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Big Data Analytics in Supply Chain: Hype or Here to Stay?

Accenture Global Operations Megatrends Study



Big Data Analytics in Supply Chain: Hype or Here to Stay?

Recent Accenture research reveals that while most companies have high expectations for big data analytics in their supply chain, many have had difficulty adopting it. In fact, 97 percent of executives report having an understanding of how big data analytics can benefit their supply chain, but only 17 percent report having already implemented analytics in one or more supply chain functions.

However, not all companies are struggling. A small subset of companies in our survey are actually benefiting from and evangelizing big data analytics. These companies' success can be attributed, in part, to how they approach big data analytics strategy, operations, and talent—which is very different from other companies in our survey that have yet to realize the promise of this powerful digital technology.

Since the mid-20th century, companies have been applying "analytics" to help them make better decisions—for example, calculating the optimal facility network design, applying Economic Order Quantity (EOQ) principles to replenishment and inventory, and using formulas to define optimal safety stock parameters. However, such analytics typically have been ad hoc and situation specific; companies historically have had little success in systematically implementing analytics across their operations. Fast-forward to the 21st century when advancements in IT and software, lower overall technology costs, and new strategies and skills are making it possible for companies to adopt ever-more sophisticated tools and make them a part of their everyday decision making.

Most recently, the growth of digital technologies has enabled companies to collect increasingly massive amounts of data—and, they subsequently, require even more powerful techniques to make sense of that data. Hence, the emergence of what is becoming a critical business capability: big data analytics.

While there is considerable hype about, and a high level of general awareness of the value of, "big data," many companies still do not fully understand how to apply analytics to this data to drive higher supply chain (and overall enterprise) performance.

That's why Accenture included big data analytics in our Global Operations Megatrends Study. We surveyed more than 1,000 senior executives primarily at large global companies to get their thoughts on the importance of big data analytics in their supply chain, the progress they have made in adopting it, and how they are benefiting from its use. (For more on survey participants and research methodology, see "About the Research.")

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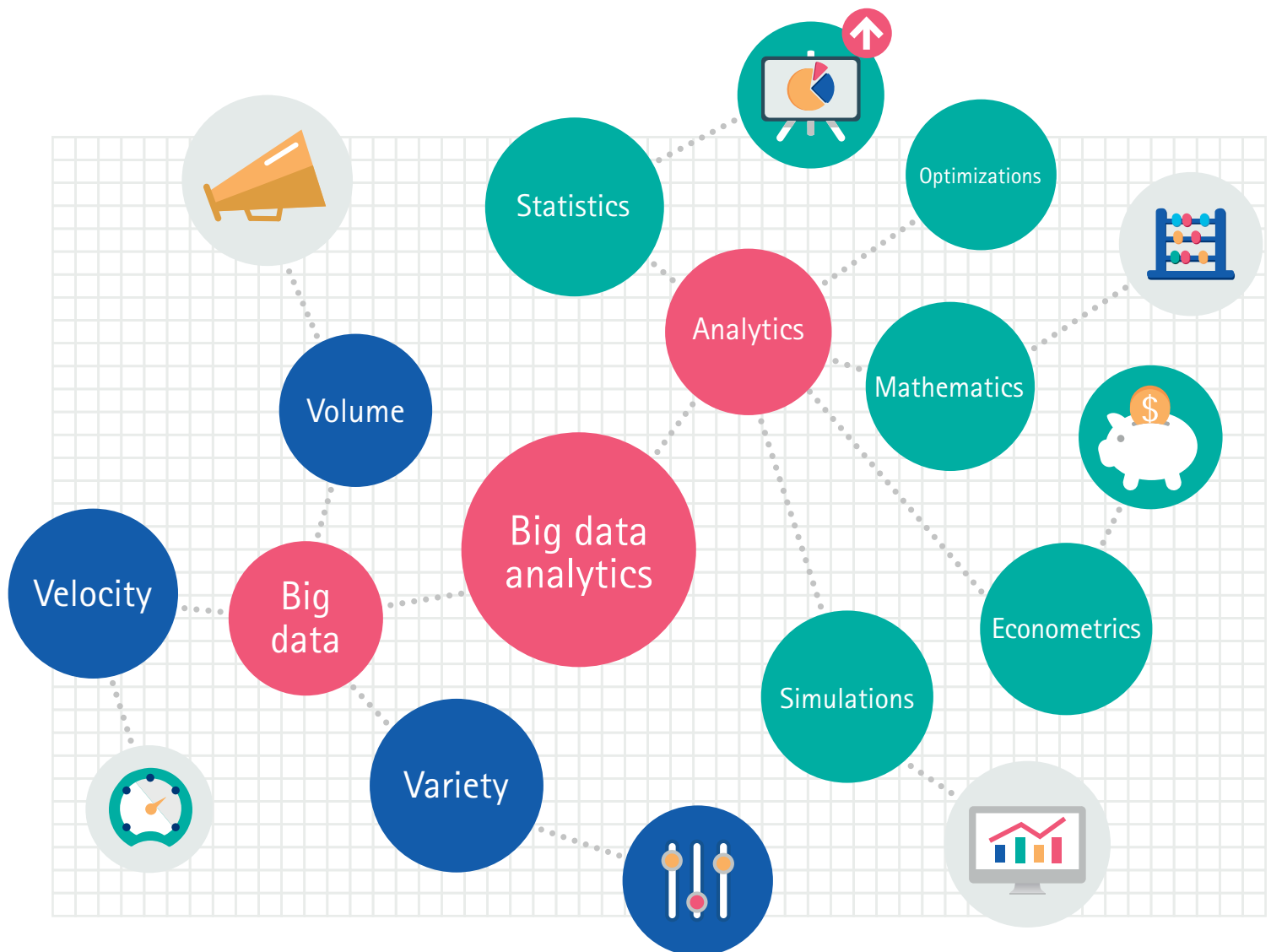
Our survey found that use of big data analytics in the supply chain function is not widespread or well coordinated across global companies, and there is little consensus among companies on how to develop, structure and deploy the capabilities that are key to success. But our research also found that many companies are on the verge of making investments to develop a mature big data analytics capability. More than one-third of executives reported being engaged in serious conversations to implement analytics in the supply chain, and three out of 10 already have an initiative in place to implement analytics.

Our research further revealed some commonalities among a small group of companies that have generated a high return from their investment in big data analytics for their supply chain.

In particular, three factors appear to make a difference in the results that big data analytics delivers to the organization: the focus placed on developing a strong enterprise-wide analytics strategy, ensuring that big data analytics is embedded in supply chain operations to improve decision making across the organization, and hiring people with a unique mix of analytics skills and knowledge of the business to produce actionable insights from big data.

In the following sections, we explore our findings in more detail and discuss specific actions companies can take to create competitive advantage with big data analytics.

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What is Big Data Analytics?

Companies for many years have applied techniques to help them make better decisions. But such “analytics” largely have been ad hoc and situation specific, and have relied on relatively simple tools whose capacity for processing large amounts of data quickly reached its limits. Those tools have evolved over the years to become more sophisticated and to assume a more central role in a company’s everyday decision making.

Today, because of the widespread use of digital technologies, companies are collecting ever-greater amounts of data—and, as a result, need even more powerful ways to make sense of that data. Big data analytics fills that need.

Big data analytics incorporates two distinct dimensions. The first dimension, “big data,” refers to the ability or need to process data with the following qualities in mind (the three “Vs”):



Velocity: in real time or close to real time



Variety: the data varies in time and in context, and is not a fixed data model



Volume: the volumes are significant and require unique approaches

The second dimension, “analytics,” involves the ability to gain insight from data by applying statistics, mathematics, econometrics, simulations, optimizations or other techniques to help a business make a decision about an issue or opportunity that needs to be addressed.

Big Data Analytics is on nearly everyone's mind

...while executives clearly are thinking about big data analytics, its use to improve business performance is far from widespread.

Companies in our survey have high expectations for big data analytics. When asked about their objectives, 48 percent of executives expect to create an organizational ability to react more quickly to changes; 45 percent expect big data analytics to help them gain insights about the future, rather than merely report what has happened in the past; and 43 percent expect to achieve a cross-functional view of the supply chain that can help them optimize overall supply chain performance.

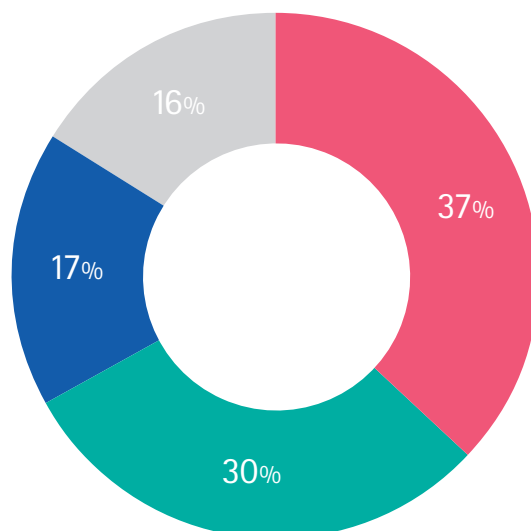
In Accenture's experience these expectations are not unrealistic. Consider the case of one original equipment manufacturer (OEM) of industrial equipment. This OEM has undertaken a significant effort to implement analytics to help the company not only determine how to best respond to warranty claims, but also to get a deeper understanding

of possible system quality issues that are suggested by claims. By using analytics to sift through all claims and identify possible common threads, the company has gained valuable intelligence that can be fed back to research and development (R&D) and manufacturing to address in future products.

Benefits such as the preceding help explain why nearly seven in 10 companies in our survey either have an active organizational initiative underway to implement analytics in the next six to 12 months or are engaged in serious discussions about deploying analytics in the supply chain (Figure 1). However, implicit in those responses is the fact that while executives clearly are thinking about big data analytics, its use to improve business performance is far from widespread.

Figure 1: Companies' experience with big data analytics to date

- Engaged in serious conversations to implement analytics in the supply chain
- An active organizational initiative (with supply chain being an integral part) to implement analytics in the next 6-12 months
- Already implemented analytics in one or more supply chain processes/functions
- Awareness from publications, conferences and/or colleagues



Actual use of Big Data Analytics is limited

Despite the acknowledged benefits big data analytics can generate, companies in our survey have faced difficulties in adopting it. Most respondents cited worries about the large investment required to deploy and use analytics (67 percent), as well as security issues (64 percent), as the greatest potential obstacles to adoption (Figure 2). Other areas of concern include privacy issues, a lack of a business case for analytics, limited executive support for it, and no in-house capability to execute an analytics initiative.

Beyond these issues, our research reveals that shortcomings in several areas are likely preventing companies from realizing the benefits of big data analytics.

For example, only four in 10 companies have a true enterprise-wide strategy (that includes the supply chain) in place that covers how the enterprise will use big data to drive business value (Figure 3).

Figure 2: Greatest concerns about the use of big data analytics

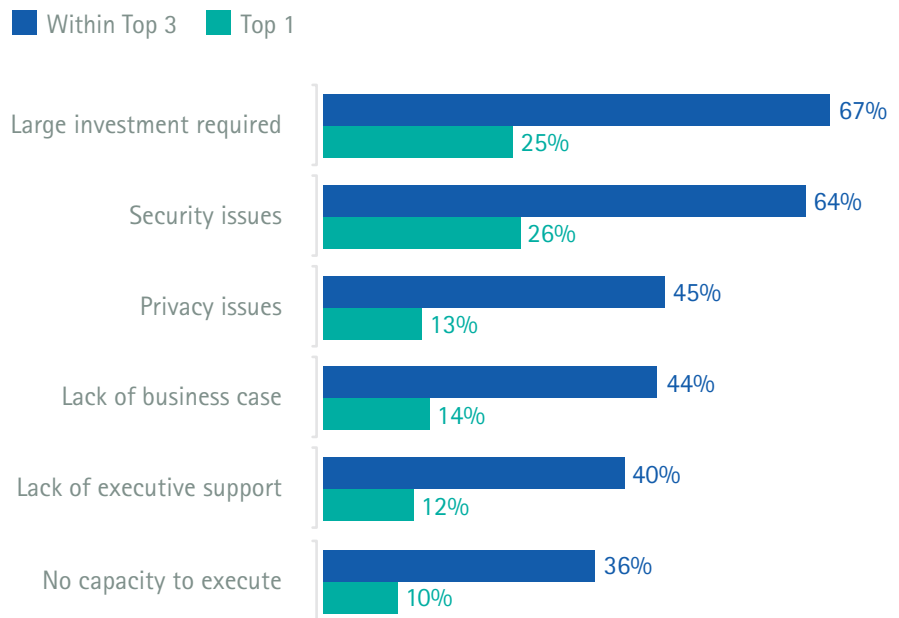
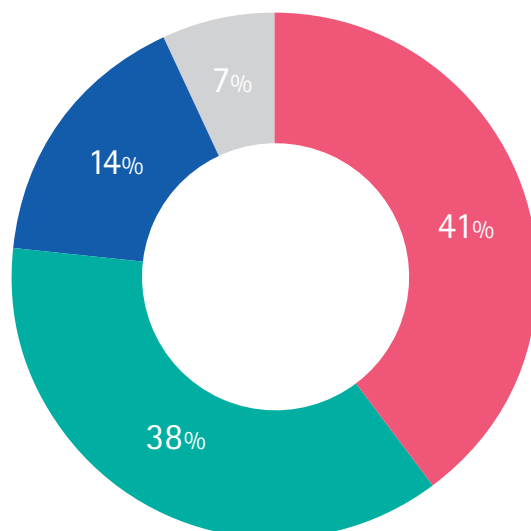


Figure 3: Do companies have a strategy for big data analytics?

- Yes, an enterprise-wide strategy exists to use big data to drive business value and supply chain is an integral part of it
- Yes, a supply chain-specific strategy exists for big data
- Yes, a big data strategy exists in some form—for some processes
- No current strategy



While companies understand the value of big data analytics, they have yet to figure out the best way to use it to improve their overall business.

Nearly the same percentage has only a supply chain-specific strategy for big data. Similarly, just 37 percent of companies said big data analytics is embedded into key supply chain processes (Figure 4). The same percentage reported using big data analytics in all areas of the supply chain, but only on an ad hoc basis. Two in 10 companies also use big data analytics on an ad hoc basis, but in just some areas of the supply chain.

The preceding may indicate that while companies understand the value of big data analytics, they have yet to figure out the best way to use it to improve their overall business.

Furthermore, although big data analytics requires specialized skills in finding, manipulating, managing and interpreting data to be effective, only 34 percent of companies have an independent team of data scientists focused on big data analysis that help develop insights on an ongoing

basis (either at the enterprise or supply chain level). In fact, just under half of participating companies said they only have limited in-house capability for analytics—and that usually refers to a person in either the supply chain or the IT organization who uses a sophisticated tool to generate insights (Figure 5). These findings suggest companies either are not able to attract the right talent or simply have not considered it a priority to build such a function.

Finally, our research reveals that respondents are more likely to view analytics as a point-solution technology—44 percent of companies rely on one or more sophisticated tools that use big data to help with day-to-day decision making, and only 43 percent of companies have an enterprise-wide big data analytics capability that includes sophisticated tools to capture, process, and produce insights for key supply chain practices (Figure 6).

Figure 4: Companies' current use of big data analytics in the supply chain

- It is operationalized—big data analytics is embedded into key supply chain processes
- Big data analytics is used in all areas of the supply chain, but only on an ad hoc basis
- Big data analytics is used in some areas within the supply chain, and used on an ad hoc basis
- Not applicable—we only make use of traditional analytics and do not use big data analytics

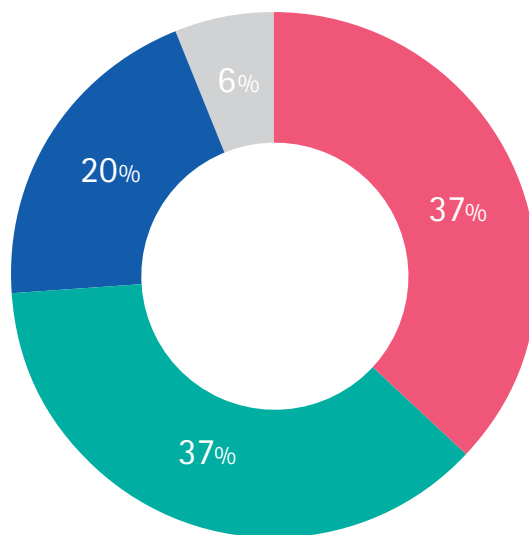


Figure 5: Companies' capabilities for developing insights via big data analytics

- Some in-house capability—someone that uses a sophisticated tool to help generate insights (supply chain function/IT owned)
- An independent team of data scientists (competent in finding, manipulating, managing and interpreting data) is focused on big data analysis and developing insights on an ongoing basis (at enterprise or supply chain function level)
- Traditional database personnel (part of IT) but not someone who could analyze vast quantities of data using sophisticated tools to generate insights
- No one in-house, but make use of third parties on an ad hoc basis

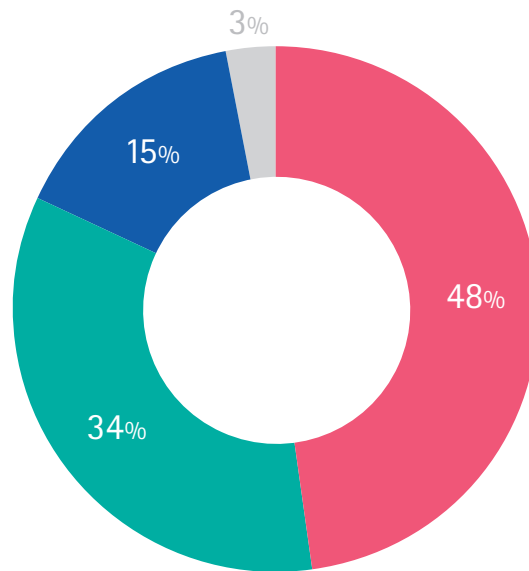
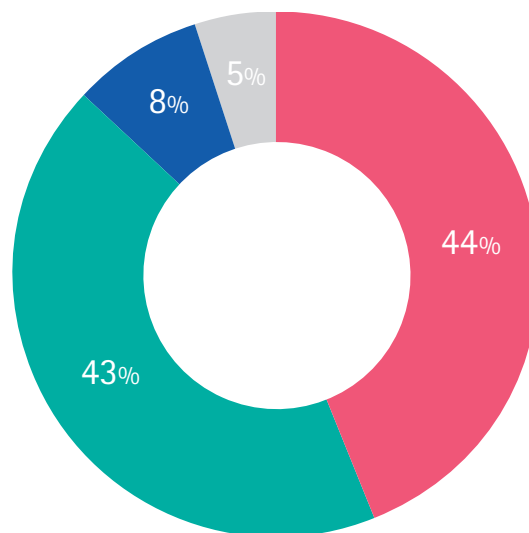
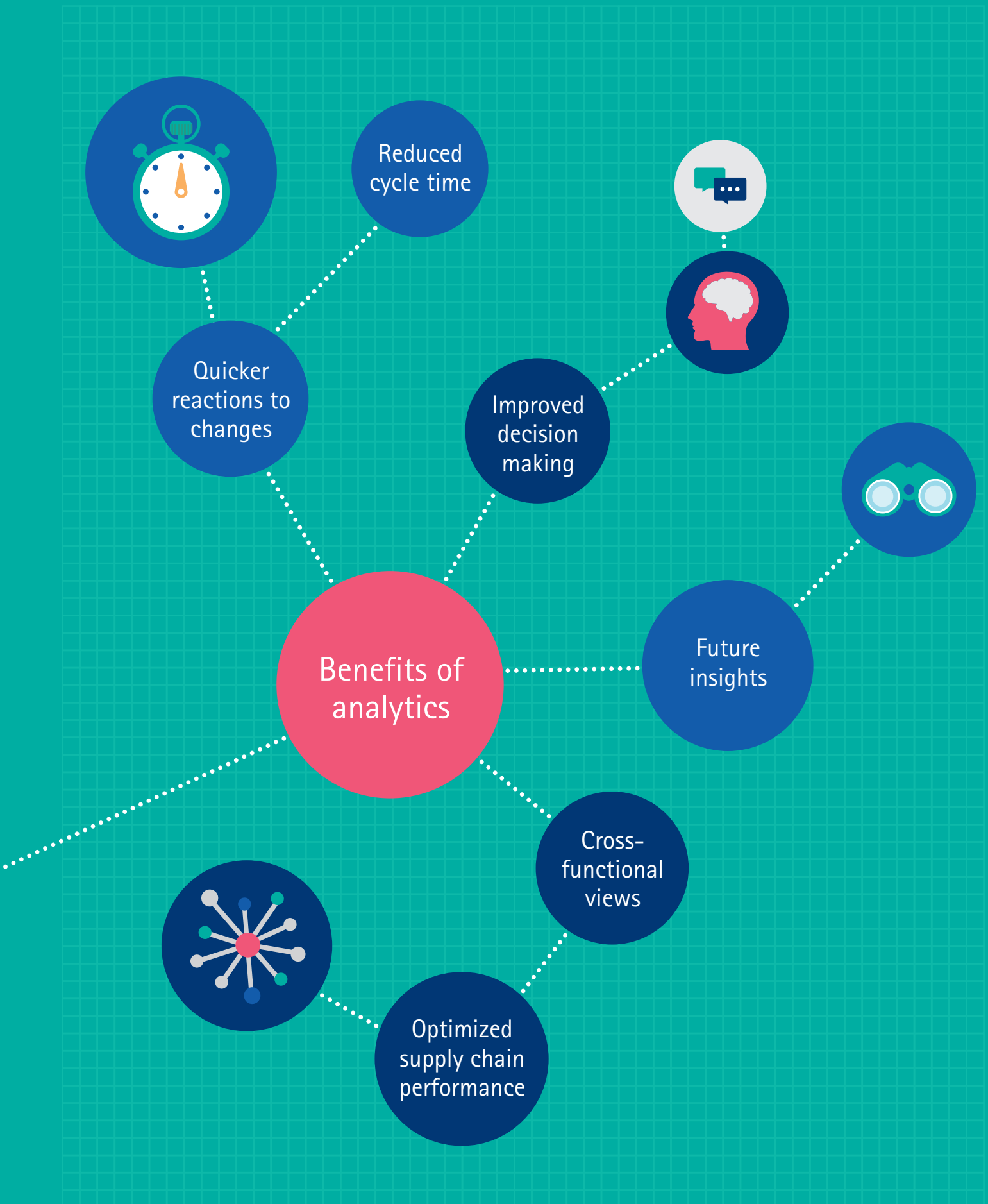


Figure 6: How current tools and technology support companies' use of big data

- Entire supply chain function makes use of one or more sophisticated tools that helps with day-to-day decision making using big data
- Enterprise-wide big data analytics capability exists (or in the process of being developed) that includes sophisticated tools to capture, process and produce insights for key supply chain processes
- A tool does exist within the supply chain
- Only rely on traditional databases and spreadsheets





Three key practices enhance the ROI of Big Data Analytics

Just as adoption of an approach to big data analytics varied across our survey sample, participating companies also have not benefited equally from their use of big data analytics. Some companies in our survey said it has lived up to its promise—helping them improve customer service and demand fulfillment, experience faster and more effective reaction time to supply chain issues, increase supply chain efficiency, and drive greater integration across the supply chain (Figure 7). But a number of big data analytics adopters have been less successful in generating such positive results from their efforts.

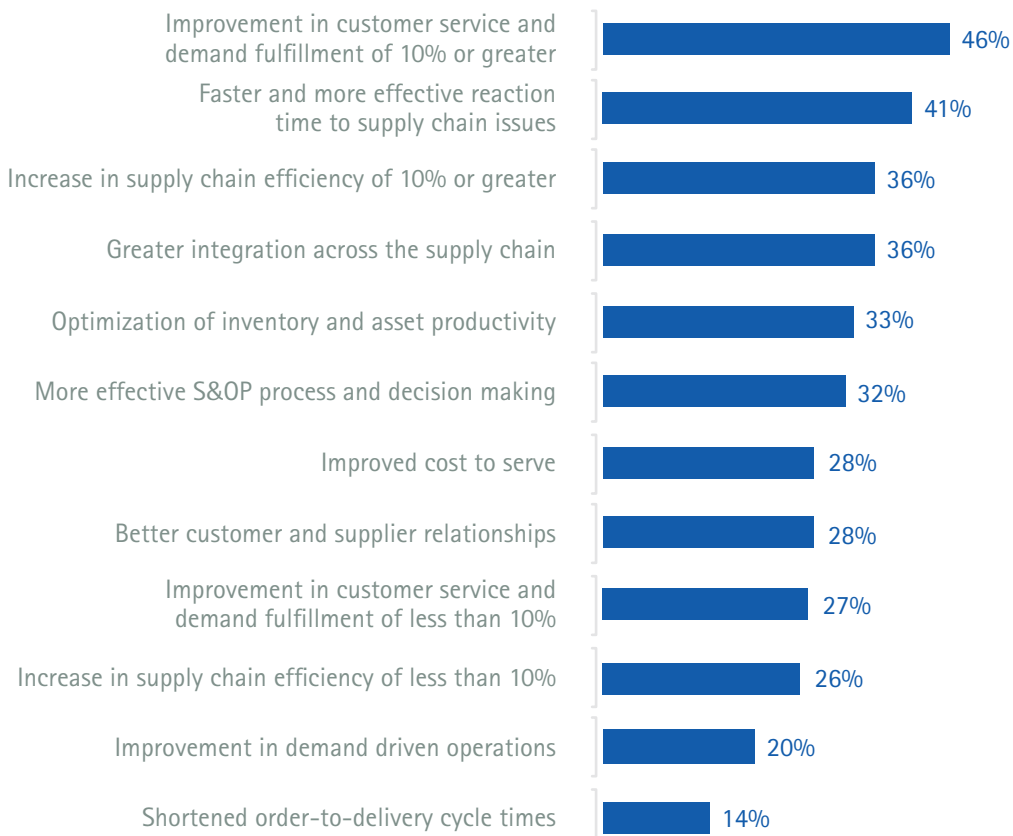
Is there a difference in how these two groups of companies approach big data analytics that could explain the disparity? Accenture thinks there is. In fact, we found three key practices that distinguished these leading companies from the others—and likely played a strong role in the results these companies generated.

Leaders make developing a robust big data analytics enterprise-wide strategy a higher priority

An enterprise-wide strategy (of which the supply chain is an integral part) that enables a company to use big data to drive business value is most strongly correlated with big

data analytics success (Figure 8). A supply chain-specific strategy for big data is the next best choice. While not as strongly correlated with the aforementioned metrics as an enterprise-wide strategy, a supply chain-specific strategy is still better than an ambiguous big data strategy focused on a few specific processes. For instance, companies with an enterprise-wide strategy are more likely than those with a process-focused strategy to have shortened order-to-delivery cycle times (61 percent versus 14 percent), a more effective sales and operations (S&OP) process and decision making (55 percent versus 12 percent), and improved cost to serve (55 percent versus 10 percent).

Figure 7: Results companies have achieved using big data analytics

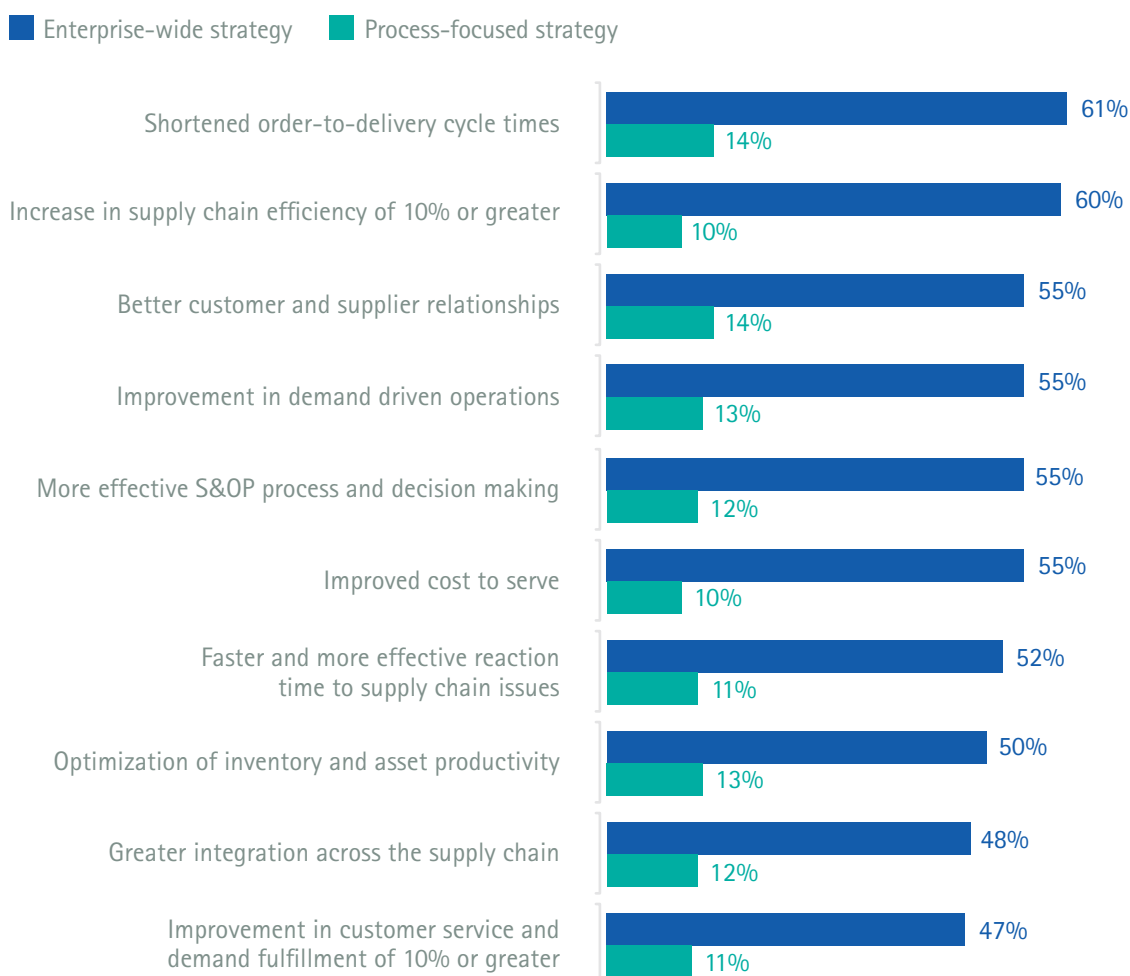


Accenture's experience indicates that high-performing companies develop a strong analytics strategy, one that clearly defines the issue and opportunity at hand, before attempting to implement and use big data analytics. In our work with clients, Accenture has found that companies that have followed a clear strategy are likely to have a larger return on their big data analytics investment because they are better able to navigate the challenges they encounter in collecting and storing data, selecting the right analytics tools, generating usable insights from their data, and ultimately being able to act on those insights to achieve positive business outcomes.

Importantly, strategy development is not a minor undertaking. One major technology company, for instance, worked with Accenture for a full year to define its strategy for applying big data analytics to its maintenance operations and to run a pilot program to understand the benefits a predictive maintenance approach could generate. This upfront work was key to the company's ability to understand the true potential of big data analytics while avoiding making a significant investment (in tools and employees) in areas that would not generate a positive return.

Accenture recommends that when developing their strategies, companies should start with a clear view of what will drive value and differentiation for them, as well as an understanding of how their industry is evolving or being disrupted—and then translate those insights into a clear business road map.

Figure 8: Companies with an enterprise-wide strategy are far more likely to generate a range of important supply chain benefits from their use of big data analytics

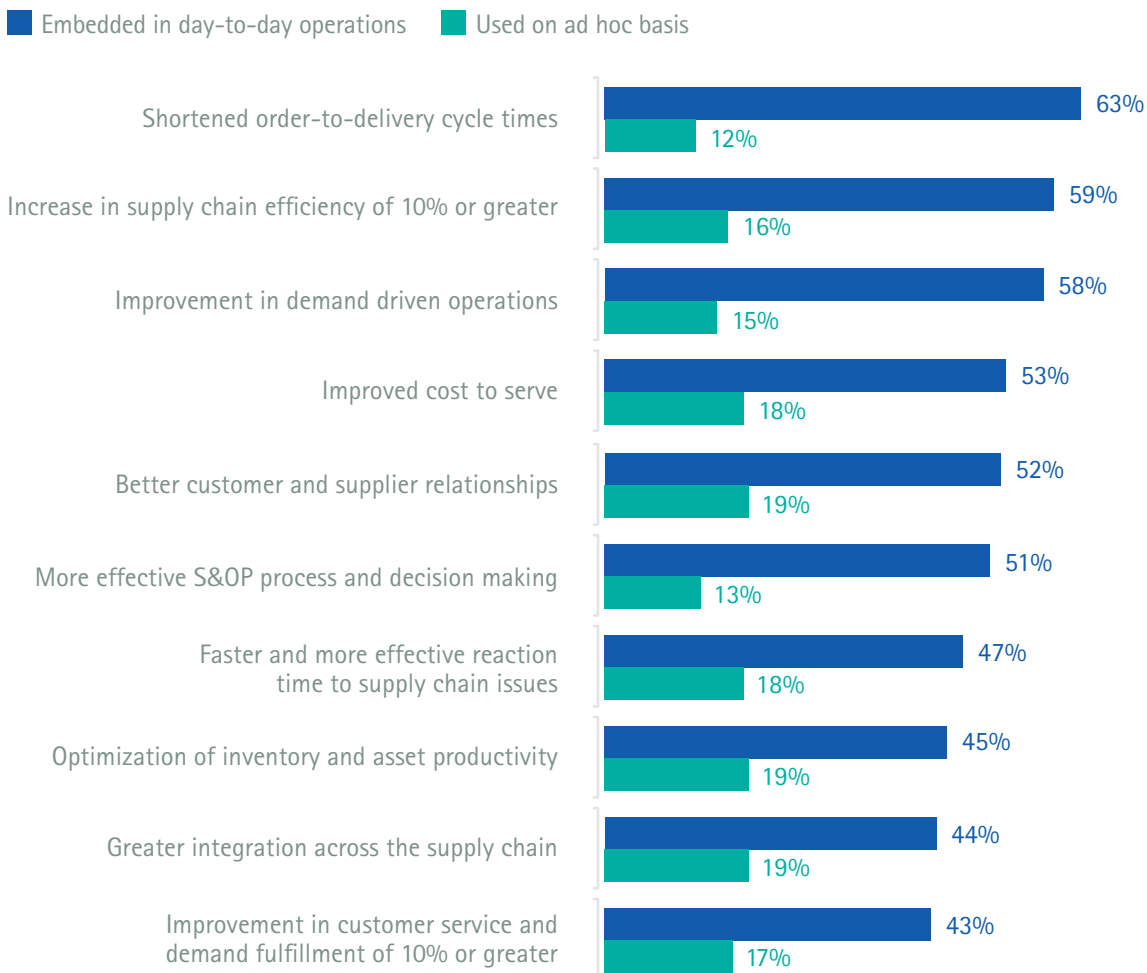


Leaders emphasize embedding Big Data Analytics into operations to improve decision making

A second key to generating more substantial returns is ensuring that big data analytics is operationalized. Accenture has found that companies that embed analytics in their day-to-day supply chain operations generate more significant and far-reaching benefits than those that use big data analytics on an ad hoc basis in limited areas of focus (Figure 9). These benefits include shortened order-to-delivery cycle

times (63 percent versus 12 percent), improvement in demand-driven operations (58 percent versus 15 percent), better customer and supplier relationships (52 percent versus 19 percent), more effective S&OP and decision making (51 percent versus 13 percent), faster and more effective reaction time to supply chain issues (47 percent versus 18 percent), and optimized inventory and asset productivity (45 percent versus 19 percent). Operationalizing analytics in this way requires deploying the right tools to support the right processes in the right way.

Figure 9: Companies that embed big data analytics in their operations are far more likely to generate a range of important supply chain benefits



However, sorting through the broad range of technologies, devices and vendors to find the right ones can be challenging. That is why it is important for a company to begin with a clear definition of what it hopes to achieve with big data analytics, and remain focused on how it will use the technology to enable specific processes to attain its goals. By embedding the tools into the relevant processes to enable systematic, consistent execution, a company can generate strong, sustainable results over time.

For instance, one manufacturer has invested in a control tower to help manage risk in the company's inbound supply chain. By making the control tower a key component of its upstream supplier management function, the manufacturer can sort through a wide variety of data and model its suppliers' capabilities to understand what suppliers are truly able to do. Such insights help the manufacturer avoid costly interruptions in supply and meet its commitments to customers.

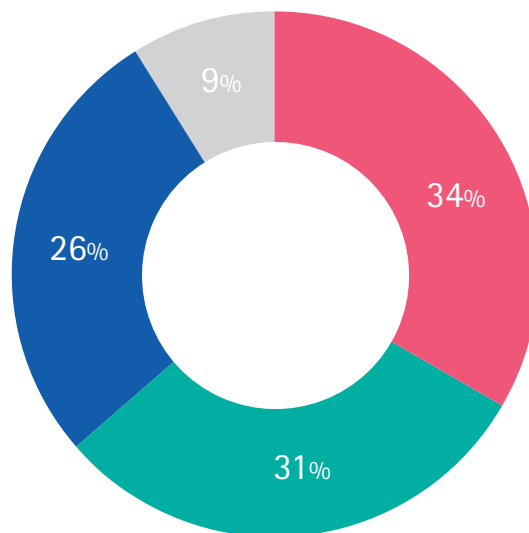
When deploying big data solutions, companies need to consider their own unique requirements (including industry, target markets, business model, and capabilities) as well as their culture to determine the most effective approach. In other words, there is no one "right" way to develop big data analytics capabilities within the supply chain organization, as illustrated by our research findings (Figure 10): About one-third of respondents said the most effective approach is an internally managed "big bang" implementation that results in a supply chain-wide big data analytics capability; a little more than half prefer a proof-of-concept pilot on a focused supply chain issue, run either by external or internal resources; and one in 9 thought a big bang, supply chain-wide implementation supported by external resources is best.

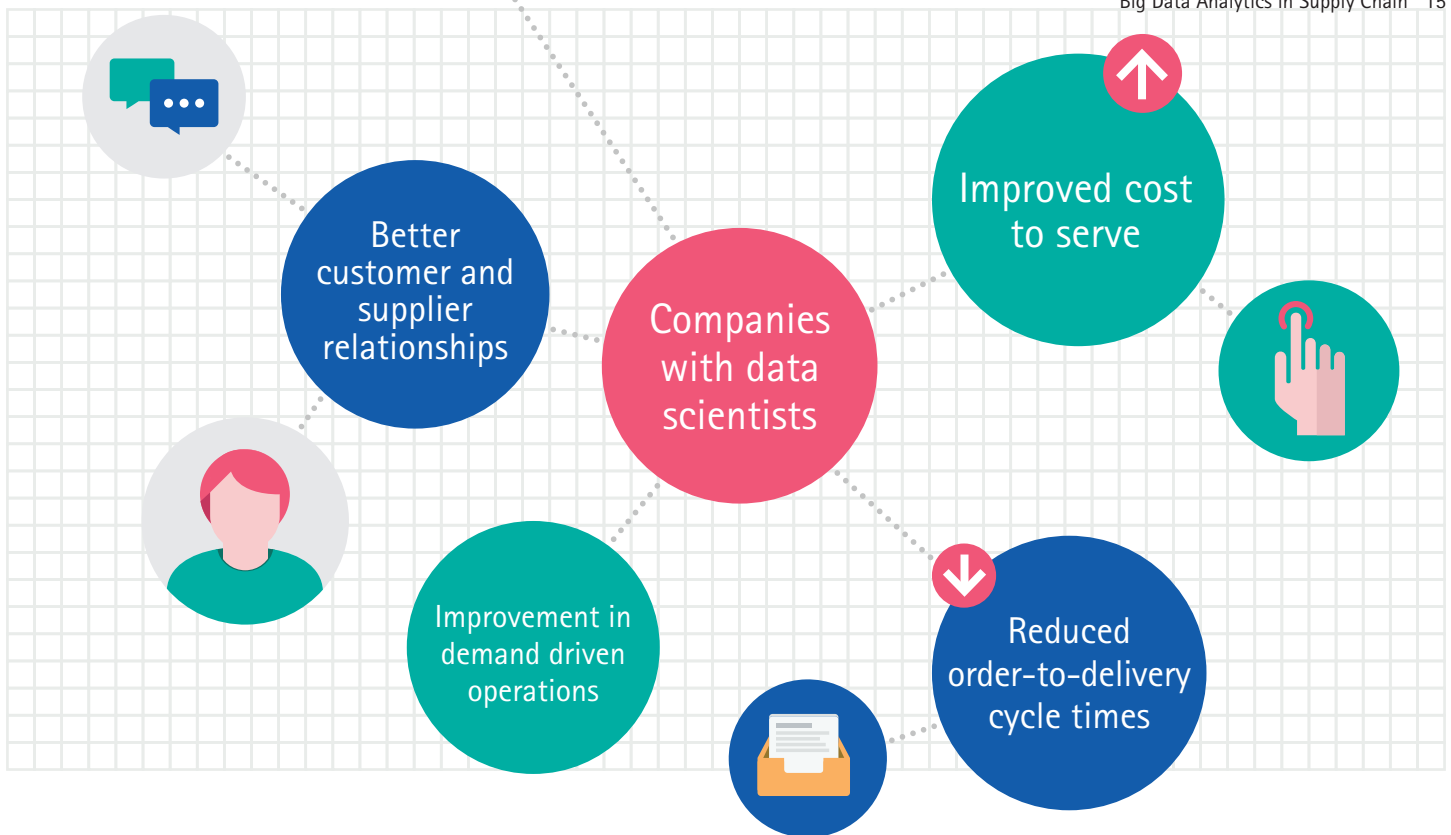
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Regardless of which approach is taken, it should be rooted in the "issue to outcome" perspective mentioned earlier and strongly linked to the organization's ability to execute on the new capabilities. For instance, if a company is unable to build and scale big data analytics capabilities as quickly as it could execute on them, it should seek outside help in implementation.

Figure 10: Companies' perspectives on the best strategy for developing big data analytics capabilities

- Internally run big bang data analytics implementation—leverage internal resources (existing or recruit) to implement a supply chain-wide big data capability
 (e.g. implementation of a new technology or tool, training and up skilling resources, modifying business processes etc.)
- Externally support proof of concept—hire external capability (people and/or technology) to see how big data analytics could assist with better understanding of a key supply chain issue
- Internally run proof of concept—leverage internal supply chain/organizational capability (personnel and technology) to see how big data analytics could assist with better understanding of a key supply chain issue
- Externally supported big bang data analytics implementation—hire external capability (people and/or technology) to implement a supply chain-wide big data capability
 (e.g. implementation of a new technology or tool, training and up skilling resources, modifying business processes etc.)





Leaders hire talent with a mix of deep analytics skills and knowledge of the business and industry.

An independent team of data scientists dedicated to big data analysis that can help on an ongoing basis (either at the enterprise or supply chain level) is the third key practice we found that correlates with big data analytics success (Figure 11). If such a team cannot be assembled and deployed, having some in-house capability in the form of a person or group who can use a sophisticated tool to generate insights can, in some circumstances, approach the benefits the data scientist team can help produce, according to our research.

We found that companies with a team of data scientists are more likely than those with just traditional database personnel to have shortened order-to-delivery cycle times (54 percent versus 9 percent), improvement in demand driven operations (50 percent versus 9 percent), better customer and supplier relationships (44 percent versus 13 percent), and more effective S&OP process and decision making (44 percent versus 11 percent).

These findings highlight an extremely critical point: While big data analytics certainly relies on technology, the data and tools are useless unless a company has people with the right skills to conduct the analysis. For many companies, such skills will be new to the organization or, if they are available, are not pervasive. To make the best use of big data analytics, a company needs people who not only have strong skills in statistics, mathematics, and econometrics that enable them to create the right analytical models, but also deep knowledge of the business and its industry to put the models into production (for example, for forecasting, optimization or simulations).

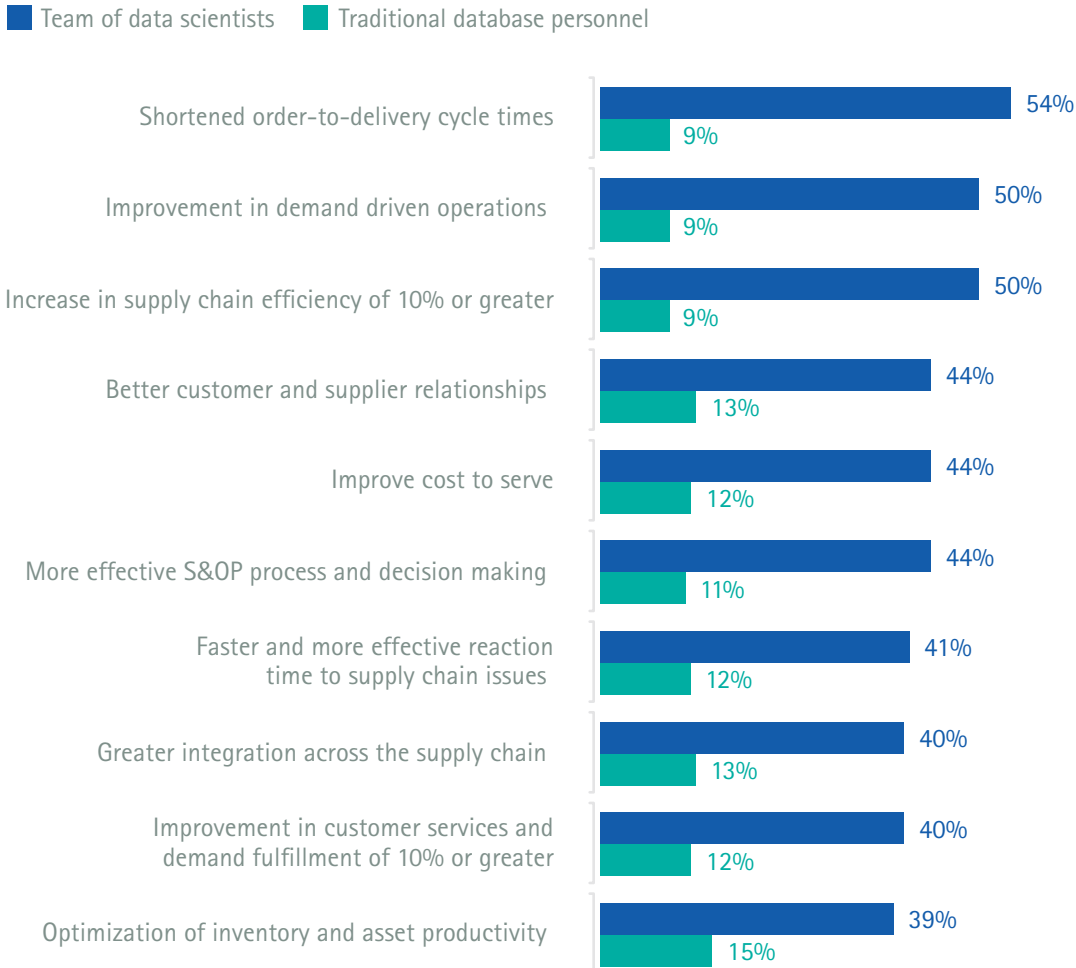
Often, companies find they must make significant changes to their talent recruiting, management and development activities because of such analysts' unique skills profile. That's especially true given that analytics skills are becoming scarcer as more companies adopt analytics as a core part of their business. In fact, a year-long research study¹ by the Accenture Institute for High Performance found that as employers add more analytics jobs, severe shortages are

developing among analytics specialists, experts and scientists.

Employers can take several steps to help counteract those shortages. They can work to raise the awareness about the career prospects of analytics jobs, especially among university recruiters. They also can make analytics jobs more attractive by helping analysts stay current with the tools and technologies of their field and enable analysts to understand how their work contributes directly to the organization's goals. And they can develop flexible career paths for analysts rather than shoehorning them into models more appropriate for different, less-specialized work—for example, by creating a compensation and promotion system that will allow great analysts to remain individual contributors without direct reports and still be eligible for pay increases and promotions. In some cases, a company could find it beneficial to work with a labor-market intermediary—which facilitates the match between talent "sellers" and "buyers"—to find and gain access to critical analytics skills around the world.

¹ "Where Will You Find Your Analytics Talent?" Elizabeth Craig, David Smith, Narendra P. Mulani, and Robert J. Thomas, Outlook, October 2012, <http://www.accenture.com/us-en/outlook/Pages/outlook-journal-2012-where-will-you-find-your-analytics-talent.aspx>

Figure 11: Companies that employ a dedicated team of data scientists are far more likely to generate a range of important supply chain benefits from their use of big data analytics



Conclusion

Big data analytics offers tremendous potential to improve many aspects of a company's business, and can have a major impact on a company's overall operating and financial performance.

Yet it also is a sizeable investment and must be thoroughly thought through in concert with the company's overall data and analytics strategy, and with the outcome and supporting business case fully understood. Doing so can enable a company to understand the organizational and process implications of big data analytics adoption and, ultimately, to select the right approach to deploying and scaling a big data analytics capability that generates significant business value.

In some cases, a company may find it difficult to build its own analytics capability in-house. As mentioned, a significant challenge is a growing shortage of available analytical talent. Industry experience is especially helpful in analysts because it gives them the context to better understand what a company should be looking for, what data is important and relevant, and what modifications in the process or analytics may be required. Furthermore, analytical tools are continually and rapidly evolving—and vendors are emerging and disappearing equally quickly—which makes keeping current in technology a major (and often costly) challenge for companies. Finally, it takes considerable time and effort to develop the kind of robust analytics processes needed to fully capitalize on big data analytics at an enterprise level.

For these reasons, some companies consider outsourcing analytics to professionals specializing in this capability. Outsourcing providers have staffs of highly skilled analysts with the requisite industry experience. They also pre-integrate the best-of-breed analytical technologies, providing companies with access to a ready-made solution companies don't have to buy and maintain, and continuously evaluate technology vendors and their offerings to ensure they are using the best tools available while guarding against the impact of any vendor's demise. And they bring to the table leading-practice analytics processes, built on years of experience, which companies can benefit from immediately.

Taking advantage of such capabilities enables a company to start up or enhance its analytics capabilities much more quickly and cost-effectively while "test-driving" various technologies before committing to purchasing and deploying them in-house. Regardless of whether a company builds its analytics capability in-house or outsources it, the key is to determine at the outset of an analytics initiative the issue or opportunity the company faces and which route will be the most appropriate for addressing it. Such a decision arguably will have the greatest impact on the return a company ultimately generates on its analytics investment.



About the Research

The Accenture Global Operations Megatrends research study is designed to explore key trends in the operations function. The research focused on three areas: emerging-market growth, supply chain risk management, and big data analytics. These were named as the top priorities and areas of concern among supply chain leaders globally. The intent of the research is to understand the specifics of what companies are executing and planning in these areas and the effectiveness of those strategies and tactics.

The research involved a web-based survey of 1,014 senior executives primarily at large global companies headquartered in the respondents' locations. Fifty-six percent of

respondents held C-level titles, including Chief Supply Chain Officer, Chief Procurement Officer, Chief Sourcing Officer, Chief Operations Officer and Chief Operating Officer (Figure 12). The remaining 44 percent were senior-level supply chain, procurement or operations executives.

Just under half (48 percent) of participating companies had revenues of greater than US\$5 billion, with 18 percent reporting more than \$10 billion in revenue (Figure 13). Companies represented a wide range of industries (Figure 14). The headquarters location of participating companies was evenly split across North America, Europe, and Asia Pacific.

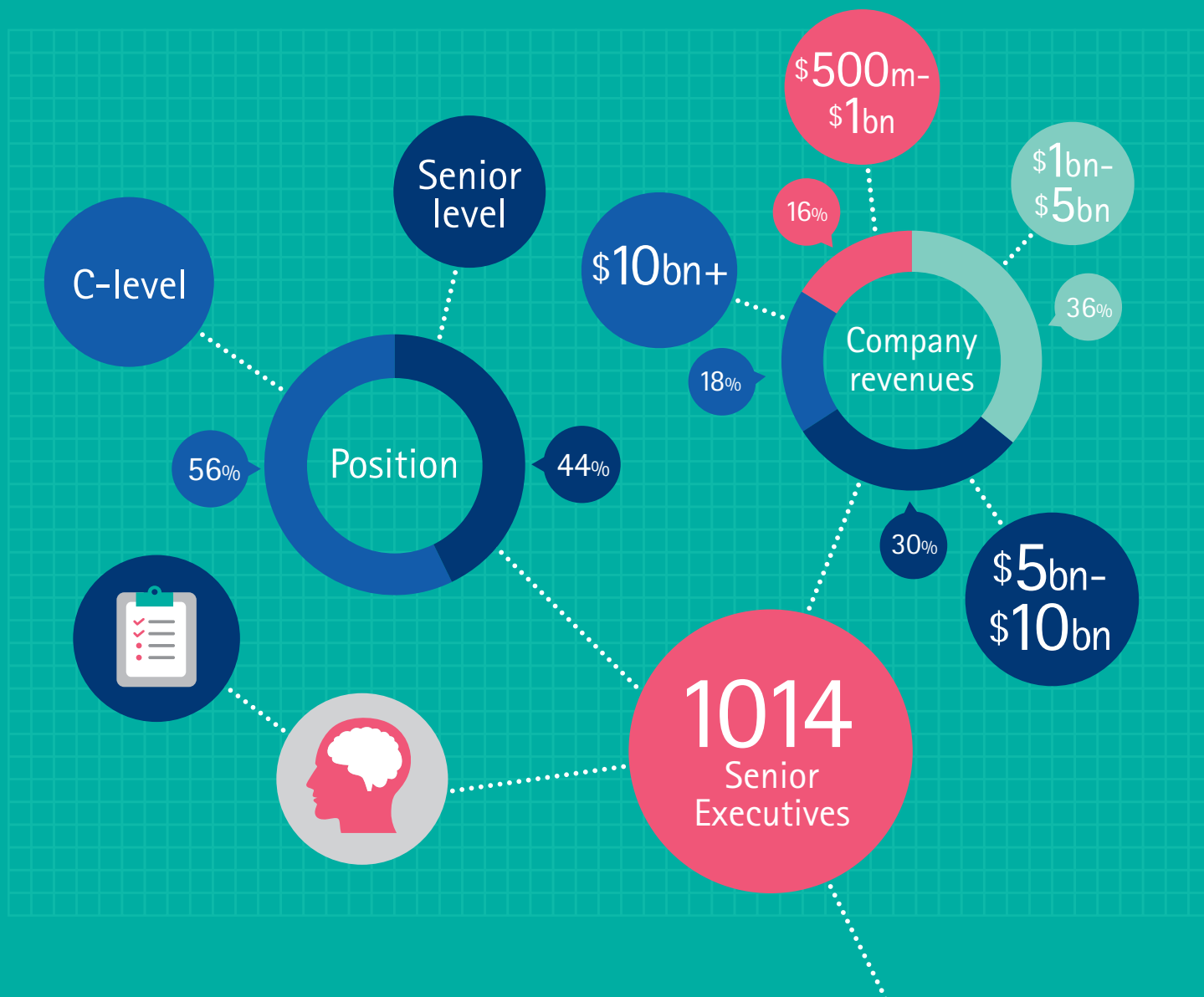


Figure 12: Participants' job title

Job Title	Count	Percent
Managing Director, Senior Director or Director of Supply Chain, Procurement, Operations or Sourcing	273	26%
Chief Supply Chain Officer	202	20%
Executive Vice President, Senior Vice President or Vice President of Supply Chain, Procurement, Operations or Sourcing	169	17%
Chief Operating Officer	140	14%
Chief Procurement Officer	111	11%
Chief Operations Officer	103	10%
Chief Sourcing Officer	16	2%
Total	1014	100%

Figure 13: Participating companies' annual revenue (USD)

Annual Revenue (USD)	Count	Percent
More than \$10 billion	183	18%
\$5–\$10 billion	308	30%
\$1–\$5 billion	363	36%
\$500–\$999 million	160	16%
Total	1014	100%

Figure 14: Participating companies' industry

Industry	Count	Percent
Electronics & High Tech	130	13%
Consumer Goods & Services	129	13%
Industrial Equipment	126	12%
Banking	125	12%
Retail	123	12%
Communications	104	10%
Health Providers (Hospitals, Clinics, Government Health Facilities)	82	8%
Energy	76	7%
Chemicals	65	6%
Utilities	51	5%
Other	3	0%
Total	1014	100%

About Accenture

Accenture is a global management consulting, technology services and outsourcing company, with approximately 289,000 people serving clients in more than 120 countries. Combining unparalleled experience, comprehensive capabilities across all industries and business functions, and extensive research on the world's most successful companies, Accenture collaborates with clients to help them become high-performance businesses and governments. The company generated net revenues of US\$28.6 billion for the fiscal year ended Aug. 31, 2013. Its home page is www.accenture.com.

For more information

Additional information and materials from this research initiative are available at www.accenture.com/megatrends. To learn more about how Accenture can help you implement an Operations Strategy that responds to market volatility and improves business outcomes go to www.accenture.com/strategy, or contact:

Mark Pearson
Munich, Germany
mark.h.pearson@accenture.com

Olaf Schatteman
Sydney, Australia
olaf.schatteman@accenture.com

Frode Huse Gjendem
Barcelona, Spain
frode.huse.gjendem@accenture.com

Gary Hanifan
Seattle, Washington, USA
gary.l.hanifan@accenture.com

Pierre Kaltenbach
Paris, France
pierre.f.kaltenbach@accenture.com

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