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Embedding Analytics in the Organisation

SANDRA HOGAN, Director, Business Analytics Advisory, SAS Australia and New Zealand

ROBERT MORISON, IIA Lead Faculty

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THE BIG IDEAS

- An analytical enterprise embeds analytics in the thinking and behaviour of individuals and the culture of the organisation.
- Analytics should be seamlessly integrated into everyday workflows and decision processes, and business people should be able to experience the results and benefits.
- Organisations need "two-speed" data management and governance methods, traditional ones for reporting, and more flexible ones for innovation and discovery.
- Analytics development roles centre on business analysis and modelling; operationalising analytics calls for business applications, communication, and change skills.
- Shared business objectives and measures encourage the use of analytics, demonstrate the value of analytics, and build the credibility of the analytics group.

Introduction

When one says, "embedded analytics," both business people and analytics professionals tend to think first of automated models and analyses embedded in business processes, for example, to score customer propensities or suggest offers to make. That's only part of the story. An analytical enterprise — one that maximises the strategic, competitive and operational value of its data and analyses — has analytics broadly embedded in the thinking and behaviour of individuals and the culture of the organisation.

In these enterprises, analytics represent not just a business and technology investment, but a pervasive organisational capability. People are comfortable working with data and feel empowered to put it to use. Experimenting, innovating and improving are integral parts of their jobs. Making fact-based and analytical decisions is simply how the organisation works.

CEOs and other senior executives take the lead, not only in sponsoring strategic analytics initiatives, but also through their behaviour and example as analytical leaders. The board pays attention to how well the enterprise leverages data and analytics, and how it does so relative to the competition. And the business actively owns its data and analytics. Technologists provide essential skills, but business people have a strong sense of what analytics can do, and they take the lead in identifying target applications and business ambitions.

That's how things work in an organisation with deeply embedded analytics. Such organisations are the exception rather than the rule. Others may spend significant money on analytics software and services — Gartner sizes the 2016 global market in analytics and business intelligence at almost $17 billion, and the Australian Computer Society estimates the Australian national market at AUS $670 million. Yet they still take too many business decisions based on faulty spreadsheets, outdated rules or pure instinct.

How can an organisation embed analytics more thoroughly? Although the organisations I've worked with have their unique challenges, I find five common success factors. Executing on them will facilitate and

accelerate embedded analytics — and drive more value from the enterprise's analytics investment.

No. 1. Work the data - but don't overengineer it

Data is at the core of the contemporary business. Executives are learning to think of it as a strategic asset, and an analytical enterprise wants to encourage good and active use of the data. Yet organisations hesitate to put their data to work, both on the front lines and in analytics applications, for three common reasons. One, they fear that the data may be inaccurate or incomplete, and people may make mistakes or poor decisions using it. Two, they have only one way of working with data, predicated on tight controls to maximise accuracy. And three, they often have concerns about data protection and privacy.

You need the right data management strategy to achieve your analytics objectives, and a contemporary data strategy begins with recognising how the exponential increase in available data has changed the game. Many data models and methods are out of date, no longer feasible from time and cost perspectives, and no longer relevant with the high volume of data being generated. It's simply impossible to get all the data "right" by traditional standards before putting it to work (though some organisations still try). Instead, be realistic and build your data and analytics capabilities in concert.

Big data changes the definition of data quality. For many analytical purposes, the data doesn't have to be complete, accurate, perfect. It just needs to be sufficient. Big data applications can find patterns looking across vast data sets in their raw form even when much of the data is imperfect at the "record level." In fact, it's *easier* to discover hitherto unknowns with data that has not been "cleansed" or otherwise preprocessed. Contrast that with the accuracy needed for legal and regulatory compliance or customer and transaction data at customer touch points. There you need data to be validated and staged ready for specific use.

Organisations need to shift how data is provisioned and consumed. They need "two-speed" data management and governance methods. The volume of data is different, the speed of data movement and analysis are different, the technologies are different, and the intent is different. Traditional data management and governance processes are needed for reporting and understanding what's happened; the output is facts as best we can establish them. New processes are needed for innovation and discovering what's possible; the output is probabilities and often the next question to explore. There's no need to overengineer the data for the latter.

Businesses need both speeds, one favouring precision and control where data use is predetermined, the other favouring agility and flexibility where data can be used in many new ways. One asks, "How do we get the data right?" and the other, "What can we learn from the data available?" When an organisation is stuck at the traditional speed, it helps to talk through the issue of data sufficiency. But the breakthrough comes when you test- drive at the new speed by tackllng a recalcitrant business problem and discovering a new solution. That frees up people's thinking about data and its use, and it builds more confidence in advanced analytics.

Finally, a word on data privacy and security. They are absolutely essential and must be addressed regardless of how they are used. Approaches will differ between the two speeds of data management. For example, high-volume, discovery-type analytics might best use anonymised data. Unfortunately, people too often make privacy and security concerns an excuse not to

do something that's in fact feasible. Privacy and security are hygiene factors, and any kind of organisation — public, private, nonprofit — can implement strong security methods and comply with privacy laws and still leverage data and analytics extensively and effectively.

No. 2. Operationalise analytics in workflows and decision processes

For analytics to be deeply embedded and widely employed across an organisation, they must become a regular part of how people work. Success depends more on how easily the business can consume the analytics output than on how clever the modelling techniques are. Analytics should be seamlessly integrated into everyday workflows and decision processes. Business people should be able to work directly with the analytics "products" without having to seek help or explanation from the professional analysts and model builders. They should be able to see the results and benefits for themselves.

To operationalise and scale up analytics, an organisation must automate as much as possible. A call center representative should be automatically served best-offer or best-action recommendations while on the line with the customer. Behind the scenes, the models are profilling customers, generating propensity scores and selecting among options to offer.

There's an important distinction between analytics in development and analytics in operation. Development happens in a "sandbox" where analysts can experiment, pilot, refine and validate models of business processes and decisions. In some organisations, methods are extremely agile: cross-functional business, analytics and technologist teams work for prescribed periods (for example, two weeks) running innovation sessions and rapidly prototyping and testing solutions for business problems. Such dedicated and intensive efforts have the freedom and flexibility to envision and experiment outside the constraints and culture of the day-to-day business.

When models are getting ready for operation, the process necessarily becomes more formal. Data and analytical inputs and outputs are automated for repeatable performance and integration into business workflows. Measuring the performance of models should also be automated, so analysts can monitor and improve models as needed.

Analytical organisations respect the distinction between development and operations through clearly defined roles, processes and capabilities across the full analytics life cycle — from conceptualization and prototyping to ongoing model monitoring and management. Development roles center on business analysis and modelling skills. Operational roles center on business applications, communication, and change. Development is about provisioning. Operationalising is about consumption. In many cases, analytics specialists try to bring all the skills and do all the work across the analytics life cycle. However, as business people and IT technologists become more fluent in analytics, more specific roles and responsibilities appear across all stages of the life cycle. Having clear roles and specialist skills to optimise outcomes makes for better analytical products and greater confidence in using them.

Confidence is the name of the game, and perhaps the most fundamental measure of how effectively analytics are operationalised. The call center representative doesn't need to understand the algorithms, but does need to know enough about the underlying data and logic to find the models dependable, as well as see the pragmatic results of following automated recommendations. Analytics

products should provide the right amount of explanation to build and continuously reinforce the user's confidence. Fortunately, people's experience with Amazon and Netflix is making them more accustomed to behind-the-scenes algorithms and more attuned to how well they are working. We appreciate the benefits of having relevant offers presented to us.

No. 3. Measure to build momentum

Measuring the performance of analytical models and their contribution to specific business objectives is key both to improving over time and to building momentum for using analytics. If you want people to line up for your analytical assets and insights, and you want to win over the skeptics who are accustomed to making decisions based on gut feel, you need to be able to measure the value that analytics can deliver.

Analysts and their leaders are sometimes hesitant to measure value in business terms and to commit to improvement objectives, especially financial ones. But they should. Analytics may be a new component of the business process, and the opportunity for business improvement may be a rough estimate, but it's still essential to have a consistent framework of metrics and targets from the start: "What is the starting position, how do we define success, and how do we measure performance and improvement going forward?"

Because analytics enable people to look at the business differently, creative new metrics enter the mix, and the analysts may take the lead in defining them. But always start with a clear baseline of established business metrics against which to measure progress. For example, new analytics may enable calculation of net promoter scores and measurement of profit-by-customer, while the baseline includes customer retention and revenue-per-customer.

Metrics and the roles in defining them will evolve as the organisation grows more analytical. In working on customer campaigns, marketing may initially define offers and select channels, and the analytics team may focus on targeting methods. Over time, measurement and analyses can become more granular, such as specific offer conversion rates by channel. Then offers and channels may be determined more analytically, and the entire process can be integrated and optimised. Throughout this evolution, revenue and customer relationship measures and targets should be shared by the marketing and analytics teams, and results should be visible to the organisation at large.

In short, robust measurement is essential to managing business change and improving the accuracy of models. Shared measures and objectives encourage use of analytics, demonstrate the value of analytics and build the credibility of the analytics group. Don't shy away from financial targets. And don't make measurement an afterthought and start to work on it midstream — that dilutes the opportunity to drive collaboration and deliver visible value.

No. 4. Focus on business as well as technical skills

From universities on, analytics has been treated as a technical career. Analysts are engineers and mathematicians, interested in algorithms, data science, and the new technologies and methods in fields like machine learning. But when it comes to embedding analytics in an enterprise, a complementary set of soft skills and business knowledge is just as important as the technical skills. Analysts need strong communication skills to translate complex methods and processes into simple terms. To

integrate analytics into workflows, they need to anticipate how business people and processes will execute on analytical outputs.

The most versatile analysts embrace the business knowledge that comes their way. The more they understand the business, the easier it is to introduce analytical outputs into business processes, to articulate the benefits of analytics, and to effect business change. They spend plenty of time in the business, both understanding how processes work and introducing analytics outputs to make the processes work better.

If the domain is talent analytics, the analysts spend time with HR professionals exploring how they recruit, look at staff profiles and identify high performers. What challenges do they face? What problems have been "too complex to solve" in the past? What are the specific pressure points? For example, when looking at attrition among high performers, what are the trends, what are the patterns in their profiles, can we identify triggers or markers for attrition, and can we predict who might be at risk of leaving? The fundamental capability here is asking the right business questions while recognising what analytics can do.

Because it's difficult to find the technical and business skills in one person, organisations compensate with cross-functional team structures and with "translator" roles for people who are conversant but not expert on both sides. However, organisations should also strive to develop analysts with the crossover skills. Some people's personal passion will remain technical, but others enjoy being "out in the business." And the leaders of analytics groups must be business focused. Look at how leadership roles in IT have evolved toward the business side in recent years — the same is happening with analytics leaders.

Therefore, senior analysts and analytics leaders must continuously hone their skills at reading and influencing their business counterparts. Is this general manager more a data person or a visual person? What is it I need to put in front of her? Deliver a flashy presentation, or sit down with a spreadsheet and talk numbers? How does she respond to business challenges and change? How aggressive and creative does she want to be with analytics? Analytics leaders are also responsible for the skills mix, hiring people with business and technical backgrounds, and helping staff develop their business knowledge and consulting skills — how to ask questions and solve problems in business terms. It's a good sign that university programs in analytics are placing more emphasis on business-side skills.

No. 5. Change the Culture as Well as the Processes

Embedding analytics in an organisation entails two kinds of change management. The first is conventional change to business processes and decisions: "How am I going to work differently and achieve my goals in different ways with the help of analytics?" The second is more a profound and cultural change: "How do I think about business problems and the data needed to solve them? How empowered am I to explore the data and innovate with analytics?" The business process changes can often happen quickly, one application at a time. The cultural changes run deeper and take time, but there are specific ways to accelerate them:

- **Publish the strategy.** The enterprise should have a concise "strategy on a page" for how it leverages analytics in pursuit of strategic objectives, plus a "strategy on a page" for each business domain using analytics to improve specific processes and decisions. Together, these documents tie analytics

initiatives to business objectives and enable individuals to see how changes to their work fit into the big picture. They also give the CEO and other executives a way to communicate: "This is why and how we are building data and analytics into our business functions and ambitions."

- **Publish the catalogue.** Let the enterprise know what kinds of analytical capabilities and models are available by maintaining a catalogue of analytics products and services. We can do propensity modelling, risk management models and forecasting — with specific examples of each and the potential benefits. This educates people and gets them thinking about new possibilities. It also reduces duplication of effort across a complex organisation when everyone has a better idea of what may already be "on the shelf."

- **Educate employees.** Direct forms of education can also shape people's appreciation of the business potential of data and analytics. In a few analytically driven organisations, all employees receive training, typically online, in the data assets and analytical tools associated with their roles. Part of every new employee's orientation is around how the organisation uses, protects and values its data.

- **Adjust the measures.** I've mentioned the importance of shared objectives and measures in analytics projects to drive collaboration and execution. Business people should also be motivated more broadly to leverage their data and be analytical in their decision-making. HR can help make this happen through the KPI system for individual employees. Just as industrial companies may include objectives around safety for every employee, an analytical enterprise will include objectives around data-driven behaviors and actions.

- **Leverage executive sponsorship.** Change management always benefits from strong executive commitment and championing. But with analytics, this has an added dimension. Business leaders don't just sponsor projects and communicate the strategic importance of analytics — they also set the cultural tone by their own data-driven behaviours and use (or nonuse) of analytics. Ideally, executives' experiences being analytical in areas like finance and supply chain translate into all facets of the business. And the good example they set cascades through the organisation. Note, however, that this cascade typically becomes diluted two or three levels down, so the other actions just listed remain essential.

Well-intentioned business leaders may still have as much difficulty as others do in becoming more data-driven. Think about how the telco industry worked a dozen or so years ago in the earlier days of mobile phones. The whole market was expanding, and business leaders could pretty much follow their gut feel about where to expand the network next to attract more account activation. Today the industry is fiercely competitive, and yesterday's procedures no longer apply. Companies must focus on and sort through customer needs and preferences, the variety of devices and apps and services, and how to engage prospects and customers. They have to do big data analytics. Yet, instead, executives' experiences and instincts sometimes prevail.

Getting going

Two big questions when embedding analytics in an organisation are where to start and how aggressively

to proceed. In a large and complex enterprise, analytics are not one-size-fits-all, and big analytics programs tend to founder. The more common and reliable procedure is to start in multiple parts of the business that offer favourable conditions — a clear problem to address, some decent data and a willingness to address the problem differently. This approach generates early successes and demonstrates a variety of use cases for analytics. It lays the ground for gradual expansion and rollout to other parts of the business.

At the same time, however, there's value in being selectively aggressive. Find one or two areas where the business is underperforming on key dimensions or is facing unfamiliar competitive threats, where processes need to be disrupted and leaders are willing to take some risks in pursuit of big returns. If you concentrate analytical energies there and deliver breakthrough results, they will serve as a wake-up call to the rest of the enterprise, and the demand for better data and analytical solutions will accelerate.

Whether you follow one of those paths or both, keep in mind the success factors I've discussed. They are the hallmarks of an analytically mature organisation:

- Strong data strategy with "two speeds" of data governance and management.
- Automated analytics embedded in business processes and decisions.
- Robust and innovative measurement of business and analytics performance and value.
- Analytics teams working in the business, not back of the house.
- Culture that puts data and analytics at the heart of both everyday work and business strategy.

Additional Information

To learn more about this topic, please visit: http://www.sas.com/en_us/insights/articles/big-data/the-future-of-embedded-analytics.html

About the Authors

SANDRA HOGAN

Sandra Hogan leads a team that leverages SAS analytics technology, expertise and resources to develop and implement strategies for operational improvement and competitive gain. Her team adds value by working alongside customers' own business managers and IT professionals, and taking a holistic view that includes their people and processes, as well as their data and technology infrastructures. The goal of the SAS Business Analytics Advisory is to help customers succeed with solutions that deliver insights for fast, best practice decision making.

Sandra Hogan joined SAS as a Senior Analytics Advisor in April 2013, with her focus on improving analytics processes for SAS clients and advising on the key capabilities they must develop in order to realise maximum benefit from their investment in business analytics.

Her most recent success was the design, development and launch of the company's SAS Results business unit. The unit offers Analytics-as-a-Service and delivers programs that support the delivery of large-scale implementation projects which focus on cloud-based technologies to drive analytics value.

"Business analytics is much more than data and technology," Ms. Hogan said. "To realise the true value of business analytics you need to align strategy with business processes and develop the core competencies of your people. Analysts need to know what questions to ask and then how to act on the insights before the benefits are evident.

"I am passionate about helping people in organizations with change, particularly enhancing skills to solve business problems with data. Our BAA team consults with clients to help efficiently match the best analytical solutions to pressing business needs and integrate them with business processes and systems. We show our customers how applications and processes can be fine-tuned to address unique challenges and opportunities, and be continuously re-evaluated for optimum effectiveness."

Sandra Hogan began her analytics career with Victoria's Transport Accident Commission. She spent ten years at Telstra where she rose to be Director of Customer Intelligence before joining Ernst & Young as an Executive Director. At EY she led analytics-embedded initiatives to improve customer value optimization and marketing solutions. She holds a BSc in Mathematics and Statistics from Monash University.

ROBERT MORISON

Robert Morison serves as Lead Faculty for IIA's Enterprise Research Subscription. An accomplished business researcher, writer, discussion leader, and management consultant, he has been leading breakthrough research at the intersection of business, technology, and human asset management for more than 20 years. He is co-author of Analytics At Work: Smarter Decisions, Better Results (Harvard Business Press, 2010), Workforce Crisis: How to Beat the Coming Shortage of Skills And Talent (Harvard Business Press, 2006), and three Harvard Business Review articles, one of which received a McKinsey Award as best article of 2004. He holds an A.B. from Dartmouth College and an M.A. from Boston University.

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