New York State Tax:
How predictive modeling improves tax revenues and citizen equity.

— Nonie Manion,
Director of Tax
Audits, New York
State Department
of Taxation and
Finance

As Director of Tax Audits at New York State Department of Taxation and Finance, Nonie Manion leads a team of 1,600 auditors, all unified by a common mission of fairness through vigilance. But you wouldn't guess her position from her work space. Out in the middle of the department's sprawling third floor, Manion's desk is decked with work in progress and family photos. A prominently placed bowl of candy attests to the open-door policy she likes to follow with her staff. The Helderberg Mountains, 10 miles to the west of Albany, are visible from the window just behind her desk.

While modesty may be Manion's style, tenacity and drive are her substance. A 24-year veteran of the department, Manion just ran her first marathon. On the professional front, she has also broken new ground, for unlike nearly all of her predecessors, Manion didn't rise through the ranks of auditors to assume leadership of the audit division. Her edge? Manion spent years writing the laptop applications that the division's auditors relied on, giving her as much–if not more–insight into the nuts and bolts of the auditing process than the auditors themselves. Equally important, Manion had been immersed in the department's early efforts to make better use of data in the audit selection process.

Leadership Spotlight

Nonie Manion took an unorthodox path to becoming head of New York State's tax audit operation. Her eclectic experience included a leading role in expanding the use of advanced analytics to pinpoint potentially questionable tax returns–and the word seems to have gotten out.

How NYS Tax got smarter

It's one thing to analyze questionable tax refunds after they've been sent out, when the only option left is to pursue them–often to no avail. It's another to detect questionable refunds before they are sent out, preventing the waste of resources and the loss of critical tax revenue. By integrating predictive analytics directly into its processing stream, NYS Tax is preemptively identifying questionable tax returns and optimizing its approach to collecting delinquent taxes. Since using predictive analysis, NYS Tax has decreased the revenue drain caused by questionable refunds by $1.2 billion, with another $400 million reduction projected in savings for 2011, while increasing collections by $100 million.

Let's Build a Smarter Planet

Evidence of Change

When New York State Tax resolved to make its processes more data-driven, Manion was seen as a natural fit. Manion's ascent from an IT management and analytics background was a first. But it was also a watershed for the department, signifying the larger role that smarter, data-driven practices would play in its future operations. Put simply, says Manion, having more and better data is the best way to keep taxpayers doing the right thing. "The most effective way to keep taxation fair for the majority who play by the rules is to encourage voluntary compliance with tax laws by providing a credible and highly visible deterrent," Manion explains. "The core of that deterrent is the incorporation of more data sources–combined with the use of predictive intelligence capabilities–to accurately identify potentially questionable returns. It sends a message to the taxpayer that fooling around with your return is not a risk you should be taking." To back up her view, Manion points to research that found more than half of U.S. taxpayers willing to take liberties with their taxes when they sense that the government lacks the information to catch them.

New York State Tax's vision for changing this mind set hinged on key changes in the tax process flow. The systemic flaw for refund requests, for example, was that problems were often detected and acted on only after refund checks had been sent and cashed. On top of being time-consuming and costly, efforts to recover these "pay and chase" refunds, in the department's experience, often prove fruitless. The key was for New York State Tax to catch and rectify such refunds before they went out the door. It achieved that goal through an intelligent screening solution it calls the Case Identification and Selection System, or CISS.

Changing the Game Through In-Stream Analytics

For New York State Tax, the breakthrough wasn't simply the use of analytics. It already had been using them to search for questionable returns patterns with historical taxpayer data stored in the department's data warehouse. While this effort incrementally improved screening accuracy, the fact that it was conducted as a separate activity–outside of the processing flow–posed a systemic barrier to the department's future optimization efforts.

What made CISS a breakthrough was that it fundamentally repositioned the role of analytics in the tax return process. Because CISS embedded analytics directly into the mainstream return process, New York State Tax can now use predictive intelligence to determine dynamically when to process a refund request and when to set it aside for further analysis by a department specialist or–in the most extreme cases–outright refusal. Moreover, in contrast to the relatively fixed algorithms drawn from historical data, CISS is designed to both continually improve their accuracy and stay ahead of newly emerging fraud threats.

The benefits of New York State Tax's predictive analytics practices:

- $1.2 billion reduction in improper or questionable refunds paid from the State of New York's coffers, plus another $400 million reduction projected in 2011

- Dramatic reduction in the costs and inefficiencies associated with "pay and chase" policies

- $100 million increase in delinquent tax collections through the use of optimization algorithms

- Over a 350% increase in criminal tax fraud investigations due to greater interdepartmental collaboration on cases

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Results Get Attention

The CISS initiative illustrates how success–in this case, extreme success–can prove contagious. At the outset, the project's initial proponents (a coalition of the department's IT, audit and enforcement staff) pitched it to the commissioner as a way to substantially increase revenue by increasingly denying improper refunds. When CISS handily beat the revenue target in its first year, the commissioner's office–already supportive of the program–took notice. When revenue again rose in the second year, notes New York State Tax CIO Brian Digman, other parts of the organization proved eager to leverage analytics. "Before long, the department's other divisions became very interested," says Digman. "The results stirred excitement around what can be done [with analytics] and what the possibilities are."

The first new initiative spawned by this success was the application of analytics and business process management to optimize the collection of delinquent taxes, which in some ways is even more complex because of a number of variables involved. Delinquent tax collection is by most measures an inherently inefficient process, reliant on letters, phone calls and the shoe-leather visits of debt collectors. The department's challenge was to figure out how to allocate its limited time and personnel resources in a way that would produce the most recovered revenue.

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Using an advanced decision optimization model, New York State Tax created a solution known as CISS Collections, which compares each open case with profiles of past similar cases to recommend which cases should be pursued and through which means–all done in a way that maximizes the overall amount of revenue collected. What CISS Collections provides is an intelligence-driven view of the big picture. But when companies go out of their way to hide their identity–sometimes they close up shop, change their name and open up under a different one across the street–the resulting muddle can complicate collections efforts. To see through it, New York State Tax plans to augment CISS Collections with relationship analysis technology that will analyze identity context over time (IBM InfoSphere® Identity Insight), which should further improve the department's revenue recovery performance.
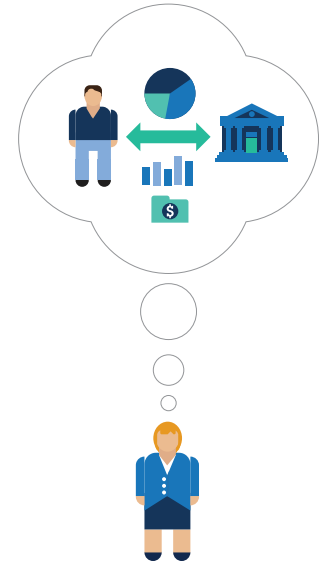
Leadership is:
Providing a new perspective

Manion's path to directing the audit division–as both an insider and an outsider–made her uniquely suited to adapt the division's practices through the expanded use of data. "My experience with data and developing audit applications made it obvious to me that our future was in analyzing data to identify noncompliance and pushing the results to the staff with the necessary skills to work the case."

— Nonie Manion

Lessons learned:
Analytics need to integrate with process

More sophisticated predictive modeling and advanced algorithms were essential to stopping improper refunds before they went out the door–but that was only half the equation. "Without something as simple as human task management–the ability to get cases to where they need to be fast enough, so they can be acted on–it wouldn't have worked. In this case our previous optimization work around business process management (BPM) proved an essential foundation."

— Brian Digman,
CIO, New York State Department of Taxation and Finance

Closing the Gap with Intelligence

So what kind of impact has the application of predictive analytics had on New York State Tax's revenue performance? Since the introduction of the CISS Questionable Refund Denial solution, the department has been able to reduce questionable refunds by $1.2 billion. An additional $400 million in adjusted tax revenue is projected in 2011. At the same time, the optimization of the department's collections efforts is expected to increase revenue availability to the state by roughly $100 million. With New York–like most other states–struggling to balance its budget while maintaining key programs, it's tempting to view New York State Tax's intelligence-based programs as a reaction to the current fiscal climate. But Manion sets the record straight. "The truth is, the department first established its vision of more reliance on data and analytics back when times were relatively flush," she explains. "The fact that we've been able to evolve it to where it is now–when it's so desperately needed–has made it an important fiscal tool for the state."

Beyond impressive numbers, the integration of intelligence into New York State Tax's day-to-day operations is also changing the relationship of different organizations within the department. Historically, the department's divisions pursued interests relatively independent of one another. On the heels of the department's successful adoption of smarter practices–and with fiscal pressure intensifying–that kind of thinking is on the way out. There's now a strong focus on collaborating across all departments to find new opportunities," explains CIO Digman. "The intensity of each department's interest in the program is especially evident when there's discussion about changing or modifying it, with just about every corner of the department wanting their voice to be heard."

New York State Tax: The parameters of smarter tax administration

⚙ Instrumented
As tax forms are processed, their information elements are run in real time against experience-based screening algorithms.

⁂ Interconnected
The integration of real-time scoring and event-driven workflow keeps the processing of tax forms moving smoothly.

💡 Intelligent
Through predictive modeling– employing continuously adapted screening rules–NYS Tax can identify questionable refund requests with a high degree of accuracy, stopping payments before they go out the door.
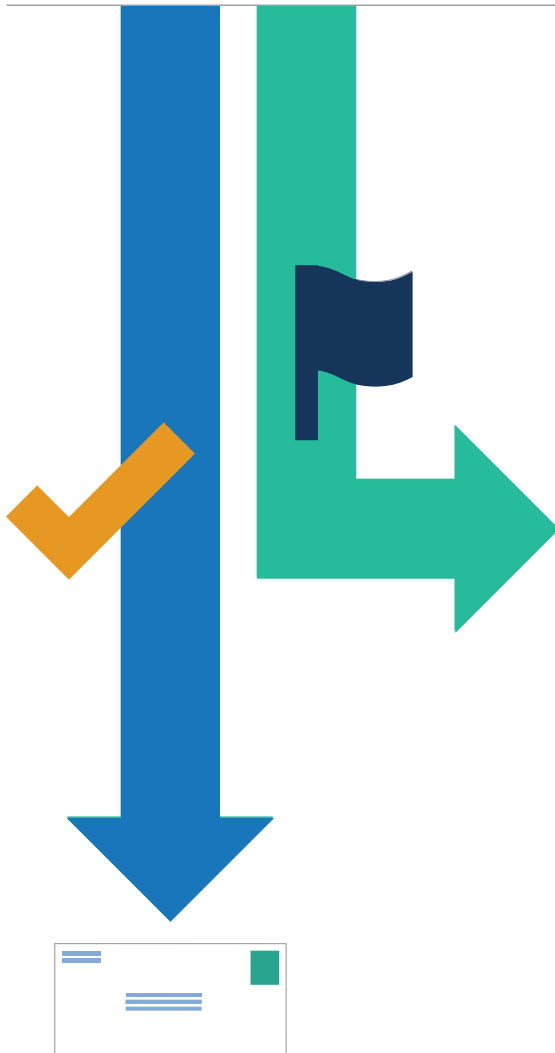
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Pushing the Data Envelope

This climate of collaboration is producing a stream of ideas on how to extend intelligence into new areas and how to improve what New York State Tax is already doing. One such idea is to incorporate different kinds of data–from new and creative sources–to further strengthen the department's predictive modeling capability. That's an effort the department is currently pursuing in earnest. To get the word out about New York State Tax's new compliance weapons, Manion spends a lot of her time outside the office, speaking at conferences and events. It's often in such settings that Manion receives those signals she considers as perhaps the most important indicator that her message is getting through. "When I hear anecdotally that New York is getting to become a much more difficult place to cheat, I know we're making the impact that we set out to make–which is to change mind sets and increase compliance," says Manion. "Demonstrating our intention to take advantage of all the tools at our disposal–including advanced analytics–is the best way to show we mean business, and to keep taxes fair for all citizens."

NYS Tax's intelligent tax compliance and collection solution is …

Framework
IBM® Tax Audit and Compliance System (TACS), IBM Tax Collection Optimization System (TACOS)

Software
IBM DB2® for Linux®, IBM WebSphere® MQ Workflow, IBM WebSphere Application Server, IBM InfoSphere™ Identity Insight, IBM InfoSphere DataStage, IBM WebSphere Process Server, IBM WebSphere Business Monitor

Services
IBM Global Business Services® –Business Analytics and Optimization, IBM Research

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