing auditors with greater confidence.

Big data is emerging as a game-changer in the world of auditing. The ability to derive valuable insights from large volumes of data revolutionizes audit processes, enhances risk identification and focuses responses, and provides stakeholders with greater assurance. By harnessing big data analytics, auditors can perform more efficient, comprehensive, and insightful audits, contributing to the overall integrity and reliability of financial reporting. As auditors adapt to the data-driven era, the future holds tremendous promise for the industry to continue to thrive.

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PART 1:

BIG DATA: WHAT IS IT, AND WHERE CAN ACCOUNTING FIRMS FIND IT?

By Jason Bramwell

"Big data." You have heard these two words grouped together as one phrase for most, if not all, of your professional career. And it is a phrase that is not going away anytime soon. Why? Because as the accounting profession continues to evolve through the use of technology, such as artificial intelligence, machine learning, and blockchain, it is critical for firms that want a competitive advantage to analyze the data collected by these tools and others to make better business decisions and deliver more value to their clients.

"Just think about how we, as a profession, touch our clients. Each and every day we accumulate massive amounts of data—from data used to populate tax returns; to data accumulated in general ledger systems; to data in our practice management systems on how much we bill our clients, how much our clients pay us, how long they take to pay us, and the method used to pay us; to the data we have accumulated about our clients in our engagement and content management systems," said Jim Bourke, CPA, a partner at public accounting firm Withum and managing director of the firm's Advisory Services practice. "I could go on for hours, but examples of big data can be found in every size firm today."

Big data impacts nearly every aspect of the accounting profession, said Julie Watson, a cloud administrator with Ace Cloud Hosting. It helps produce better data-driven audits, creating a better experience for clients and auditors. For tax, big data helps evaluate tax codes, reduce fraud, and monitor budget and tax expenses, thereby saving time, money, and stress for filers. The advisory sector uses big data to create better reports to improve clients' business performance.

"It is one of the most valuable technologies that accountants need to adopt in their business processes," she said.

For this report, we are going to focus on the types of insights big data can provide to small and midsized accounting firms, as well as the types of data analytics accountants should know and how firms can leverage big data to enhance their relationship with clients.

> **"THE POWER OF BIG DATA LIES IN ITS ABILITY TO REVEAL TRENDS AND PATTERNS IN HUMAN BEHAVIOR THAT ARE DIFFICULT TO SEE WITH SMALLER DATA SETS."**
>
> — *Ludovic Rembert, security analyst, network security engineer, and founder of PrivacyCanada.net*

BIG DATA AND THE "FOUR V'S"

But first, let's find out from experts in and around the accounting profession how they would describe big data. Big data is "extremely large data sets that may be analyzed computationally to reveal patterns, trends, and associations, especially relating to human behavior and interactions," said Randy Johnston, founder of Network Management Group Inc. and co-owner of K2 Enterprises.

From a business perspective, big data is "the idea or concept that everything we do creates a digital trail of information that can, and should, be used for analysis of activity," said Paul Perry, CPA, practice leader of the Security, Risk and Controls Group at public accounting firm Warren Averett.

"With the creation of the internet and the internet of things, almost everything electronic collects data in some form or fashion," Perry added. "Big data is industry agnostic, in the sense that in the context of accounting or accounting firms, there is no difference to the definition, just different types of data available for use and review."

Big data's true value does not just lie within the number of data points it contains—it is typically measured in tera- or zettabytes, which is far beyond the scope of any human organization to really parse, said Ludovic Rembert, a security analyst, network security engineer, and the founder of PrivacyCanada.net.

"The power of big data lies in its ability to reveal trends and patterns in human behavior that are difficult to see with smaller data sets," Rembert said. "Accounting already deals with the collection and analysis of data sets, so the marriage of the two—industry and resource—seems inevitable."

The attributes that define big data are volume, variety, velocity, and variability—commonly referred to as the "four v's."

Volume: The key characteristic of big data is its scale—the volume of data that is available for collection by your firm from a variety of devices and sources.

Variety: The different formats data comes in, such as email messages, audio files, videos, sensor data, and more. Classifications of big data variety include structured, semi-structured, and unstructured data.

Velocity: The speed at which large data sets are acquired, processed, and accessed.

Variability: The meaning of the data constantly changes; therefore, before big data can be analyzed, the context and meaning of the data sets must be properly understood.

DIFFERENT SOURCES FROM WHICH BIG DATA CAN BE COLLECTED

By 2025, it is estimated there will be 175 zettabytes of data collected worldwide, up from 33 zettabytes of data in 2018, according to a report from the International Data Corporation. This collected data will be extremely valuable to accounting firms that want to analyze it and gain insights from it. But before firms can extract insights from that data, they first need to collect it.

According to Darrell Williams, chief information officer at CPA firm Blue & Co., popular internal and external data sources for small and midsized accounting firms include:

- Practice management systems (such as CCH, Right Networks Practice Engine, IRIS Star, and Deltek) and other smaller systems for their internal operations (such as time entry, utilization, billing, accounts payable, and accounts receivable);

- Tax preparation platforms (such as CCH ProSystem *fx* Tax or CCH Axcess Tax);

- Audit and attest systems (such as CCH Axcess Engagement); and

- Payroll and human resources information systems (such as ADP).

Perry added that any client data available from a transactional perspective can be used for insight and analysis. Other big data sources, according to Perry, include:

- Journal entries;
- Disbursement lists;
- Revenue details;
- Vendor listings; and
- Employee demographics and related payroll information.

"The struggle for smaller firms is getting the information—internally or from your client—in a usable format for review and analysis," Perry said. "This requires some extraction and manipulation of how the data is received. Having a data-minded individual on staff can help determine the best way to gather, restructure, and mold the data into a usable format."

Matt Kraemer, CPA, manager of ADAPT (Automation and Data Analytics Process Team) consulting services at public accounting firm Schneider Downs, said ADAPT serves clients in a variety of industries and analyzes data from many different sources—even the federal government.

"We utilize data from a variety of sources, but it typically depends on the industry and the goal of the project," he said. "For our health and human services clients, the electronic health record data is of particular importance. For our retail clients, the point-of-sale data can be really impactful. In terms of third-party or outside data, there are a number of member organizations that collect a lot of data from their members. We have utilized these sources for industries such as not-for-profit and construction. Depending on the industry and goal of the analysis, the federal government and state governments make a lot of data available, such as census data, neighborhood safety data, small business data, and higher education data."

What types of advantages do small and midsized firms that are all-in on big data have over their non-big-data-using competitors? That is the focus of Part 2 in this series.

PART 2:

ADVANTAGES BIG DATA CAN PROVIDE TO SMALLER ACCOUNTING FIRMS

By Jason Bramwell

Reporting and data analytics are essential for all accounting firms, regardless of size and strategic goals. But a survey conducted by *Accounting Today* on behalf of Wolters Kluwer in 2021 revealed that only 25% of small firms identified using big data and analytics as one of their strategic goals in the next three to five years.

"Leveraging big data and data analytics to provide clients with data-driven insights—and drive firm decision making—may be a potential differentiator for firms struggling to set themselves apart in a highly competitive market," Stephanie Plaza and Georgia Smith of Wolters Kluwer wrote in the report *Building Your Small Firm's Ideal Tech Stack.*

Here is some more research: A few years ago, Donny Shimamoto, CPA, founder and managing director of specialized CPA firm IntrapriseTechKnowlogies, took an informal poll of 562 accountants about their use of emerging technologies like artificial intelligence, blockchain, and data analytics tools that allow them to work with big data.

A majority (56%) anticipate a moderate to severe impact from big data, "meaning they perceive that having access to big data and the potential opportunities it provides for automation or analytics that impact accounting or auditing functions will cause us to have to significantly redesign the way that we currently do these jobs," he said.

But one in five accountants said they saw no impact from big data upon their current jobs, and almost a quarter saw just a mild impact, which surprised Shimamoto.

"However, when I looked at the organization and firm sizes, about half of the respondents are coming from small to midsized firms and organizations, so my suspicion is that many of those respondents feel like they would not need to change the way they're doing their accounting or auditing because it's 'simple enough' to not leverage what's possible with additional data, or because they may not have felt that there was enough potential benefit from investing in the automations," he said. "Another potential reason may be that smaller organizations usually have more manual processes, so they would not have access to the additional data for the automations."

He said the return on investment may be even greater for smaller firms if accountants focus on the potential benefits of big data and the fact that simpler operations mean these automations will be easier to design and cost less to implement.

"If an accounting firm is specializing in a particular industry, then the use of data-based automations provides an even bigger potential benefit as they can utilize those automations across multiple clients," Shimamoto said. "Auditors specializing in a particular industry can also utilize the data for benchmarking and other analytics across the aggregated data. This could provide a huge competitive advantage in terms of the types of services and insights auditors could provide to clients, especially if their competitors are just providing traditional services."

Based on the findings of those two surveys, there is an opportunity for smaller accounting firms to differentiate themselves in a competitive industry by using and analyzing big data.

"The key word is 'differentiate.' A firm that understands how to use the tools and analyze its big data, on a recurring and continual basis, will absolutely be able to react quicker to potential opportunities that are buried in data too deep to reveal using traditional tools," said Jim Bourke, CPA, a partner at public accounting firm Withum and managing director of the firm's Advisory Services practice.

Let's look at some key client service areas in which big data could give smaller firms an advantage:

AUDITING

Auditors have been at the [forefront of accounting's use of big data](). The ability to analyze entire data sets—in some cases billions of transactions in a ledger—is changing traditional approaches to audit, which are based on sampling. While auditors still do detailed work on smaller samples of data, analytics enables them to identify outliers and exceptions and focus on the areas of greatest risk. They can also use a wide range of analytics tools to visualize the data, connect financial and non-financial data, and compare predicted outcomes with the real world.

"The pandemic forced more companies to operate electronically, so there is a lot more data and electronic documents available," Shimamoto said. "Accountants and auditors should take advantage of the increased availability of data and electronic documents to utilize data analytics and artificial intelligence tools to work with the data and information extracted from the documents to automate more of their work or analyses."

One of the ways big data is impacting the accounting profession is that it enables accountants to incorporate non-financial data into accounting processes and use that data to provide increased insights to support better decision making in their firms and for their clients, Shimamoto wrote in an article for CPA Trendlines. For auditors, that means they can analyze non-financial data to detect fraud.

"In cases where there are other activities that precede a financial transaction, we can use the non-financial data from those activities to detect transactions that don't follow the typical activity pattern, which could be an indicator for fraud," he said.

"Consider the audit scenario where you're testing revenue. Traditionally, auditors would just trace a sample of the transactions that compose the total revenue amount to their source invoices. As more and more invoices are delivered electronically, it becomes increasingly easy to create fake invoices. I can just create an invoice in the accounting system, and I can modify a PDF of a purchase order received from a customer easily as well," Shimamoto continued. "However, if there is a sales or e-commerce system where activity occurs before the actual invoice is created, data from those systems can provide an expanded audit data trail that I can trace to beyond just the invoice."

RISK MANAGEMENT

Another example of how non-financial data can be used by organizations is for risk management, Shimamoto said. Data from devices and sensors, such as a vehicle's GPS, can be used to help quantify non-financial risks—many of which have financial implications.

"By combining the GPS data with street map data with speed limits, you could determine how often and by how much a driver is speeding. If the driver were to get a ticket while driving the company's vehicle, or even worse get into an accident while speeding, the company could be liable for the ticket or any ensuing litigation," he said. "By monitoring this risky behavior and counseling drivers who demonstrate this behavior, or even by sending a real-time reminder to their mobile device that you noticed that they are driving in an unsafe manner, you could proactively manage this risk."

Big data and data analytics can also help accountants identify financial risks right at the outset. For example, big data can help identify expenditures going overboard in certain business processes right from the start. Business leaders can then take the necessary steps to minimize and mitigate the risks, Naveen Joshi, founder and CEO of software solutions provider Allerin, wrote in an article for *Forbes*.

On the tax side of things, using big data to identify and resolve areas of risk early in a tax compliance engagement can save a lot of time, money, effort, and headaches for both the tax professional and his or her client, CPAs William Brink and Victoria Hansen wrote in an article for *The Tax Adviser*.

"The IRS maintains and publishes statistical information gathered from various tax filings. This information is freely accessible on the IRS Statistics of Income (SOI) webpage. Tax professionals can use these free statistical data to add value to client engagements by using them to assess a client's tax audit risk (the risk of being audited)," according to the IRS. "The SOI database provides a plethora of data related to many types of tax returns (e.g., individual, business, and estate) in Microsoft Excel format that can easily be used by the public. These data can also be used to obtain an understanding of the size and number of types of taxpayer entities, and various elements of taxable income."

STATE AND LOCAL TAX COMPLIANCE

Shimamoto wrote that non-financial data could also be gathered and analyzed by CPAs for state and local tax (SALT) compliance and defense.

"Remember that in most SALT situations the burden of proof for a tax position rests on the taxpayer, not the taxing authority," he said. "So by gathering the additional data related to product storage, movement, handoffs, and final delivery routes and locations, both the determination of tax implications (e.g., nexus, point of consumption, etc.) and defense of positions taken based on the data become a lot easier to automate."

CLIENTS VS. COMPETITORS

Big data can also be helpful for comparing a client against direct competitors in their industry, said Ludovic Rembert, a security analyst, network security engineer, and the founder of PrivacyCanada.net. For example, big data sets can allow accounting firms to aggregate performance metrics across an entire industry and present them to a client, pointing out specific reasons the competition may be outperforming the client rather than relying on outdated methods, such as ratios or guesswork.

"This is incredibly valuable for accounting firms that need to sell their services; providing accurate and actionable information to clients is a great way to boost firm value. The accuracy will only increase as data quality increases," he said.

INDUSTRY AND ECONOMIC TRENDS

In addition, big data allows accounting professionals to look at the big picture of a particular industry and see shifts in consumer behavior or trends, according to Rembert. When combined with savvy analysis, accountants will be able to easily spot possible signs of fraud or even anticipate the way the greater economic wind is blowing, he said. Such strategic insights are invaluable for any client working with an accounting firm.

"It comes down to serving your clients more efficiently and effectively," said Matt Kraemer, CPA, manager of ADAPT (Automation and Data Analytics Process Team) consulting services at public accounting firm Schneider Downs. "We are using data analytics to better serve our clients in all of our service lines. Whether that is audit analytics, internal audit procedures, tax advisory projects for different tax credits, forensic accounting, or litigation support, we have found that injecting analytics into our services allows us to be more efficient with our procedures. It has also led to value-add opportunities where we identify a trend or outlier that management was not aware of, which gives them the opportunity to address the issue."

There are four types of data analytics that accountants should know. What are they, and what types of data analytics tools and skills should they have? We will answer those questions in Part 3 in this series.

PART 3:

THE FOUR TYPES OF DATA ANALYTICS ACCOUNTANTS SHOULD KNOW

By Jason Bramwell

More data is created every year than the year before, collected from devices and applications, such as mobile phones and internet-based platforms, that many people use all day. This abundantly large data set is rapidly becoming more accessible and thus usable by those willing to examine it—like accountants.

"For accounting firms, big data represents an opportunity for expansion and great service provision," said Ludovic Rembert, a security analyst, network security engineer, and the founder of PrivacyCanada.net. "Those who have the adaptability and insight to work with big data's possibilities and predictive capabilities may soon find they become more valuable than their peers."

The art of analyzing the collected raw data using various tools and software is called data analytics—and it presents small and midsized accounting firms a huge opportunity to uncover for their clients valuable insights within their financials, identify process improvements that can increase efficiency, and better manage risk.

"Business professionals use data analytics tools to build data analyses, forecasts, and projections. Data analytics focuses on identifying and managing data that can be useful in identifying what happened, why it happened, what will happen in the future, and how we can improve," said Randy Johnston, founder of Network Management Group Inc. and co-owner of K2 Enterprises.

"What happened" refers to descriptive analytics, "why it happened" refers to diagnostic analytics, "what will happen in the future" refers to predictive analytics, and "how we can improve" refers to prescriptive analytics. These are the four types of data analytics.

"Accountants will be increasingly expected to add value to the business decision-making within their organizations and for their clients," said Wendell Gilland, PhD, an associate professor who teaches data analytics for accountants at the University of North Carolina Kenan-Flagler Business School. "A strong facility with data analytics gives them the toolset to help strengthen their partnership with business leaders."

To get a better handle on big data, it is important for accountants to understand each type of data analytics, according to Gilland.

1 DESCRIPTIVE ANALYTICS

This is used most often and includes the categorization and classification of information. Accountants report on the flow of money through their organizations: revenue and expenses, inventory counts, and sales tax collected, among others. Accurate reporting is a hallmark of solid accounting practices. Compiling and verifying large amounts of data is important to this accurate reporting.

2 DIAGNOSTIC ANALYTICS

Diagnostics are used to monitor changes in data. Accountants regularly analyze variances and calculate historical performance. Because historical precedent is often an excellent indicator of future performance, these calculations are critical to build reasonable forecasts.

3 PREDICTIVE ANALYTICS

Here, data is used to assess the likelihood of future outcomes. Accountants are instrumental in building forecasts and identifying patterns that shape those forecasts. When accountants act as trusted advisors and build forecasts, business leaders grow increasingly confident in following them.

4 PRESCRIPTIVE ANALYTICS

Tangible actions—and critical business decisions—arise from prescriptive analytics. Accountants use the forecasts they create to make recommendations for future growth opportunities or, in some cases, raise an alert on poor choices.

"Many accountants already use descriptive analytics in their daily work. They compute sums, averages, and percent changes to report sales results, customer credit risk, cost per customer, and availability of inventory. Accountants also are generally familiar with diagnostic analytics because they perform variance analyses and use analytic dashboards to explain historical results. This, however, is not sufficient," wrote accounting professors Norbert Tschakert, PhD, Julia Kokina, PhD, Stephen Kozlowski, PhD, and Miklos Vasarhelyi, PhD, in a 2016 article for *Journal of Accountancy*.

"Predictive analytics and prescriptive analytics are now required because they provide actionable insights for companies," they continued. "Accountants need to increase their competence in these areas to provide value to their organizations. Predictive analytics integrates data from various sources (such as enterprise resource planning, point-of-sale, and customer relationship management systems) to predict future outcomes based on statistical relationships found in historical data using regression-based modeling.

One of the most common applications of predictive analytics is the computation of a credit score to indicate the likelihood of timely future credit payments. Prescriptive analytics uses a combination of sophisticated optimization techniques (self-optimizing algorithms) to suggest the most favorable courses of action to be taken."

STATE AND LOCAL TAX COMPLIANCE

By itself, data is of little use. For accountants to sift through and make sense of large data sets, they will need to use data analytics tools and software. These resources help accountants organize large volumes of data, identify relationships between complex data points, and generate reports to show trends. They also allow accountants to spot patterns and outliers, require low-to-no coding skills, and provide user-friendly drag-and-drop interfaces.

The accounting department at Franklin University in Columbus, OH, put together a brief list of some popular tools and software accountants can use for data analytics:

- **Microsoft Excel:** Yup, old faithful Excel makes this list because it is easy to navigate for core accounting needs, including drafting budgets, building financial statements, and developing balance sheets.

- **Tableau:** Accountants who work in larger data sets have found business intelligence tool Tableau to be a strong and flexible data analytics platform. It is particularly valued for its ability to visualize data.

- **Microsoft Power BI:** Another well-known business intelligence and data visualization tool, Power BI easily connects with Excel, QuickBooks, and Google Analytics so accountants can use it to aggregate multiple data streams.

- **Caseware IDEA:** Accountants use IDEA because it is software specifically built for data analytics. Data can be easily imported and analyzed quickly, efficiently, and in a user-friendly format.

- **Artificial intelligence:** AI holds powerful potential for the accounting profession, but when it comes to data analysis, it has limitations. While AI systems may be able to analyze large data sets quickly, accountants will still need to critically evaluate, interpret, and create business plans based on that data.

"Small, medium, and large firms all have access to the same tools to uncover the stories that are buried in big data," said Jim Bourke, CPA, a partner at public accounting firm Withum and managing director of the firm's Advisory Services practice. "Think about the visualization capabilities of tools like Microsoft Power BI. A firm could drill down on data housed in content management or tax preparation systems to identify opportunities for cross-selling research and development studies, identify clients that may be candidates for potential new tax credits, identify those clients that drain our resources and should be counseled out of the firm, and more. Understanding the types of data being accumulated is the first step in determining what to do with it."

The accounting faculty at Franklin University also recommends that accountants understand the machine learning language Python and the statistical language R to create custom algorithms and data models that can be used with larger sets of data.

ANALYTICS SKILLS AN ACCOUNTANT NEEDS

The analytics skills an accounting professional needs will differ depending on whether that person produces or consumes information, wrote Tschakert, Kokina, Kozlowski, and Vasarhelyi in their article for the *Journal of Accountancy*.

"Analytics production includes sourcing relevant data and performing analyses, which is more suitable for junior-level accountants. Analytics consumption is using the insights gained from analytics in decision-making and is more relevant for senior-level roles," they said. "Similar to a driver who doesn't know exactly how all the car's parts are working, CPAs do not need to become data scientists or computer engineers to benefit from the coming data revolution. It is most important that CPAs become more proficient consumers of analytics to both enhance their current audit practice with available technology as well as support their client base in undertaking data analytics activities."

The online software marketplace Capterra put together a list of the top eight data analytics skills an accountant needs:

1.   **Analytical mindset:** Recognize the opportunities and limitations of accounting data in solving a business problem.

2.   **Data mining, cleaning, and preparation:** Extract the data and clean and prepare it for analysis to address the issue at hand.

3.   **Data quality:** Perform statistical tests to examine the quality of the data being collected, and collaborate with developers to improve it.

4.   **Data manipulation:** Sort, rearrange, merge, and reorganize data for in-depth analysis. For example, picking the right variables to track administrative costs in a business.

5.   **Basic programming:** Gain basic programming skills in Python or R language and querying languages, such as SQL, to process and retrieve data from databases.

6.   **Descriptive analysis:** Describe basic features of the data with a preliminary analysis to summarize business outcomes.

7.   **Problem solving with statistics:** Use statistical analysis to draw effective conclusions and make timely recommendations through predictive modeling.

8.   **Data visualization and reporting:** Present and communicate data results to decision-makers for their specific needs.

So with all of this data at their fingertips, small and midsized accounting firms can use that data to provide added value to clients. After all, accountants are their clients' trusted advisors. We will delve into this subject in the fourth and final article in this series.

PART 4:

HOW SMALLER FIRMS CAN USE BIG DATA TO ENHANCE CLIENT RELATIONSHIPS

By Jason Bramwell

Small and midsized accounting firms can leverage big data to transform client relationships and offer more value-added services. And by embracing big data analytics, firms stay competitive, deepen client satisfaction, and strengthen long-term relationships.

"The tools are all at our fingertips and the results are honestly easy to capture, visualize, and communicate. Not to mention, our clients have a greater appreciation for the results from our big data analysis than delivery of our traditional compliance services," said Jim Bourke, CPA, a partner at public accounting firm Withum and managing director of the firm's Advisory Services practice.

Here are several areas in which smaller firms can use big data and analytics to enhance their relationship with clients:

1. TAILORED SOLUTIONS

Big data analytics allows accounting firms to gain a deeper understanding of each client's unique business challenges and goals. By analyzing large data sets, accountants can customize their services to meet specific client needs. They can identify industry trends, customer preferences, and competitor performance to provide customized financial and business advice, as well as strategic insights, leading to more personalized and effective solutions.

"It is important to remember that technology is not infallible," said Sharai Lavoie, CPA, CEO of financial operations management and outsourced accounting firm Lavoie CPA. "While software programs can perform tasks with incredible accuracy, they are only as good as the data they are fed. It is up to people to ensure that the data being input is accurate and complete. It is up to CPAs to interpret the data and provide insights and solutions to clients based on their expertise and experience."

2. REAL-TIME FINANCIAL REPORTING AND INSIGHTS

With automated dashboards and data visualization tools, accountants can deliver up-to-date information, allowing clients to make timely decisions. This real-time reporting fosters a sense of trust and confidence in the accounting firm's capabilities.

"Nearly all of our data analytics clients have real-time or near real-time data transfers that are automated from their source systems to their consumption level—whether that is their traditional reporting tool, analysis tool, or dashboards. Real-time data and real-time insights are valuable because it allows the business to react quickly and make business decisions when necessary," said Matt Kraemer, CPA, manager of ADAPT (Automation and Data Analytics Process Team) consulting services at public accounting firm Schneider Downs. "The real-time data becomes more valuable when the data is something that changes reliably throughout the day. Point-of-sale data would be an example of this for retail. Status of deliveries would be an example for transportation and logistics companies."

3. KEY PERFORMANCE INDICATORS

Accounting firms can suggest a wide range of key performance indicators (KPIs) to their clients using big data. The specific KPIs will vary depending on the industry, business objectives, and available data sources.

"It is important that your clients understand and articulate what questions about their business they are trying to answer with big data. Then the next step is to understand where that data resides," said Darrell Williams, chief information officer at CPA firm Blue & Co.

Here are a few examples of KPIs firms can recommend to clients by leveraging big data:

> **"MAKE SURE THAT THE KPIs ARE IN LINE WITH YOUR CLIENT'S STRATEGIC VISION AND WHAT IS BEST FOR THEM AS A WHOLE."**
>
> — *Darrell Williams, chief information officer at Blue & Co.*

FINANCIAL PERFORMANCE KPIs

- **Revenue growth rate:** Measure the percentage increase in revenue over a specific period, allowing businesses to track their sales performance.

- **Gross profit margin:** Calculate the percentage of revenue remaining after deducting the cost of goods sold, indicating the profitability of the core business operations.

- **Return on investment:** Assess the efficiency of investment by comparing the financial gain or loss with the initial investment.

- **Cash conversion cycle:** Track the time it takes to convert investments in inventory and other resources into cash flow from sales.

CUSTOMER-RELATED KPIs

- **Customer acquisition cost:** Determine the average cost incurred to acquire a new customer, considering marketing expenses, sales commissions, and other related costs.

- **Customer lifetime value:** Estimate the total revenue expected from a customer throughout their relationship with the business, helping assess customer profitability.

- **Customer churn rate:** Measure the percentage of customers who stop using the product or services, indicating customer retention and loyalty.

- **Net promoter score:** Measure customer satisfaction and loyalty by analyzing responses to the question, "How likely are you to recommend our business to others?"

OPERATIONAL EFFICIENCY KPIs

- **Inventory turnover:** Assess the number of times inventory is sold and replaced during a specific period, providing insights into inventory management efficiency.

- **Order fulfillment cycle time:** Track the time taken to process and deliver customer orders, helping identify bottlenecks and improve operational efficiency.

- **Employee productivity:** Measure the output of employees, such as sales per employee, revenue per employee, or units produced per labor hour, to evaluate workforce efficiency.

- **Waste reduction:** Monitor and reduce waste generation across operations, leading to cost savings and improved sustainability.

4. PROACTIVE ADVISORY SERVICES

Anticipating financial challenges and opportunities based on data-driven forecasts, accountants can guide clients in making strategic decisions. Proactive advisory services can range from optimizing cash-flow management to identifying potential tax-saving opportunities, demonstrating the firm's commitment to adding value beyond compliance-related tasks.

"A firm could drill down on data accumulated in enterprise resource planning systems to deeply analyze production and sales statistics for a manufacturing company," Bourke said. "Maybe the client is super profitable at the 30,000-foot level, but when you have an opportunity to uncover the stories that are embedded in big data, you can spot issues and margin challenges in specific production lines, warehouses, or factories that simply get missed when looking at data from a high level."

5. COMPLIANCE AND RISK MANAGEMENT

By analyzing large volumes of financial and operational data, accountants can identify potential compliance issues or financial irregularities. Implementing robust data analytics tools also helps in detecting fraudulent activities early on, enabling accountants to take timely actions to safeguard clients' interests.

"Auditors can use data analytics to gain deeper insight into the risk profile of a company to better enable inherent and control risk assessments on audit engagements, and thus facilitate better audit planning," C. William Thomas, CPA, PhD, the J.E. Bush professor of accounting at Baylor University, wrote in an article for the Texas Society of CPAs. "In addition, because of the proliferation of data analysis tools, audits are evolving toward the application of audit procedures to entire populations (rather than merely sample items) and identification of transactions with unusual characteristics, thus permitting more effective interpretation of audit results."

6. FINANCIAL PLANNING AND BUDGETING

Big data analytics allows firms to analyze historical financial, market trends, and industry benchmarks to support clients in creating realistic and data-driven financial plans and budgets. These insights facilitate more accurate forecasting, better resource allocation, and improved financial decision-making.

"Think about layering in big data when preparing forecasted financial statements," Bourke said. "Look at a client's daily sales trends for the past five years, and layer in big data like daily weather data. Then forecast out daily sales for next year and add in 'projected weather data' from a publicly accessible site like the Farmers' Almanac. Now analyze the results and draw a correlation between the daily weather on daily historical sales in projected sales data. It is just one of so many ways to tap into the power of big data to not only wow our clients but lock them in as clients for life."

7. CLIENT GROWTH OPPORTUNITIES

Through big data analytics, firms can help clients identify untapped growth opportunities. By analyzing market data and customer behavior, accountants can provide insights on potential new markets, product diversification, or different sales strategies. Helping clients uncover growth opportunities strengthens the firm's reputation as a trusted advisor.

"Knowing that your client has a customer that bought 12 widgets is informational. It is not helpful. But knowing a customer bought 12 items last month and six this month and has repeated that pattern for the last two years might provide insight you can use to help your client better sell to that customer," said Paul Perry, CPA, practice leader of the Security, Risk and Controls Group at public accounting firm Warren Averett.

8. CLIENT SEGMENTATION AND TARGETED SERVICES

Big data enables firms to segment their client base and offer targeted services based on specific needs and characteristics. This segmentation helps optimize resource allocation and tailor marketing efforts to attract and retain clients effectively. By offering specialized services that cater to different client segments, firms can position themselves as experts in their clients' industries.

"Ultimately, our role as business consultants is to assist our clients with solving business problems. Analytics have helped our clients in a variety of ways depending on the industry," Kraemer said. "In health care, monitoring physician performance based on patients seen, procedures performed, accuracy of billing, and correlation of procedures and diagnosis are examples of some KPIs that we have built analytics around. The costs associated with inaccurate billing and misdiagnoses can be significant to offices of physicians and hospitals. In manufacturing and retail, the importance of managing inventory has been an increasingly important factor in businesses—particularly in the past 24 months with the global supply chain issues. With that in mind, we have done some work predicting inventory stock-outs based on lead times of vendors and seasonal demand by customers."

> **"ULTIMATELY, OUR ROLE AS BUSINESS CONSULTANTS IS TO ASSIST OUR CLIENTS WITH SOLVING BUSINESS PROBLEMS."**
>
> — *Matt Kraemer, manager of ADAPT consulting services, Schneider Downs*

THE TIME IS NOW

There is no better time than the present for small and midsized accounting firms to start integrating big data and analytics into their services. A data-driven mindset can empower firms to become more strategic advisors and deliver enhanced value to their clients.

"Accountants can add so much more value by delivering real-time intelligent results to clients," Bourke said. "I know we need to continue to deliver historical financial data, after the fact, for compliance purposes, but delivering real-time, actionable data to clients is priceless."

ABOUT THE AUTHOR: Jason Bramwell is senior staff writer for *CPA Practice Advisor*. He has nearly 25 years of professional writing experience, the last nine covering the accounting profession. He most recently was a staff writer and editor at Going Concern, and he previously spent five years as a staff writer and editor at AccountingWEB. He can be reached by email at jbramwell@cpapracticeadvisor.com.

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