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Going Big: Why Companies Need to Focus on Operational Analytics

Operational Analytics: A Strategic Priority that Remains Unexploited

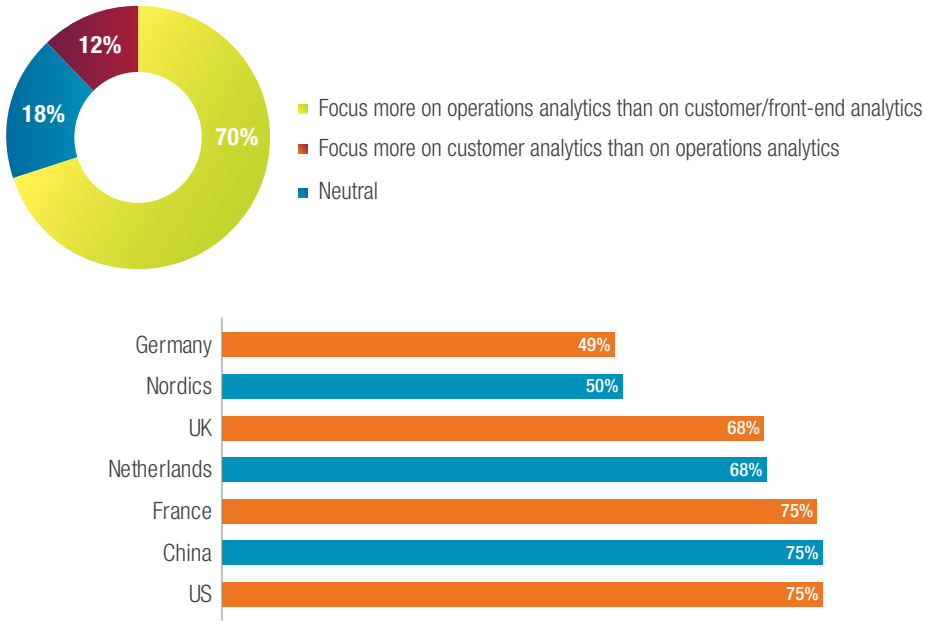
$371bn

The size of the data prize for manufacturing organizations

Given that digitization had such a transformative effect on customer behavior and relationships, it is perhaps not surprising that many organizations focused their digital transformation efforts on the customer experience front-end. However, in the race to focus on the customer, it was all too easy to ignore operations. Our 2013 research with MIT Sloan Management Review found that while 40% of digital initiatives were focused on the customer experience, this dropped to 26% for operations[1].

Times are changing, however. Our latest survey of more than 600 executives from the US, Europe and China[a] finds that over 70% of organizations now put more emphasis on operations than on consumer-focused processes for their analytics initiatives (see Figure 1). Analytics in operations is increasingly seen as a strategic priority for organizations. Over 80% of respondents agreed that analytics in operations plays a pivotal role in driving profits or creating competitive advantage.

Figure 1: Percentage of Companies that Focus More on Operational Analytics than on Customer Analytics



N = 608

Source: Capgemini Consulting and Capgemini Insights & Data

[a] For more details on the research, please refer to the research methodology at the end of the paper

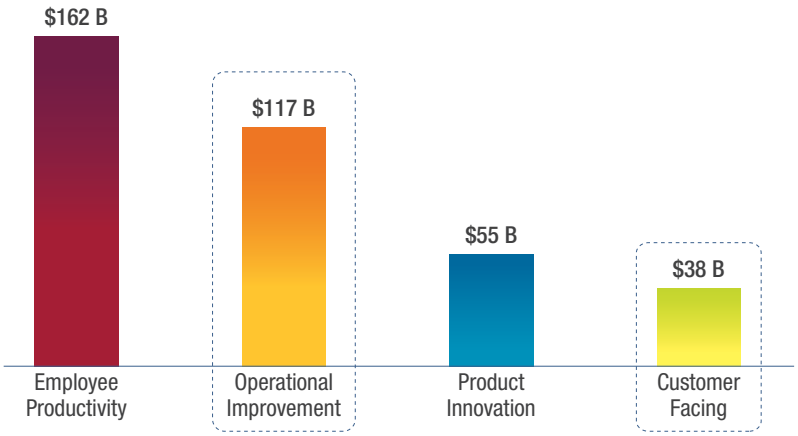
The Size of the Prize Explains the Strategic Shift toward Operations

The importance placed on operations is a result of the size of the prize on offer. Research shows that by utilizing data, manufacturing organizations can realize benefits of up to $371 billion globally (see Figure 2), with a large part of this upside coming from operations. Data-driven operational improvement[2] accounts for $117 billion of the total prize, with consumer-facing processes delivering just $38 billion[3].

The disparity in these benefits cases can perhaps be explained by the sheer spread of improvements that can be delivered from operational analytics: reduced downtime, improved productivity, better capacity utilization, accurate forecasting capability, and higher flexibility in response to external events. Organizations across industries are already reaping the benefits of operational analytics (see Figure 3).

3x Benefits from usage of data in operational improvement vs. front office

Figure 2: Benefits manufacturing companies can generate using data analytics



Source: Technet, "The $371 Billion Opportunity for "Data Smart" Manufacturers", May 2014

Analytics can also have a significant impact on an organization's production process. For example, an Asian steel manufacturer is currently using analytics to transform the efficiency and competitiveness of its 30-year-old business practices. It is using data on process innovation to identify most-critical quality issues and analyze them for root causes. By continually monitoring the process data, the company has been able to identify issues early on and re-engineer the process as required. As a result, it has achieved a 50% reduction in lead time for standard hot coil production and a 60% reduction in inventory[4].

£125 m

Cost savings realized by Network Rail by using analytics

Figure 3: Benefits of Implementing Analytics Initiatives in Operations

Functional Area	Company	Benefits Realized
Procurement	AmBev	▪ Improved inventory turnover rate by 50%
Supply Chain	TESCO	▪ Saved £100 million in annual supply chain costs
Production	Asian Steel Manufacturer	▪ Reduce production lead times and inventory levels by 50% ▪ Reduce scrap ratio from 15% to 1.5%
Asset Maintenance	bp	▪ Saved $200 million in capital expenditure in reduced non-productive asset time

Source: Information Age, "Tesco saves millions with supply chain analytics", April 2013; SAS, "Supply-Chain Analytics: Beyond ERP & SCM"; Tessella, "Tessella helps BP harness drilling data to save millions"

The impact of operational analytics is not confined to improving the efficiency and performance of operational processes. Organizations have started to use these efficiency gains as the underlying basis to also improve the customer experience. For example, Tesco is using analytics for its supply chain processes and has achieved cost savings of £100 million[5]. But the international retailer also uses its supply chain statistical models, which incorporate various external indicators such as weather, to predict customer behavior and to inform how it stocks products. This capability ensures that there is a 97% chance of customers in-store and online being able to buy what they want, significantly improving satisfaction levels[6].

Operational Analytics at Network Rail

Network Rail in the United Kingdom is using analytics to better manage its core rail assets. It uses a solution that brings together data from over 14 asset information systems into a single digital platform, providing a consolidated and consistent view of the asset data. This data insight is combined with an operational model that embeds data capability in the business. For example, Network Rail provides its engineers with critical data through mobile devices, so that they can access it when and where they need it the most. In turn, this insight is allowing Network Rail to make better operational decisions and allows it to undertake preventive track maintenance, resulting in fewer asset faults and failure. Using data to make better decisions, the company has realized cost savings of £125 million over a five-year period.

Source: Capgemini, "Enabling Track Asset Decision Support at Network Rail", 2014

The Future is Bright – and Full of Operations Data

The IoT-led Data Explosion

A typical smart metering project is estimated to involve 500 million meter readings per day[1]. All told, data is projected to grow tenfold from 4.4 trillion gigabytes in 2013 to 44 trillion gigabytes in 2020 and global data production forecast to be 44 times greater in 2020 than it was in 2009[2].

Up in the Sky – Drones

Companies are increasingly using drones for commercial applications, such as inspecting aircraft surfaces or monitoring wind farms. All these applications generate massive amounts of data. Some military drones, for instance, can generate as much as 70 TB of data in a single 14-hour mission[3].

The Rise of Driverless Vehicles

Operating driverless vehicles requires analysis of a massive amount of data, with self-driving cars collecting 10 GB of data per minute[4]. In the mining industry, Rio Tinto has rolled out fully automated truck fleets at two of its iron ore mines in Australia. Sensors attached to the trucks send back data that is then analyzed and processed. According to the company's senior leader: "This autonomous fleet outperforms the manned fleet by an average of 12% and we've also seen a 13% reduction in load and haul costs… We presently collect around one terabyte of data each day, the analysis of which will provide the next business evolution[5]."

1. *Gartner, "Industrial Analytics: The Next Wave of Business Transformation", 2014*
2. *IDC, "The Digital Universe of Opportunities: Rich Data and the Increasing Value of the Internet of Things", April 2014*
3. *InfoQ, "Drone Data Adds a New Horizon for Big Data Analytics", September 2014*
4. *GeekWire, "Ford plows ahead with self-driving vehicle technology", March, 2016*
5. *Rio Tinto – Speech by Chief Executive, Iron Ore, November 2015*

10
Gigabytes/minute Estimate of data collected by self-driving cars

Few Organizations are Succeeding in Seizing the Operational Analytics Prize

While the potential of operational analytics is clear, few organizations are realizing that potential.

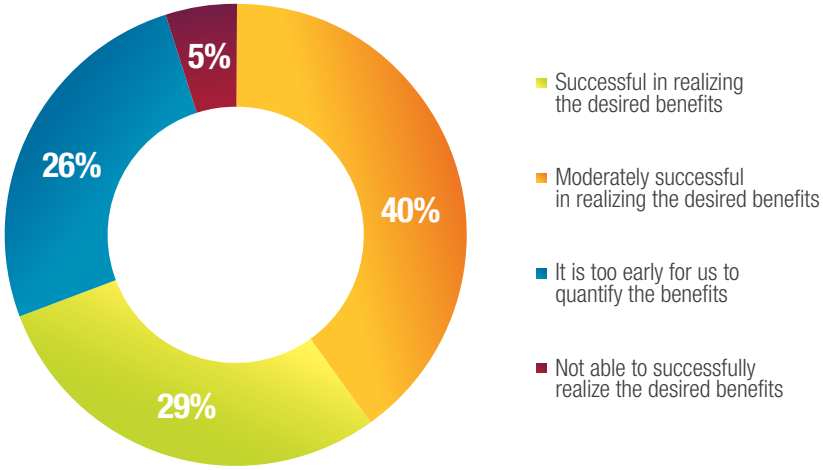
Only 39% of organizations in our survey said they have extensively integrated their operational analytics initiatives with their business processes. In other words, these organizations have gone into full-scale production by implementing analytics throughout their operations. The diversity of datasets and formats as well as poor data quality explain this relatively low level of implementation.

Only 29% said they had successfully achieved the desired objectives from their operational analytics initiatives, with 40% saying that they have achieved only moderate success (see figure 4).

These trends were consistent across geographies and industries.

> ***We are far away from where we want to be in terms of operational analytics.***
>
> Head of supply chain, Global Consumer Goods Company

Figure 4: Percentage of Companies on Achieving Objectives from the Analytics Initiatives in Operations



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Source: Capgemini Consulting and Capgemini Insights & Data

We undertook further analysis of the surveyed companies and we found that only 18% had extensively integrated their analytics initiatives across operations *and* realized their objectives. These companies have implemented analytics initiatives across most business processes and have adopted a data-driven approach towards decision-making. We have named these companies 'Game Changers' (see Figure 5).

Data Mining and Analytics at a Leading Automotive Firm

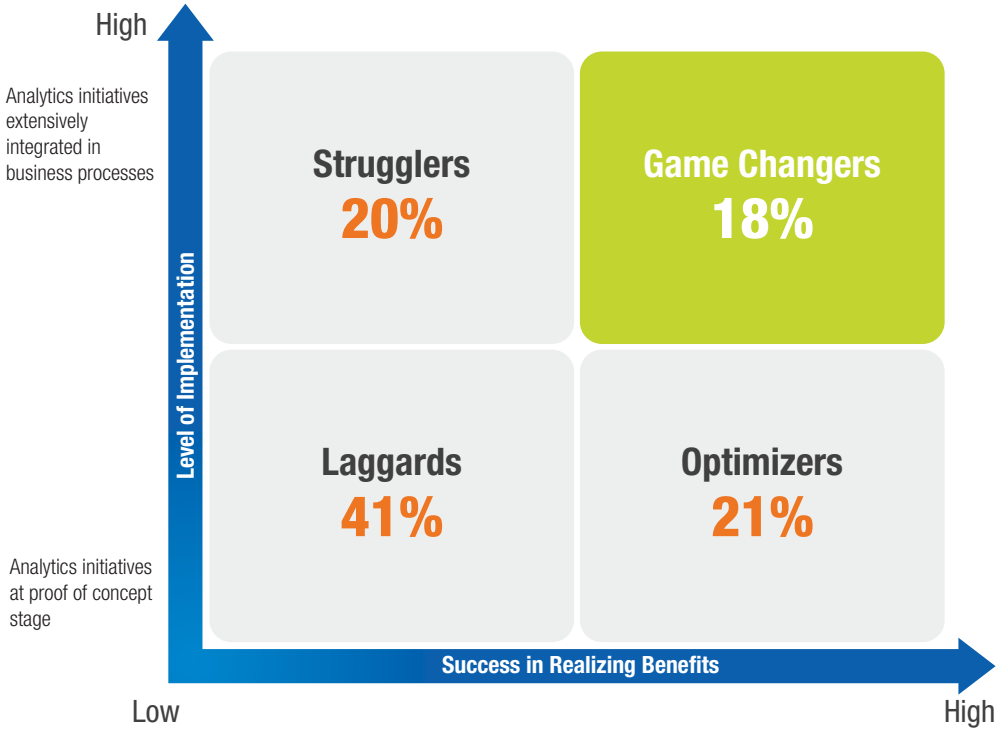
At a leading European automotive firm, around 10,000 cylinder heads are produced per day in a complex production process. The production line generated data but the firm struggled to use the data effectively, failing to identify what quality parameters affected the quality of its cylinder heads and caused delays. The company implemented a data-mining and analytics solution with the clear and strategic aim of maximizing the number of flawlessly produced cylinder heads. This resulted in:

- A 25% increase in productivity
- A 50% reduction in the time taken to ramp up the process to target levels
- The capability to monitor the process in near real time and make agile adjustments

Source: Capgemini Consulting client

18%
companies have deployed analytics initiatives widely across operations and achieved desired objectives

Figure 5: Level of Implementation and Success of Operational Analytics Initiatives



'Laggards' are introducing analytics initiatives in their operations. They have mostly implemented proof of concepts and are struggling to realize benefits from their analytics initiatives..

'Optimizers' have typically realized early benefits from their analytics initiatives in a limited number of areas within their operations .

'Strugglers' have integrated analytics in most of their business processes; however, lag behind in realizing benefits.

'Game Changers' have integrated most of their analytics initiatives with their business processes and have realized the desired benefits from their analytics initiatives.

N=446; Analysis includes only the companies that were able to quantify the benefits from their analytics initiatives in operations
Level of Implementation: Low indicates analytics initiatives are still at Proof of concept stage. High indicates Analytics initiatives are extensively integrated into business operations.
Success in Realizing Benefits: Low indicates firms are not able to realize desired benefits. High indicates firms are highly successful in realizing desired benefits from analytics initiatives.

Source: Capgemini Consulting and Capgemini Insights & Data

The remaining companies we would characterize as follows:

Laggards (41%). These are the significant number of companies that have a low level of integration between analytics initiatives and business processes, or are still running proof of concepts and are unable to get the results they wanted.

Optimizers (21%). These are the companies that have taken the right initial steps. Their level of implementation of operational analytics might be low, but the right approach has enabled them to achieve initial success.

Strugglers (20%). These companies have not enjoyed success despite extensively integrating analytics with their business processes.

Companies in each category possess distinct characteristics, which we discuss in detail in the following sections.

The DNA of Game Changers

43% vs. 11%

'Game Changers' vs. 'Laggards' who have completely integrated datasets

Operational analytics can make organizations more productive and smarter. But achieving this potential rests on a number of key principles: a robust data strategy – focused on making the maximum use of data and making analytics an essential part of the decision-making process in operations (see "What are the 'Game Changers' doing differently?").

A Robust Data Strategy

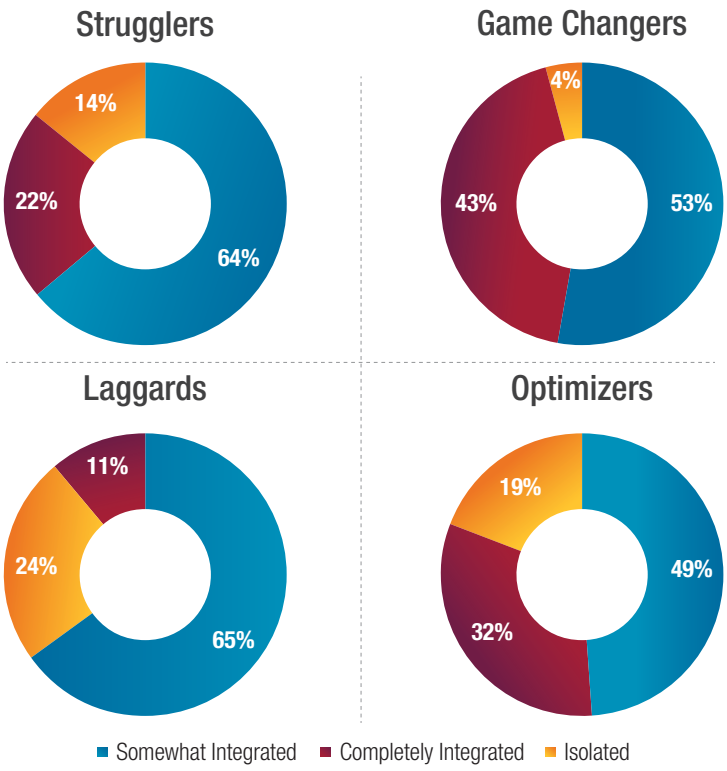
Integration of Data to Achieve a Single View of Operations Data

Leaders in operational analytics integrate their datasets across the organization. Integration of datasets helps organizations operate with a single version of data that is uniformly available, reducing scope for misunderstanding. We found that 43% of 'Game Changers' have completely integrated datasets compared to only 11% of companies classified as 'Laggards' (see Figure 6). Moreover, even in the case of 'Strugglers' only 22% of companies had integrated datasets across operations.

Use of Variety of Data to Enhance Quality of Insights

Successful companies enhance the quality of their operations data by using external and unstructured data. We found that 59% of companies classified as 'Game Changers' routinely collected unstructured data to improve the quality of data. Also, 48% of these companies used external data routinely to enhance insights. For example, at Agilent Technologies, the organization regularly incorporates data from its suppliers from across the globe. By doing this, it has gained visibility of more than 94% of its supply chain[7]. This type of approach is in stark contrast to the 'Laggards' where only 27% and 23% of the companies collected unstructured data and used external data respectively.

Figure 6: Percentage of Companies that have Integrated their Datasets



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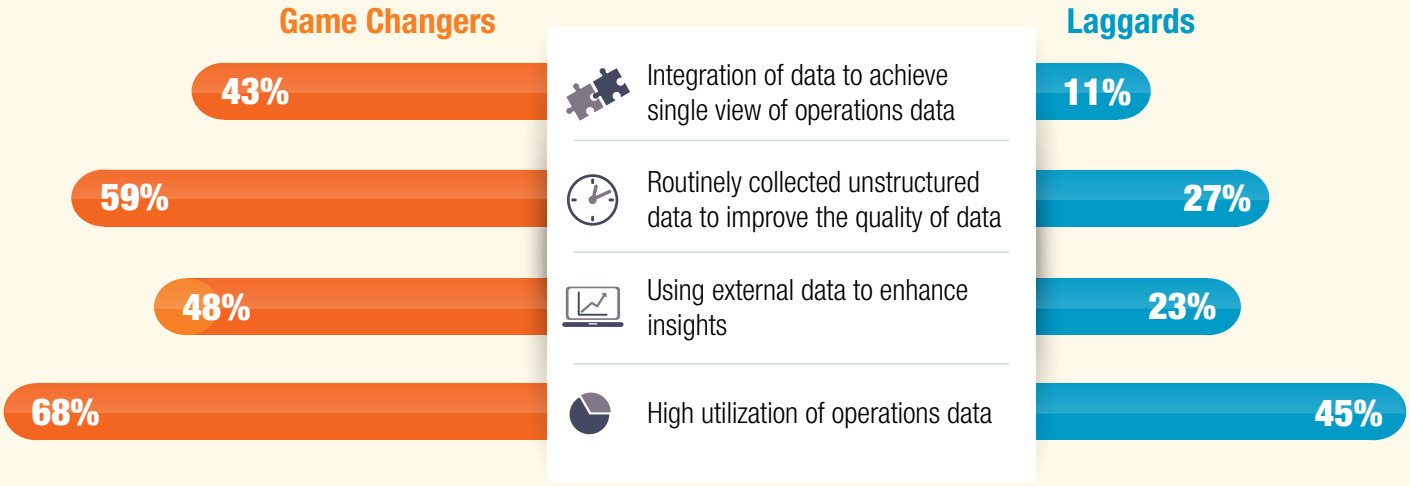
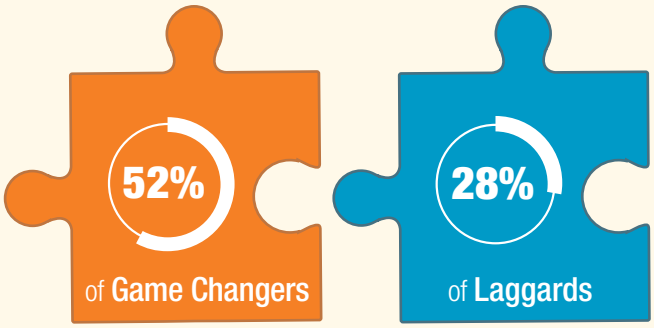
Source: Capgemini Consulting and Capgemini Insights & Data

What are the 'Game Changers' doing differently?

Game Changers have a robust data strategy



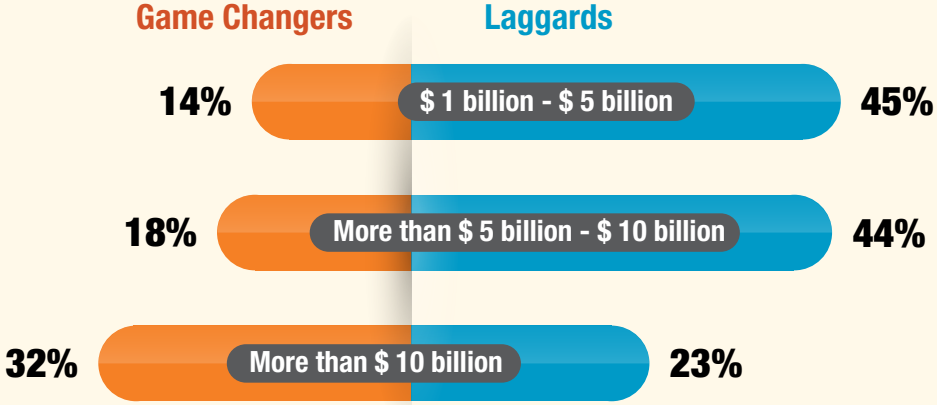
Game Changers have made analytics an essential part of their decision-making process



have made **analytics** an essential component of our **decision-making process** in operations

Companies with higher revenues have realized better success from their operations analytics initiative

Percentage of Companies that are Either 'Game Changers' or 'Laggards', By Revenue Bracket



If we want to improve the quality of the outcome from our analytics initiatives we need to go outside our own bubble.

Supply chain head of a major consumer goods company

Analytics for Improving Manufacturing Results at Intel

Intel has a global network of factories that generate massive amounts of data:

- For instance, each semiconductor 'wafer' is associated with roughly 1 GB of data, and Intel sorts thousands of wafers daily.
- Data also comes in through thousands of sensors on the factory floors.

But the company faced the challenge of collecting and analyzing this data across its global footprint. When the organization's Manufacturing IT Group deployed advanced analytics solutions to integrate and analyze this data, the results were significant:

- One process, which originally took 4 hours, now takes less than 30 seconds.
- Engineers now work on engineering issues rather than having to spend their time finding data.
- By reducing the frequency of parts-replacement stoppages, Intel has experienced less downtime and reduced maintenance costs to the tune of millions of dollars in parts replacement.
- Senior team leaders can focus only on the critical insight. Instead of looking at thousands of graphs, factory leads look only at the top 20.
- Processing more than 5 billion points per day has resulted in measurable improvement in equipment availability and yield improvement.

Source: Intel, "Joining IoT with Advanced Data Analytics to Improve Manufacturing Results," October 2015

High Utilization of Operations Data

Companies successful in gaining benefits from their analytics initiatives in operations utilize a high percentage of their operations data. 68% of companies classified as 'Game Changers' utilize more than 50% of their operations data. On the other hand, the same figure for 'Laggards' stands at 45%.

A Decision-Making Process Based on Analytics

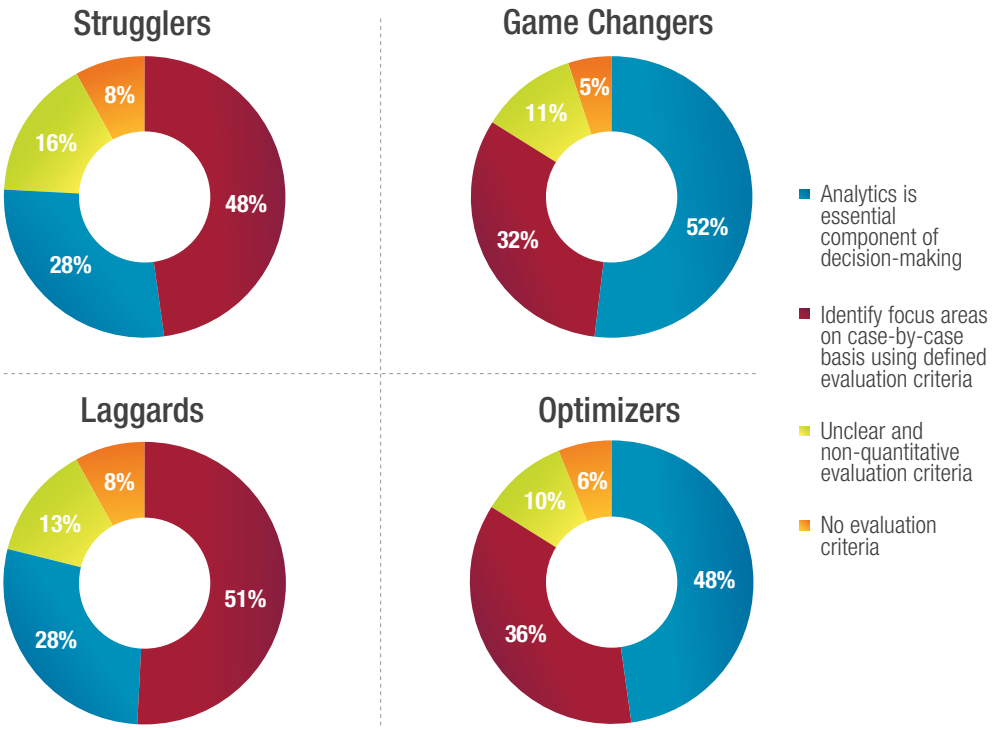
Making analytics an essential part of the decision-making process in operations enables companies to make a more informed choice – increasing the chances of success. We realized that more than half (52%) of 'Game Changers' had integrated analytics in their decision-making process within operations. Interestingly, a high percentage of companies (48%) among 'Optimizers' had also done so, which could explain their early success despite the relatively low level of implementation. However, only 28% of 'Laggards' had their decision-making process based on data or analytics (see Figure 7).

28%
'Laggards' who have their decision-making process based on data analytics

vs.

52% **for Game Changers**

Figure 7: Percentage of companies, across categories, saying that they have made analytics an essential component of their decision-making process



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Source: Capgemini Consulting and Capgemini Insights & Data

Analytics for Production Optimization at Merck

Merck, the global healthcare player, wanted to understand why some vaccines it produced had higher than usual discard rates. So the company began digging into data from a variety of sources: production shop floor, plant equipment service dates, calibration, temperature, pressure and other readings in every plant.

Using advanced analytics, Merck quickly processed data from 16 different sources. The data was aggregated and aligned across common factors such as batch ID, plant equipment ID and time stamp. This data was used to develop and test models to prove or disprove the hypothesis behind low yields. After 15 billion calculations, and more than 5.5 million batch-to-batch comparisons, Merck was able to identify that certain characteristics in the fermentation phase of vaccine production were closely tied to yield. The fermentation traits could then be tested in a lab, before changing the production process once regulatory approvals were secured. Merck is applying the lessons learned to optimize the production of other vaccines.

Source: InformationWeek, "Merck Optimizes Manufacturing With Big Data Analytics", April, 2014

Who are the Game Changers?

17 of the top 20 Big Data companies are hosted in the US

There are leaders in operational analytics across sectors and geographies worldwide. And, as we have seen, companies that are leading in operational analytics are using tools and techniques as a driver of competitive advantage, which is bad news for those organizations that are lagging. For companies around the world, it is important to understand who the leaders are and where they are placed in the four quadrants (see Figure 8).

US Companies have the Early Lead

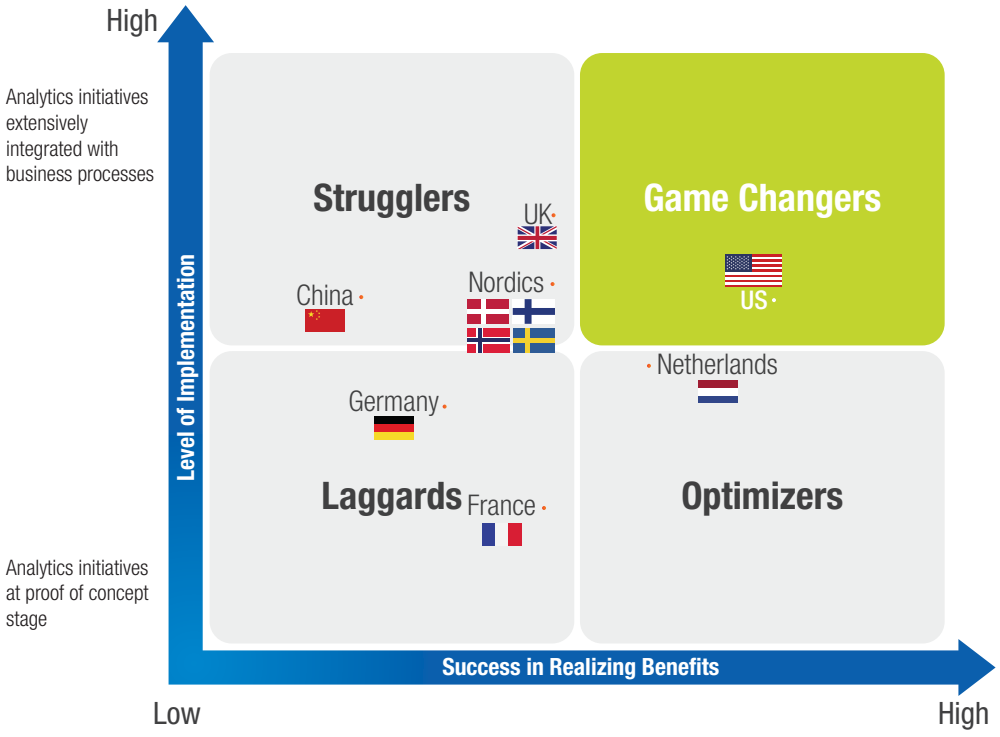
Our survey finds that US companies are the most successful in their operational analytics initiatives as well as the most advanced. This is perhaps not surprising in a country that hosts 17 of the top 20 big data companies[8]. It also helps that the US Government is taking concrete action in this domain. In 2012, they announced a "Big Data Research and Development Initiative" involving six federal agencies, with more than $200 million committed to Big Data investments[9].

We found that 50% of US companies have been successful in realizing the desired benefits from operational analytics. In contrast, only 23% of Chinese players have reported the same level of success. An important point to note in this context is the scale of analytics initiatives themselves. 39% of firms in the US have achieved full-scale production of analytics initiatives, versus 24% in France.

These results also confirm the increasing competitiveness of the US industrial sector, which has driven a recent resurgence in US manufacturing. In the Global Manufacturing Competitiveness Ranking released by the US Council on Competitiveness, the US climbed from #3 in 2013 to #2 in 2015 and is expected to displace China as #1 by 2021[10] (see Figure 9). While there are a range of factors in making a nation competitive, operational analytics leadership is an interesting early indicator of the US progress as it aims to eventually supersede China.

50% of US companies have been successful compared to **23%** in China

Figure 8: How Do Countries Fare in Realizing Success from Operational Analytics Initiatives?



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Source: Capgemini Consulting and Capgemini Insights & Data

2021

The year US is expected to displace China in the global manufacturing competitiveness ranking

Figure 9: Global Competitiveness Rankings, Select Countries, 2013-2021

Source: Compete – US Council on Competitiveness, "2016 Global Manufacturing Competitiveness Index", January 2016

A strong contributing factor of the success of US companies is their focus on setting up effective data and governance processes. 47% of US-based companies have made analytics an integral part of their decision-making process compared to just 28% in Europe.

47%

US companies have made analytics an integral part of their decision-making process compared to just 28% in Europe

How Raytheon Uses Analytics to Improve its Supply Chain

Raytheon, the major American defense contractor and industrial corporation, has made extensive usage of analytics across its supply chain to drive efficiency and reduce costs. "Raytheon's supply chain environment is complex: we're a company of four businesses, 8,000 programs and more than 10,000 suppliers," explains David Wilkins, vice president of contracts and supply chain. "A few years ago, we realized we needed a platform that provided rapid, data-driven decision making across all of these factors. So we developed 'Supplier Insight,' which integrates structured and unstructured data from sources within and outside of the company. We're able to track our suppliers' financial stability and performance on a number of key factors. And, if there's a wildfire, hurricane, or earthquake that may affect our suppliers' ability to provide what we need, we know about it immediately and can make quick decisions that'll reduce any impact to our customers….The data analytics Supplier Insight allows us to better negotiate costs by whittling down our suppliers and engaging in long-term contracts for multiple programs. Are we purchasing materials from Supplier A, B and C that we could get from Supplier A for a better price? Does Supplier C have a critical technology we need, eliminating our need to spend IR&D dollars? These are just a few examples of how data analytics have provided a tremendous benefit to reducing the cost of our programs."

Source: Company website

Analytics for Driving Equipment Utilization at Mines

Joy Global is a leading supplier of advanced equipment and services for the global mining industry. Some years ago it observed that equipment utilization rates at many of its customers' mines were below 50%, but customers continued to ask for new products designed for greater reliability. The company deployed advanced operational analytics solutions at its customers' mines to capture diverse data from all machines and interpret it on a system-wide basis, rather than in silos. By analyzing data from all the equipment in a mine it was possible to identify improvement opportunities and increase equipment utilization as well as reliability.

The results turned out to be extremely robust. Some coal producers increased their equipment utilization rates to as much as 70%. Smart connected equipment and the usage of analytics also helped drive a 65% increase in production. The added bonus was that the analytics solutions also helped predict the formation of roof cavities, which helped prevent roof collapses, a key health and safety hazard in the mining industry.

Source: World Coal Association case study on Joy Global, July 2015

French and German Companies Have Much to Worry About

30% of German companies have achieved their objectives against 50% for US firms

Developed market European powerhouses, such as France and Germany, are falling behind in the adoption of operational analytics.

The View from Germany

Based on our survey, German companies have a number of concerns. In earlier research conducted by Capgemini in 2014, 58% of German companies had implemented or were in the process of doing so in the next 12 months, compared to 84% of US companies[11]. Our current research confirms that Germany is still lagging behind. They feature quite low on the scale of both the level of implementation and success of operational analytics initiatives. Less than 30% of German firms have extensively integrated operational analytics into their business processes compared to 39% of US companies and only 30% have managed to achieve their objectives against 50% in the US. The reasons for their lack of success are not hard to see, once we start looking into some of the contributing factors:

- Use of external data sources is lowest in Germany, with only 16% routinely using external sources against 44% for the UK or 32% for US.
- Only 11% of companies in Germany have completely integrated datasets vs. 27% in US.
- Only 14% of companies have their operational analytics initiatives led by C-level executives against nearly 41% in the UK.
- Also, German companies seem to have the lowest focus on operational analytics – only 43% as compared to 76% in the US.

Seeing Germany in the 'Laggards' quadrant is nevertheless surprising given the German government's commitment to Industry 4.0. It seems that Germany has been mostly focusing on the 'hardware' elements of its Industry 4.0 push; it already has the highest shipments of industrial robotics annually within Europe[12] and is in the top five nations globally in terms of the overall installed base of industrial robots. However, hardware is only part of the solution and Germany needs to up its ante on big data. Addressing that imbalance will be key to Germany's ambitions of becoming the leader in digital manufacturing.

The View from France

French companies need to start paying more attention to analytics initiatives at the highest level. We found that more than one in two operational analytics initiatives at French companies are driven either locally or, at best, at the BU level. In contrast, over 65% of initiatives at US companies

23%
Chinese companies have operational analytics initiatives driven at the C-level against
41% for UK

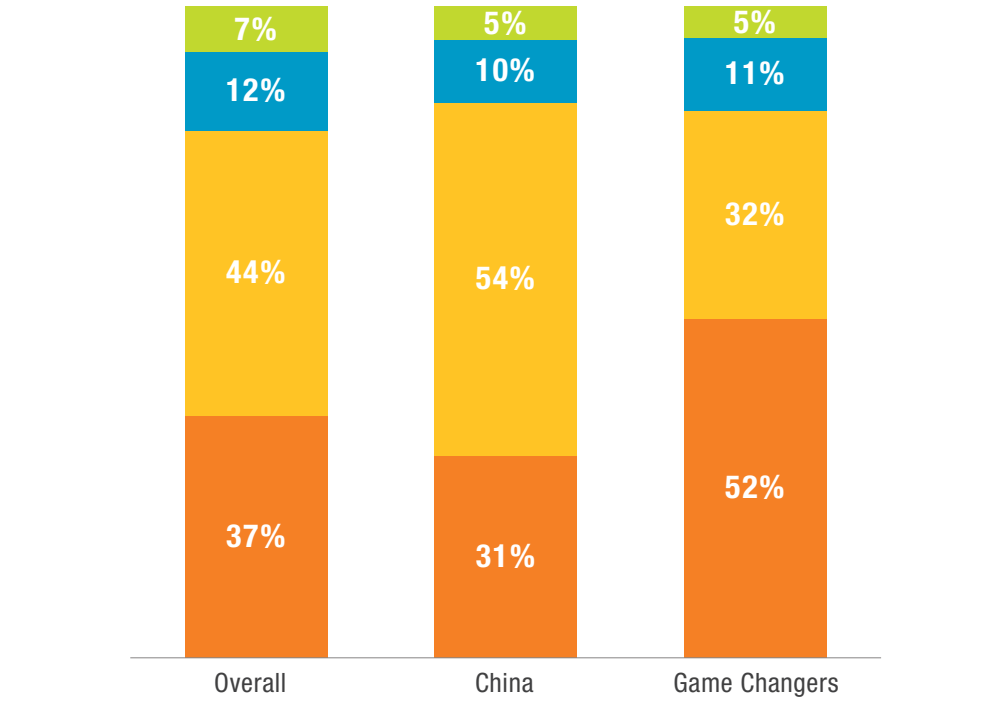
are driven either at the C-level or CxO-1 level. This has direct consequences on the level of success and ambition of French firms: only 34% of French companies have managed to achieve their objectives from operational analytics against 50% in the US; only 24% French firms have been able to extensively integrate operational analytics with their business processes, which is the lowest level among all countries surveyed.

Given France's ranking of 22 in the global competitiveness index, much more needs to be done to ensure operational analytics can play its part in transforming the effectiveness of French manufacturing. The country appears to have taken some conscious actions already. In July 2014, the steering committee driving the "New Industrial France" adopted a big data action plan. The aim of the plan is to help create or retain more than 130,000 jobs in France between 2014 and 2020[13].

Are Chinese Companies Failing to Connect Investment and Implementation with Success?

Chinese companies have been aggressive in adopting operational analytics for some time now. Our earlier research showed that as many as 94% of Chinese respondents said their companies had implemented or were in the process of implementing big data technology, or would do so in the next 12 months[14]. However, this intent has perhaps not been backed up with sound processes. We found that more than half of Chinese companies have not been successful in realizing the desired benefits from their operational analytics. The lack of clear governance models and leadership support also shows through (see Figure 10). Only 31% of Chinese companies have made analytics an essential component of their decision making process. Also, only 23% of Chinese companies have operational analytics initiatives driven at the C-level.

Figure 10: Lack of Governance in Operational Analytics Initiatives in Chinese Companies



Source: Capgemini Consulting and Capgemini Insights & Data

How are the Sectors Placed?

As Figure 11 shows, certain sectors have a clear lead over the others.

Electricity Companies have Leapfrogged Other Sectors

In 2012, our joint research with the MIT Center for Digital Business revealed that utilities were amongst the most pronounced laggards in terms of digital transformation[15]. The sector's companies lagged the industry average when it came to process digitization, the use of analytics in operations or the monitoring of operations.

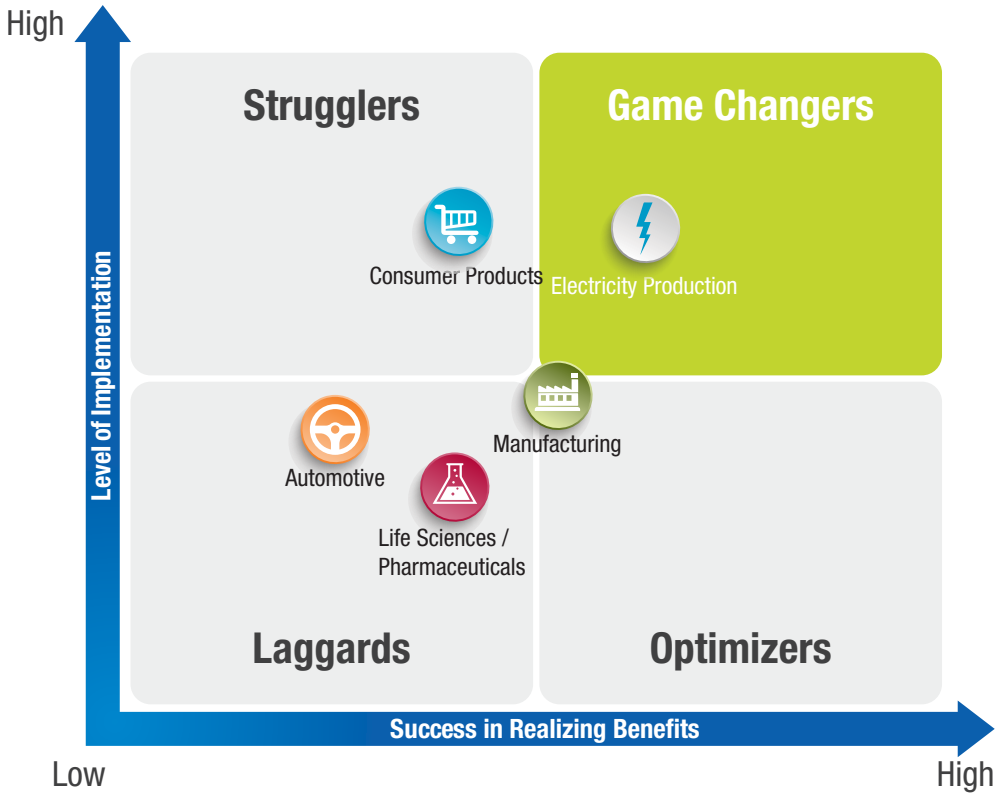
Fast forward to 2016, and we see that utility companies, electricity production companies in particular, have ticked all the right boxes when it comes to achieving success in operational analytics:

- Electricity production, for example, at 37% has the highest percentage of companies that routinely use external data to enhance insights
- Also, 33% of companies in Electricity Production have completely integrated datasets – the highest for any sector
- Nearly one in two firms in the sector have made analytics an essential component of their decision-making process.

1 in 2

electricity production firms have made analytics an essential component of their decision-making process

Figure 11: How do Industry Verticals Fare on Realizing Success from Operational Analytics Initiatives?



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Number of companies across sectors: Electricity production – 83; Automotive – 87; Consumer Products – 89; Life Sciences/ Pharmaceuticals – 91; Manufacturing – 96.

Level of Implementation: Low indicates analytics initiatives are still at Proof of concept stage. High indicates Analytics initiatives are extensively integrated into business operations.

Success in Realizing Benefits: Low indicates firms are not able to realize desired benefits. High indicates firms are highly successful in realizing desired benefits from analytics initiatives.

Source: Capgemini Consulting and Capgemini Insights & Data

The results are telling:

- 45% of firms in the sector have extensively integrated operational analytics with their business processes.
- 47% of electricity production firms are successful in achieving the objectives of analytics initiatives.

This reflects market realities in the sector. The global electricity market today has a wide variety of players and technologies, and customers have a greater choice in power sources and providers. Electricity producers are under immense pressure from consumer groups and politicians to cut down on their tariffs, given the decline in wholesale electricity costs[16]. This subsequently forces organizations to cut costs and be more efficient in their operations. Analytics gives organizations the necessary flexibility to respond.

Automotive Companies Need to Accelerate

One of the big surprises of this survey was the poor positioning of automotive companies. As the market transitions to the era of connected cars and driverless cars, the amount of data that they will generate will only continue to rise. It is estimated that each Jaguar Land Rover car generates 1.5 GB of data each day on average[17]. Analytics capabilities must play a key role in ensuring the industry can leverage these massive amounts of data.

In our earlier research, we found that as many as 80% of engineering organizations (including automotive firms) were at some stage of implementation of analytics technologies[19]. Today, however, that early-mover advantage seems to have fallen away. The survey raises possible reasons. Almost 22% of automotive companies collect only structured data, which is the highest among all the industries. Also they have a high percentage of completely isolated datasets (21%) versus manufacturing at 13%.

> ***If British manufacturing is to survive it needs to be competitive and it cannot be competitive without data***[18]**.**
>
> Executive,
> Jaguar Land Rover

Operational Analytics Initiatives at Irish Power

Irish Power implemented a comprehensive analytics platform to help increase plant reliability and availability. The company installed a condition-based, real-time monitoring solution featuring 141 sensors, and the integrated data from these sensors provides facility operators with a single, consolidated view of plant performance. The data is also helping Irish Power to detect operational anomalies and parts degradation before they turn into serious issues.

Source: Computer Weekly, "GE predictive analytics optimizes Irish Power electricity production", August 2015

Where are the Opportunities?

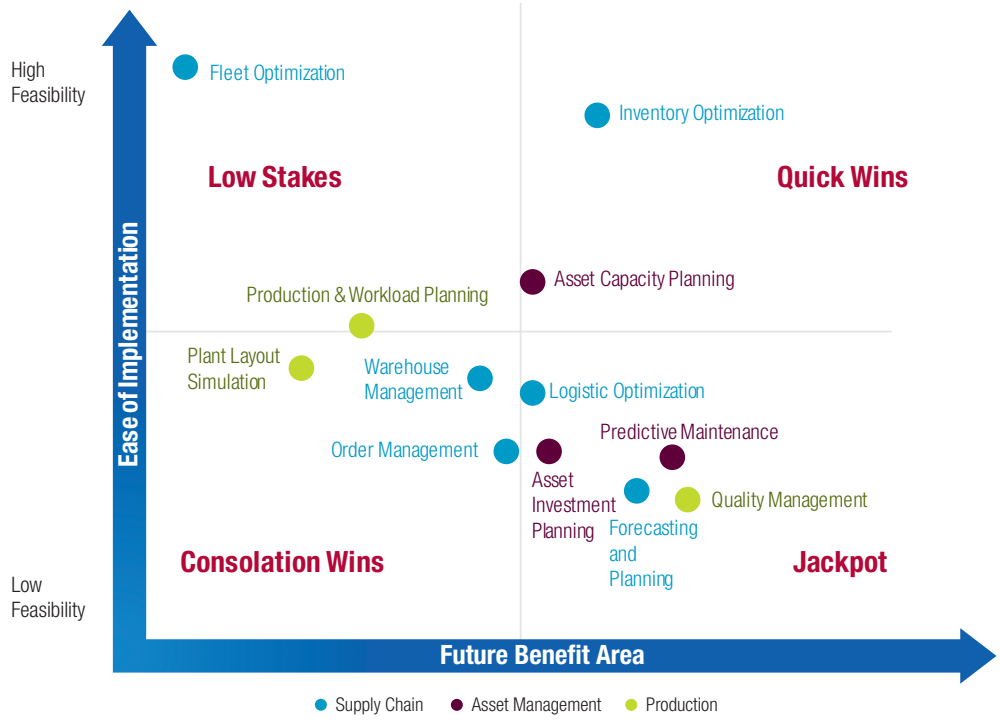
Production Makes the Difference between 'Game Changers' and Others

Two-thirds of Game Changers have secured production benefits, against 41% for Laggards. Production is the key area that will offer a step change for organizations. The number of machines that will be connected to the industrial internet is expected to increase by more than 50 times between 2012 and 2025[20]. Within the production domain, quality management emerges as the function with the most benefits, both current and future. 92% of Game Changers have secured benefits in quality management today and expect to continue to do so in the future (See Figure 12).

Intel, for example, carried out a series of pilots to test production analytics. In one case, the company wanted to reduce the number of units that were incorrectly rejected by automated test equipment. Using analytics, the company was able to predict 90% of potential tester failures, significantly reducing the number of units that were incorrectly rejected. In another example, visual analytics were conducted of units that were of marginal quality, reducing the selection time by a factor of 10 compared with the manual method. These pilots and others helped Intel save $9 million during the pilot phase[21].

50%
reduction in product inventory coverage through analytics at AmBev

Figure 12: Future Benefits and Ease of Implementation of Analytics Initiatives in Different Functional Areas



Source: Capgemini Consulting and Capgemini Insights & Data

[a] *Functional Areas identified – Asset Management, Supply Chain and Production*

Companies are Failing to Seize the Prize Offered by Optimized Asset Management

Use of analytics in asset management offers significant potential. However, companies are largely ignoring this upside. Predictive maintenance, for example, can help companies reduce downtime and maintenance costs. In Abu Dhabi, where power and water demands have increased by 7.5% year-on-year for several years, the Abu Dhabi Water and Electricity Authority (ADWEA) has transitioned to a Smart Utility. As part of that, ADWEA deployed an asset management solution that helped cut maintenance costs by 40%[22]. However, these sorts of successes are few and far between. Even 'Game Changers' are failing to drive benefits: only 46% have realized a high level of success in asset management, as compared to 70% in supply chain. Not only this, only 69% of companies see asset management as a future benefit area; compared to 74% in supply chain.

The high complexity associated with implementation of analytics initiatives at large scale might explain companies' failure in realizing benefits and disillusionment in the future with asset management. Predictive maintenance is a good example, as results are highly dependent on the quality of the data coming from the machines and on the sample of machines connected. Achieving success means connecting all machines with sensors, mapping and sharing data with proprietary protocols onto an analytics platform to derive good predictions.

Supply Chain Continues to Offer Immense Benefits

Over 67% of 'Game Changers' are already achieving significant analytics benefits in Supply Chain. For example, AmBev - Latin America's largest beverage company - has cut product inventory coverage rates from 14-15 days to 7-8 days by using demand forecasting and planning[23].

Kimberley-Clark also used data analytics to gain better visibility into real-time demand trends. This enabled Kimberley-Clark to make and store only the required amount of inventory needed to replace what consumers actually purchased, instead of manufacturing based on forecasts from historical data. By utilizing a wide variety of data, and coming up with new metrics, Kimberly-Clark has seen a reduction in forecast errors of as much as 35% for a one-week planning horizon and 20% for a two-week horizon. Reduction in forecast errors translated into one to three days less safety stock. More accurate forecasts and the corresponding reductions in safety stock have helped Kimberly-Clark reduce its finished-goods inventory by 19% in 18 months[24].

The opportunities for future benefits in supply chain continue to be strong. In fact, a vast majority of companies –74% – believe that supply chain will continue to deliver significant benefits in the future as well.

How Can Organizations Walk the Talk?

The critical success factor is to have a sponsor who is actively engaged in the process and has the mandate to implement analytics insight into the organization.

Business Intelligence and Operational Analytics Lead, resources company

For many organizations, there is a long journey ahead when it comes to achieving significant success with operational analytics. While the roadmap to success will vary depending on where an organization lies in its maturity curve (a tool at the end of this report allows companies to perform a self-assessment), there are a range of factors that are critical:

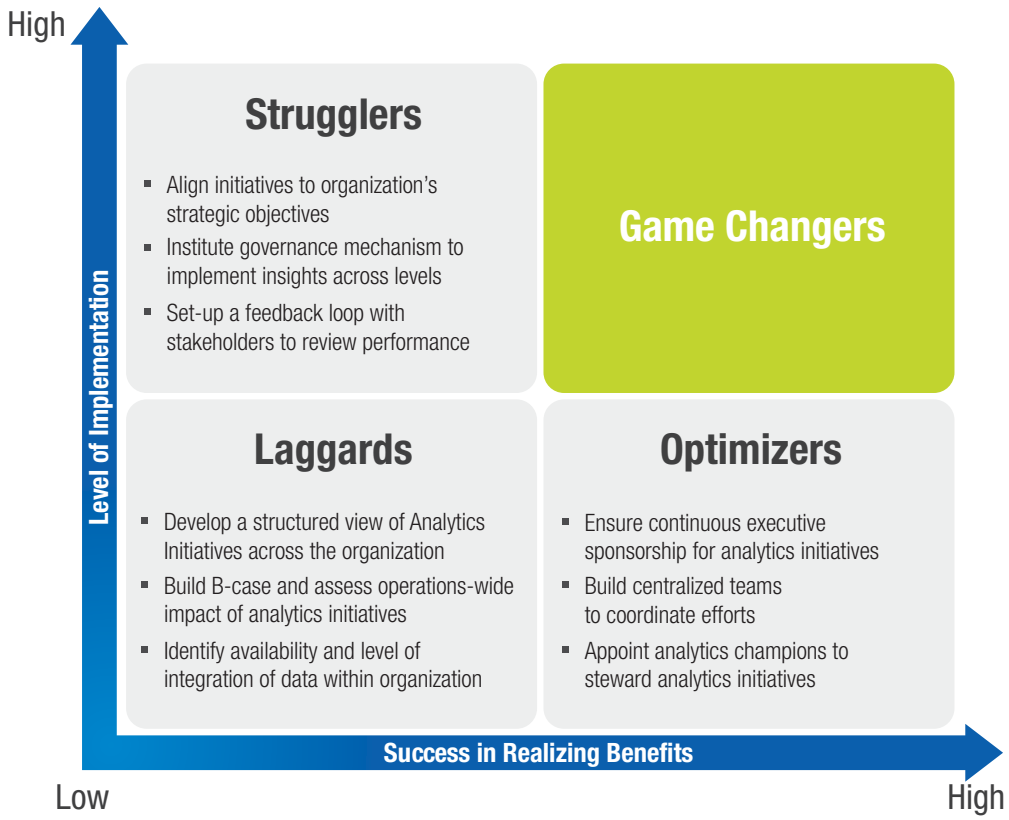
Ensure a Sustained Senior Management Push throughout the Operational Analytics Lifecycle

The involvement of a senior sponsor encourages a focus on generating actionable insights, ensures the initiative is aligned with strategic goals, and allows for faster and better integration of analytics initiatives across functional areas. Our research indicates that, as analytics is gradually integrated into business operations, it creates a momentum that increases the success rate of ensuing initiatives.

Set Up Operations-wide Centralized Teams to Coordinate Analytics Efforts

The biggest business challenge (cited by 59% of respondents in our survey), was ineffective collaboration across analytics initiatives in different functional areas. Centralized teams help organizations generate an overarching view of the impact and benefits of analytics initiatives. They also ensure organizations make best use of data sitting across different locations, share best practices, and tap synergies from analytics initiatives being implemented in other parts of operations.

Figure13: Operational Analytics Transformation Path



Source: Capgemini Consulting and Capgemini Insights & Data

Develop an Effective Implementation Framework to Disseminate Insight across Different Levels

An analytics initiative will only be as successful as an organization's ability to translate the insights generated into programs that deliver tangible returns. Organizations need to develop an implementation framework that lets them regularly evaluate the impact of data-driven insights on different business processes at many levels. It also should give the organization the room to step back and re-engineer its existing processes if required.

Transformation Paths for Different Types of Players

The journey to achieve benefits from analytics initiatives in operations differs for different companies. Organizations need to take specific steps that address their current state and help them make the transition to become 'Game Changers' (see Figure 13).

The insert below mentions the most important steps that companies from various categories – Laggards, Strugglers and Optimizers – should focus on to maximize results from their analytics initiatives in operations.

Getting Operational Analytics Right

Laggards	**Getting the Basics Right is Key for Laggards.** Laggards should focus on building a structured and overarching view of their operational analytics initiatives. They should begin by focusing on developing the business case for every area that would profit from analytics, ensuring they have clear performance indicators to maximize returns. They also need to identify the level of integration in their operations data, ensuring they have access to the right kind of data at the right time and integrate operations data with external or unstructured data to improve the quality of the datasets and subsequently the insights.
Optimizers	**Optimizers Need to Focus on Building Strong Governance Mechanisms.** Optimizers should focus on ensuring continuous sponsorship from senior management to push the analytics agenda through the initial phase. The involvement of a sponsor helps maintain the focus on actionable insights aligns initiative to strategic goals and allows for swifter and higher integration of analytics initiatives across functional areas within operations. Also, the initial success they enjoy from a relatively low level of implementation should not hold them back from setting up centralized teams that can disseminate best practices and coordinate their analytics efforts. Centralized teams give organizations an overarching view of the impact or benefits of analytics initiatives. They also ensure organizations utilize data from across different locations, share best practices, and tap synergies from different analytics initiatives. All these efforts should be underpinned by a parallel program in which analytics champions (at BU or functional area-level) steward the analytics initiatives within operations. This also helps in clearly communicating the strategic importance of analytics initiatives.
Strugglers	**Strugglers Should Prioritize and Align Goals of Analytics Initiatives.** Strugglers should begin by aligning their analytics initiatives to their organization's strategic objectives and develop the right governance structures. Achieving success from analytics also depends on how successfully organizations are able to translate the insights generated into programs and projects that deliver tangible returns. It is imperative, therefore, that they disseminate insights across different levels of the operations hierarchy. This should be complemented by a mechanism that allows for continuous performance evaluation and incorporates feedback from stakeholders. It should also give the organization the room to step back and re-engineer its existing processes if required.

Keeping Abreast with the Analytics Startup Ecosystem

We highlight a few startups that are operating in the industrial analytics space, each with their own unique perspective and take on drawing insights from data.

Company Name	Location	Description
BRAIN CUBE	Issoire, France	Manufacturing intelligence platform, supporting the steering and optimization of production processes
elementum	Mountain View	Software to manage end-to-end supply chain with cloud apps that simplify monitoring, logistics, risk management and collaboration
UPTAKE	Chicago	An industrial analytics firm aiming to improve uptime, minimize failures, reduce fuel costs and streamline operations
WI-NEXT THE INDUSTRIAL EDGEWARE	Palo Alto	A provider of software and hardware solutions for collecting and analyzing data from industrial machines
C3 IoT	Redwood City	A provider of full-stack IoT solutions aimed at gathering, analyzing and generating actionable insights from industrial data
MAANA	Palo Alto	Analytics platform for operationalizing Big Data insights
Ayla	Santa Clara	IoT platform to enable companies to connect any device to the cloud and make meaningful decisions from their data
SIGHT MACHINE Manufacturing Analytics	San Francisco	Analytics for transforming manufacturing to digital manufacturing
mnubo making objects smart	Montreal	An IoT analytics company working across sectors
WORLD SENSING	London	Data monitoring solutions across a range of industries
PLANET OS	Sunnyvale	A platform for collecting and storing data from a variety of sources
Preferred Networks	Tokyo	A company that aims to apply real-time machine learning technologies to new IoT applications

Source: Capgemini Consulting and Capgemini Insights & Data

Conclusion

Big Data has the potential to transform the operating effectiveness of organizations – separating the world into data-enabled leaders and those who are struggling to respond. By making the most of their operational data, organizations can make better decisions, bring their products and services to market more quickly and efficiently, and gain the intelligence and insight to compete in a volatile and complex economic environment. From transforming ways of working, to supporting growth strategy, operational analytics is the big untapped prize of digital transformation. All organizations need to understand where they currently stand, what they can learn from the leaders in this field and begin planning their transformation journey. These capabilities are now central to how organizations – and countries – can outperform their competition.

How Mature are You in Realizing Benefits from Operational Analytics? Take Our Self-Assessment

To what extent do you agree or disagree with the following statements:	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree	Score 1 to 6
Focus on Operations Analytics							
We focus majority of analytics initiatives to optimize operations than consumer-facing processes	1	2	3	4	5	6	
We believe that analytics can play a pivotal/an important role in driving profits/ creating competitive advantage for the organization	1	2	3	4	5	6	
Practices: Identifying Focus Areas							
We have extensively integrated analytics initiatives in our business operations	1	2	3	4	5	6	
We have made analytics an essential component of our decision-making process in operations	1	2	3	4	5	6	
Practices: Utilizing Operations Data							
We have been able to utilize a large percentage (more than 50%) of the data collected within operations	1	2	3	4	5	6	
We have completely integrated datasets, from both internal and external sources, across the entire organization	1	2	3	4	5	6	
We have full knowledge of our portfolio of datasets and actively ensure that we routinely use insights generated across the business to enhance the outcome of our analytics initiatives	1	2	3	4	5	6	
We enhance the quality of data by routinely collecting unstructured data along with structured data	1	2	3	4	5	6	
We routinely use external data sources to enhance insights	1	2	3	4	5	6	

To what extent do you agree or disagree with the following statements:	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree	Score 1 to 6
Governance Structures							
Before starting any operations analytics initiative, we secure sponsorship from senior management	1	2	3	4	5	6	
We develop a clear business case, taking into account external factors and the operations/organization-wide impact of the analytics initiative	1	2	3	4	5	6	
We have centralized teams that coordinate implementation of operations analytics	1	2	3	4	5	6	
We have a robust mechanism to regularly evaluate performance of analytics initiatives	1	2	3	4	5	6	
We are highly flexible in designing and implementing new operational processes based on the generated insights	1	2	3	4	5	6	
We have an effective mechanism to disseminate insights to key decision-makers for swift implementation/change management	1	2	3	4	5	6	
Technology Experience							
We have transformed our legacy systems such as ERP or legacy data warehouse to process and analyze data collected in operations	1	2	3	4	5	6	
We have the right tools and technology for making optimum use from operations data	1	2	3	4	5	6	
We have been able to successfully integrate operations data with various types of data such as unstructured data or external data	1	2	3	4	5	6	
We ensure a common protocol for machine data	1	2	3	4	5	6	
We have been able to gather proprietary information (or first-hand data) from machines to a large extent	1	2	3	4	5	6	
Our operations division is technologically mature, resulting in recording of operations data with minimum error	1	2	3	4	5	6	
Digital Skills							
We have sufficient analytics talent to cater to your needs for operations analytics	1	2	3	4	5	6	
Our operations leadership has sufficient representation of people that is proficient in analytics	1	2	3	4	5	6	
Our organizational culture puts a premium on data-based decision making	1	2	3	4	5	6	

Overall Score Legend:

More than 124 : Game Changers – You are doing everything right to successfully realizing benefits from your operational analytics initiatves

More than 100 - Less than 124 : Optimizers – You are taking the right initial steps to benefit from your operational analytics initiatives.

More than 74 - Less than 100 : Strugglers – You have been using analytics initiatives in operations. However, these initiatives lack focus and the right direction; thus hampering the results.

Less than 72 : Laggards – You have been very cautious in implementing analytics initiatives in operations. Also, have been largely unsuccessful in realizing the desired results.

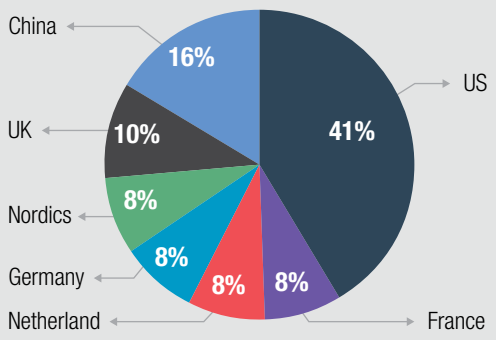
Research Methodology

The research for this study was conducted in the following two phases:

Quantitative Survey of Operation Executives

This phase involved conducting quantitative survey of over 600 operations executives across the US, Europe (UK, France, Germany, Netherlands and Nordics) and China in Q4 2015.

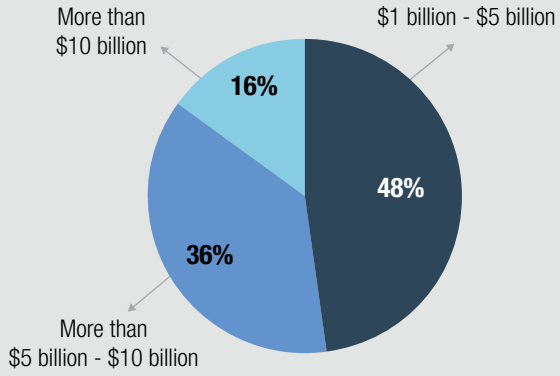
Split of respondents by Region



The executives surveyed in this phase were involved in executing or managing operational analytics initiatives within their organizations. As a part of this survey exercise, we covered the following industry verticals: Manufacturing, Consumer Goods, Electricity Production, Automotive and Life Sciences/Pharmaceuticals.

All organizations which participated in this survey have $1 billion or more in revenues. Organizations were classified into 3 categories: $1 billion - $5 billion, more than $5 billion - $10 billion and more than $10 billion.

Split of respondents by Company Revenues



In-Depth Interviews of Senior Operations Executives

The second phase of the research involved conducting focus discussions with senior operations executives on the topic. The executives interviewed for this phase were either heading operations or specific functional areas or were leading the implementation of operational analytics in their respective organizations.

Split of respondents by Sector

Countries	Manufacturing	Consumer Products	Automotive	Life Sciences/ Pharma	Electricity Production
US	20%	20%	20%	20%	20%
France	20%	20%	22%	20%	20%
Netherlands	20%	20%	15%	24%	22%
Germany	20%	20%	22%	20%	20%
Nordics	20%	20%	20%	20%	20%
UK	25%	23%	18%	17%	17%
China	20%	20%	20%	20%	20%

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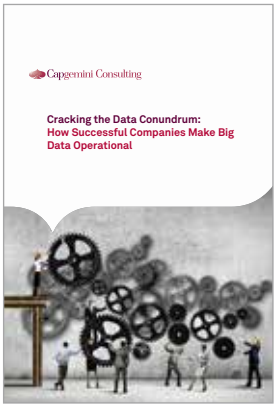

Cracking the Data Conundrum: How Successful Companies Make Big Data Operational

Big Data BlackOut: Are Utilities Powering Up Their Data Analytics?

Stewarding Data: Why Financial Services Firms Need a Chief Data Officer

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About the Authors

Anne-Laure Thieullent
Director, Global Big Data Solutions, Capgemini
annelaure.thieullent@capgemini.com
@ALThieullent

Anne-Laure has been converting data into insights for over 16 years. She currently runs Capgemini's Big Data practice for Europe and is often seen hand-in-hand with some of Capgemini's biggest partners and customers.

Mathieu Colas
Vice President, Capgemini
mathieu.colas@capgemini.com
@ColasM78

Mathieu Colas brings with him exhaustive experience in engineering and management of digital transformation – for companies relying on brick & mortar activities. He also manages a portfolio of active partnerships with innovative start-ups.

Jerome Buvat
Head, Digital Transformation Institute
jerome.buvat@capgemini.com
@jeromebuvat

Jerome is head of Capgemini's Digital Transformation Institute. He is passionate about helping clients understand the digital world and works closely wi industry leaders and academics to help demystify the digital puzzle.

Subrahmanyam KVJ
Senior Manager, Digital Transformation Institute
subrahmanyam.kvj@capgemini.com
@Sub8u

Subrahmanyam is a senior manager at the Digital Transformation Institute. He loves exploring the impact of technology on business and consumer behavior across industries in a world being eaten by software.

Ashish Bisht
Senior Consultant, Digital Transformation Institute
ashish.bisht@capgemini.com
@ashishb1603

Ashish is a senior consultant at the Digital Transformation Institute. He brings with him extensive knowledge of the emerging IoT ecosystem, the associated data and security challenges and loves to work at the intersection of the physical and digital worlds.

Digital Transformation Institute
dti.in@capgemini.com

Digital Transformation Institute – The Digital Transformation Institute represents Capgemini's cutting-edge thinking on all things digital and their impact on the world.

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For more information contact

Global Contacts

Anne-Laure Thieullent
annelaure.thieullent@capgemini.com

Marc Chemin
marc.chemin@capgemini.com

Manuel Sevilla
manuel.sevilla@capgemini.com

Steve Jones
steve.g.jones@capgemini.com

Netherlands
Liesbeth Bout
Liesbeth.bout@capgemini.com

China
Yu Huang
Yu.huang@capgemini.com

Germany
Ingo Finck
Ingo.finck@capgemini.com

France
Laurence Chrétien
Laurence.chretien@capgemini.com

Charlotte Pierron-Perlès
Charlotte.pierron-perles@capgemini.com

India
Manik Seth
Manik.seth@capgemini.com

North America
Ashley Skyrme
Ashley.skyrme@capgemini.com

Norway
Erlend Selmer
Erlend.selmer@capgemini.com

Spain
Jose Ignacio Reboredo Canosa
Ignacio.reboredo@capgemini.com

Sweden
Mats Hovmoller
Mats.hovmoller@capgemini.com

UK
Nigel Lewis
Nigel.b.lewis@capgemini.com

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