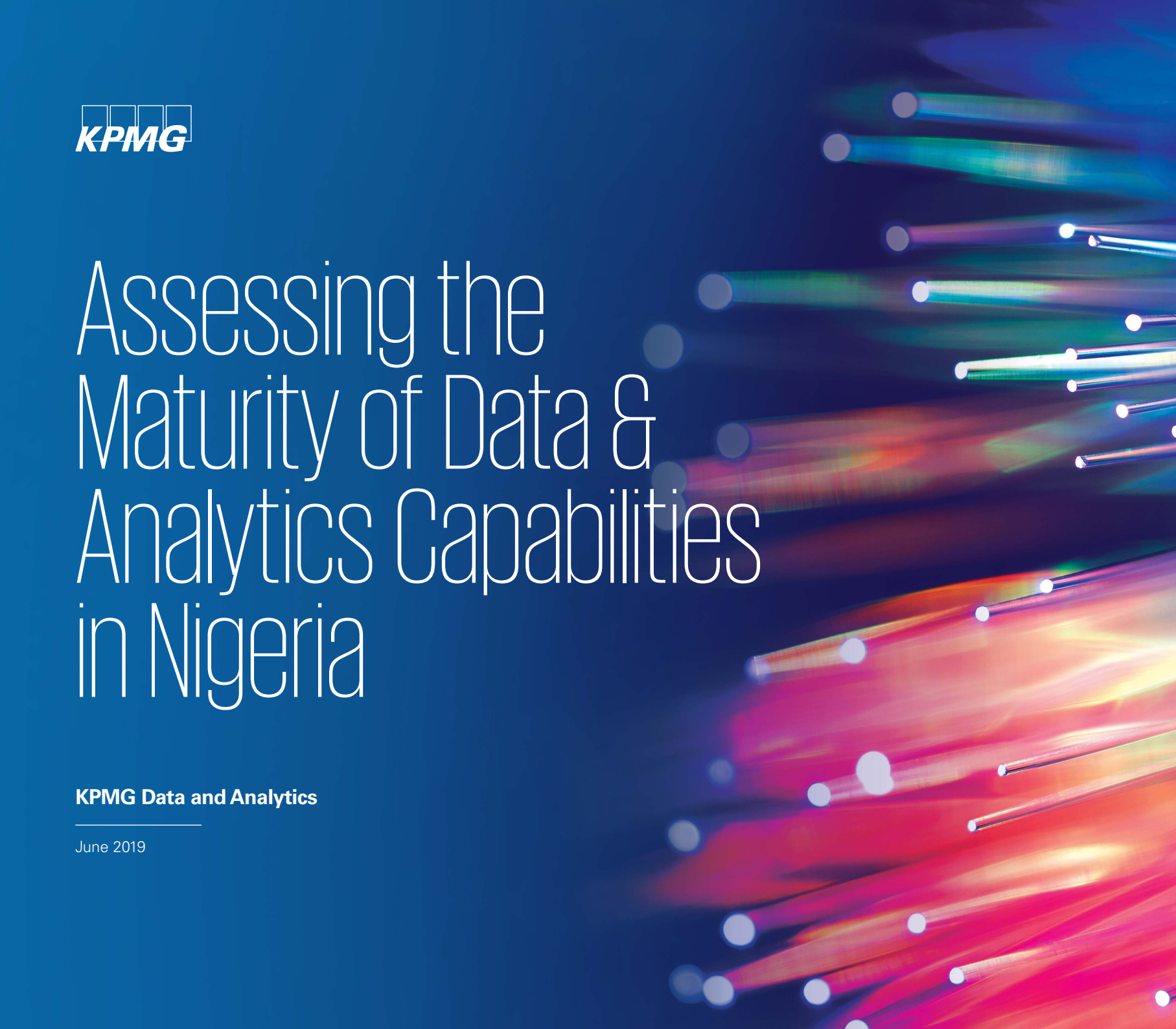


Assessing the Maturity of Data & Analytics Capabilities in Nigeria

KPMG Data and Analytics

June 2019

Foreword

This Report addresses the absence or little presence of Data and Analytics (D&A) in Nigeria. This is the first research in the country that shines the light on this problem. It takes information from over 100 organizations across various areas of the business environment including financial services, consumer markets, energy and natural resources and even the public sector.

This survey is specifically focused on the following objectives:

- Assessing the maturity and positioning of the current D&A practices across industries in Nigeria
- Gauging the depth of D&A skills and challenges in building capacity.
- Highlighting the typical D&A use cases developed by organizations.

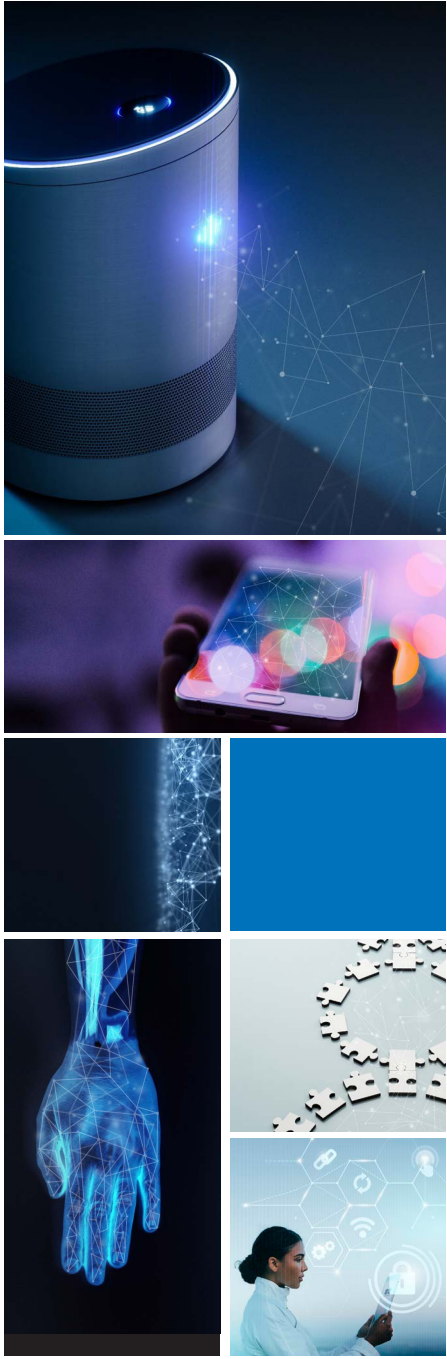
This Report also articulates the KPMG point of view on the maturity of the D&A landscape in Nigeria and its key applications across various parts of business enterprise. It also share KPMG's position on some stay-awake issues of organizations as it relates to data and analytics. Areas covered include:

- Fraud Analytics
- HR in the Analytics age
- Artificial Intelligence and the finance function
- Analytics to build customer relationships in banking

We believe the outcome of this research is a big step towards illumination on the state of data and analytics capabilities in Nigeria. It also has useful guidance for organizations who are interested in building data and analytics capabilities.

Olumide Olayinka
Partner and Lead
Data & Analytics
KPMG in Nigeria

Overview



Executive Summary

Snapshot of Data & Analytics in the Nigerian Market

56%

Of organization based their decision-making on intuition than data

Only 16%

of the organizations have a defined role for their Chief Data Officer. Most of the organizations have assigned all responsibilities of D&A to the Chief Financial Officer

Sales

Is the most common use case planned for investment in the next 18 months

On average, organizations are planning to spend not less than N50 million annually to build D&A capabilities.

4 in 10

Only 4 in 10 Nigerian organizations are interested in using artificial intelligence to enable their decisions and enhance their operational processes.

46%

Of organizations have no data science professional

Executive Summary

Data and Analytics Use Cases

Highlights of Data and Analytics Use Cases

Fraud Analytics and the Four Anchors of Trust	Analytics can be an indispensable tool in the highly complex world of fraud detection. This is especially important considering the huge cost of fraud. Companies that seek to detect fraud can deploy data and analytics to search for anomalous or suspicious transactions. However, successful analytics requires high-quality trusted components. These components include quality of the data components, effective use of the analytics process, established operational controls and ethical integrity of the process
HR in the Analytics Age	Applied properly, HR analytics can show connections, correlations and even causality between HR metrics and other business measures – all of which can be used to inform HR strategy and actions. The HR function can use analytics to transform itself into a strategic partner capable of showing company leadership how well the organization's people programs are aligned with the business strategy and how much value they are adding to the company's results
Artificial Intelligence and the Finance Function	Artificial intelligence has the power to transform the entire finance function as high-skilled analytical jobs are replaced by smart algorithms, learning machines and artificial intelligence. It will be the CFOs who act now and embrace this change – even before seeing its full potential – who are likely to gain most. Those who wait may face mounting costs in upskilling their workforce as they try to close the talent gap.
Fraud Analytics and the Four Anchors of Trust	Analytics have inherent potential to create value and help build trust. Analytics can help create tailored services to customers, detect fraud, assess risk exposure, ensure consistency of service and predict market risks. Analytics have inherent potential to create value and help build trust. Analytics can help create tailored services to customers, detect fraud, assess risk exposure, ensure consistency of service and predict market risks.

Introduction to Data Analytics

Data analytics is the process of thoroughly evaluating raw data with the purpose of drawing insights that remain consistent and meaningful. It goes beyond traditional business intelligence to discover deeper insights, make predictions or generate recommendations

Levels of Analytics

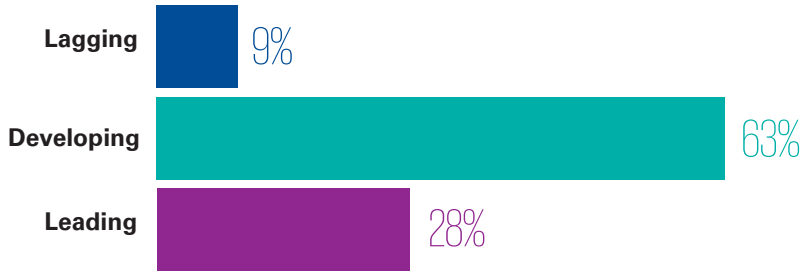
Current State of Data & Analytics in Nigeria

Companies across board are seeking ways to get better in their operations, grow and develop. Nigerian-based businesses organizations are now using Data & Analytics (D&A) to compete and improve their operations. More about the Analytics Use Cases in subsequent sections of this Report.

We asked 162 respondents how they rated their organization's competitive ability in D&A. **28% said they were leading in D&A, 63% said their competitive ability in data & analytics was developing, while 9% considered their organizations to be lagging in D&A capabilities.**

Of all organizations who consider themselves to be industry leaders (top 10%), 45% were seen to be leading in D&A, 53% developing and 1% said they were lagging. We see Data & Analytics as a new source of competitive advantage. It's either you are doing it to survive, or you get left behind. There is no middle-ground.

Further insights revealed 80% of respondents in the financial service industry rated their D&A capabilities as developing. This figures suggest financial services is one of the fastest adopters of D&A capabilities in the Nigerian business landscape. The telecoms industry on the other hand, is currently the most mature when it comes to leveraging D&A capabilities in the Nigerian business landscape. 80% of respondents in this industry rate their organizations as leading. Infrastructure, Government and Healthcare were the slowest adopters of D&A, 20% of respondents rated their organizations as lagging.



Lagging - Behind most organisations in our industry
Developing - Keeping pace with many other organizations in same industry.
Leading - Being ahead of most organizations in same industry.

> " Leveraging Data & Analytics is now a source of competitive advantage. It's either you are doing it to survive, or you get left behind. There is no middle-ground"

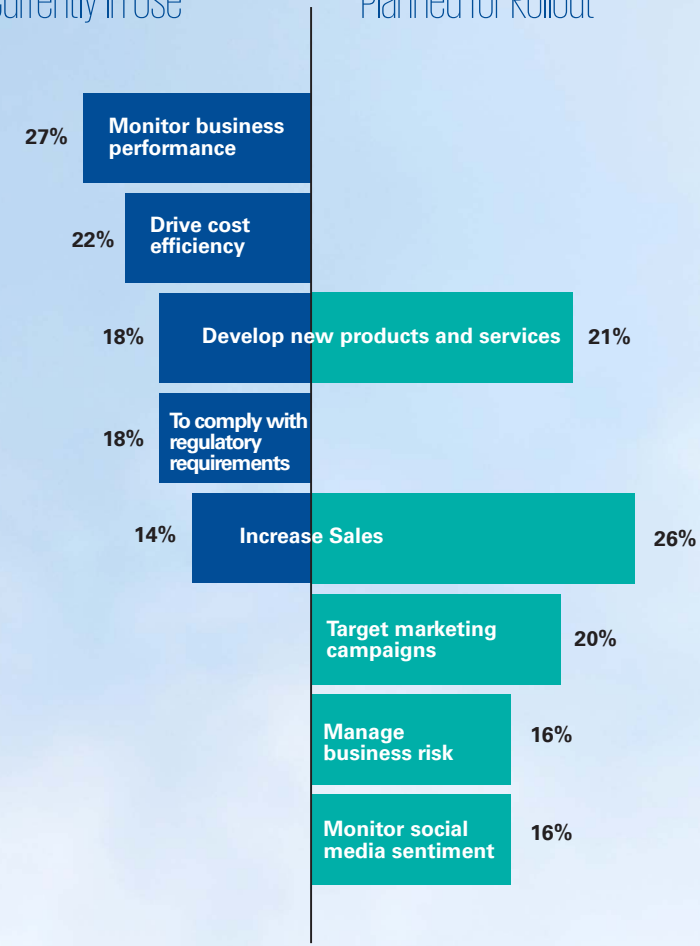
Most Popular Analytics Use Cases in Nigerian Based Businesses

How you currently leveraging D&A in your business?

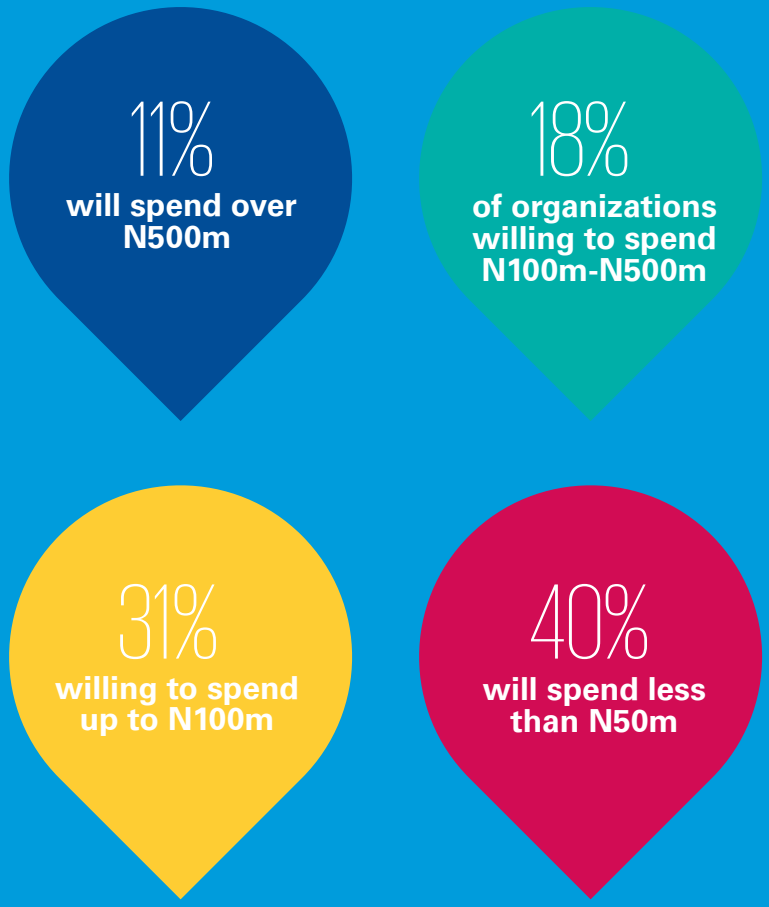
Currently In Use

What are likely areas for investment in D&A within the next 18 months?

Planned for Rollout



Potential Market Spend on Data & Analytics... in the next 3 years



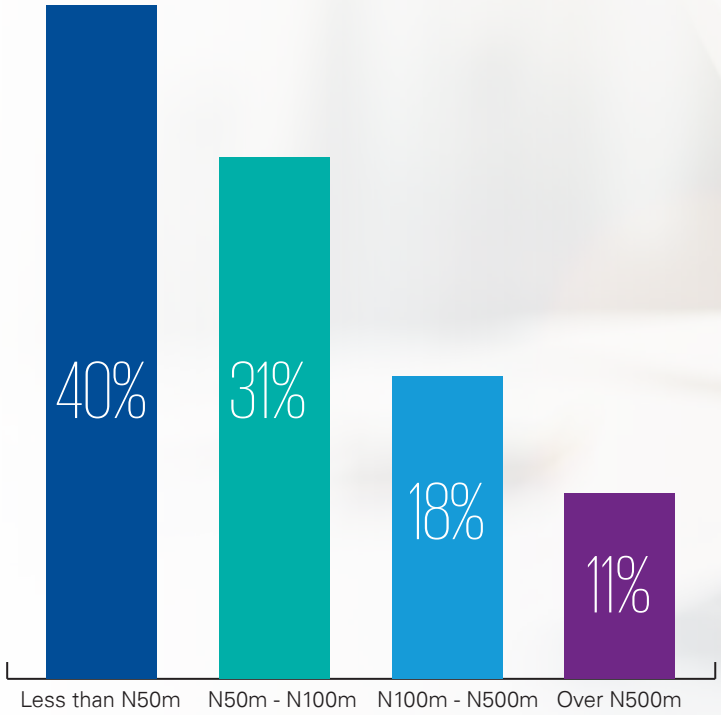
The Industries willing to spend the most were Financial services and Technology, Media and Telecoms.

Top 3 Business Areas likely for investments in D&A :

1. Finance
2. Customer-facing/Marketing
3. Product Development

How much does your organization plan to invest in Data & Analytics capabilites over the next 3 years?

Out of 162 respondents from **42 organizations, 40% said their organization want to invest Less than N50 million naira, 31% are ready to put in between N50m-N100m, 18% said they were looking to invest N100-N500 million and only 11% want to invest over N500million.**



Scale of Investments in Data & Analytics capabilites over the next 3 years?

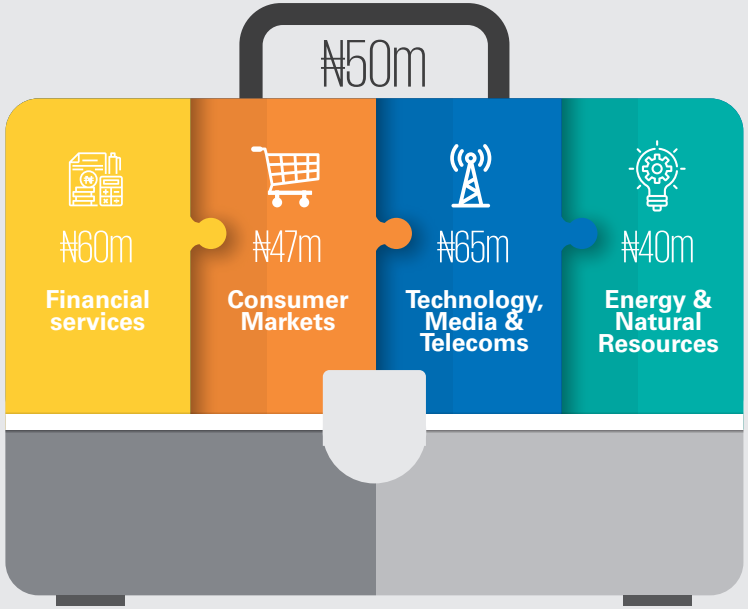
Were there any differences across industries?
The survey revealed by industry the biggest investments in Data & Analytics capabilities were in Financial services and Technology, Media and Telecoms.

In the financial service industry, 41% organizations said they will invest less than N50million. Technology, Media and Telecoms industry had 25% of its organizations wanting to invest over N500million.

The Public Sector however, wasn't as keen to invest in D&A over the coming years. While the respondents acknowledged the need to enhance operations and decision-making, they fear that the slim resources of Government will make foray into a seemingly new area difficult to justify in the face of daunting challenges across many other areas of government responsibilities.

By revenue, organizations with higher revenues want to invest more in D&A capabilities to enhance their revenue potential, increase or maintain market share.

What did asset size say about investments in D&A?
There was no significant relationship between asset size of a business and planned investment in D&A.



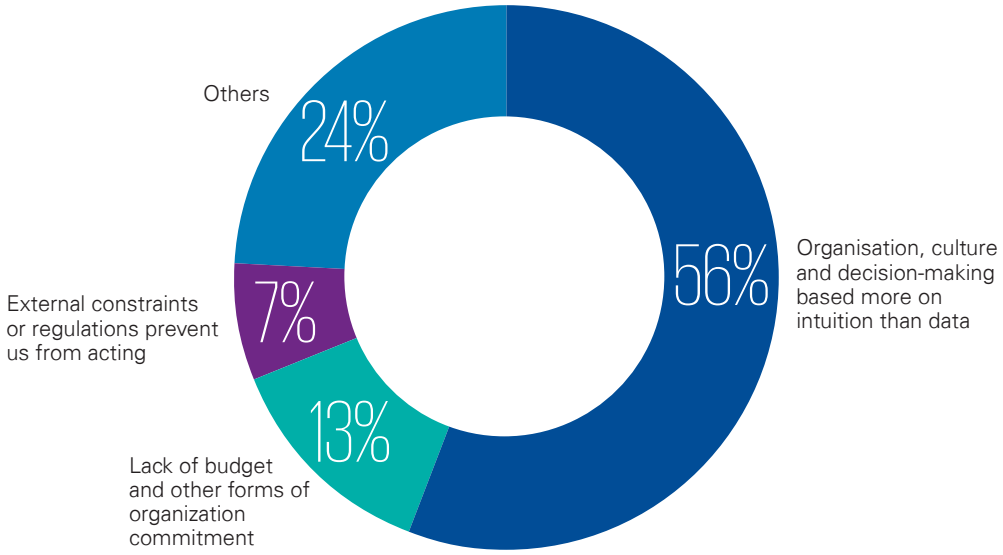
Average annual spend on D&A across business sectors

Building Analytics Capabilities in Nigerian Businesses

What We Found…

Factors hindering adoption of D&A capabilities

56% Of the respondents base their decisions on intuition rather than data.

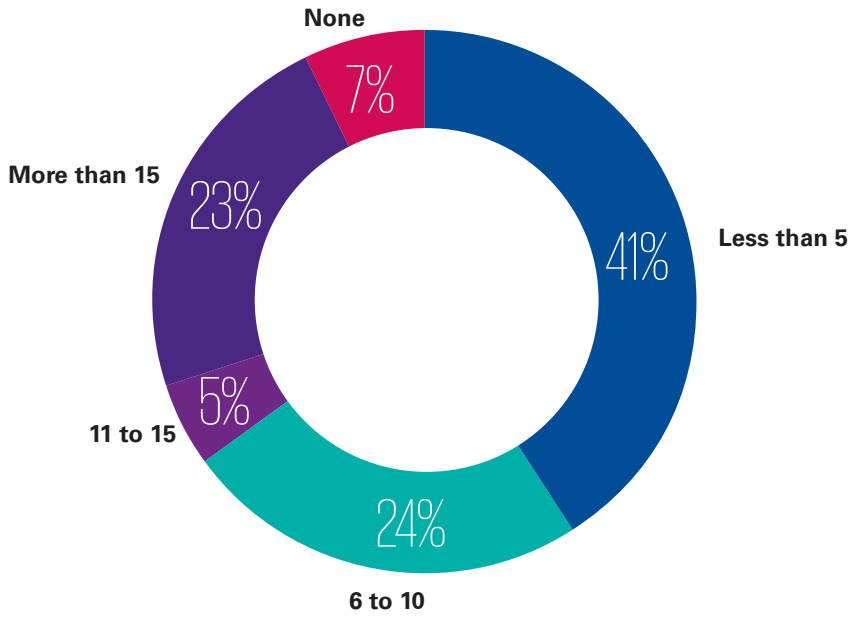


Others include: Lack of data architecture & technology infrastructure and lack of senior leadership support

"In Nigeria today, critical decisions in organizations incorporating data and analytics to their business operations are being driven majorly by their c-level executives who trust their business understanding and years of experience than insights from data. This can be flawed as business strategy change consistently with emerging disruptive technologies. Recruiting senior data and analytics professionals to carry out this key decisions should be high on the organization's board agenda in order to provide senior leadership support at the top level. They should also invest significantly in data architecture and infrastructure to improve efficiency on a sector by sector basis"

Size of D&A Team

41% of the respondents have less than 5 members in their team



In the Nigerian business environment, and particularly in organizations that have started building local D&A capabilities, the average size of the D&A team is about 5 individuals.

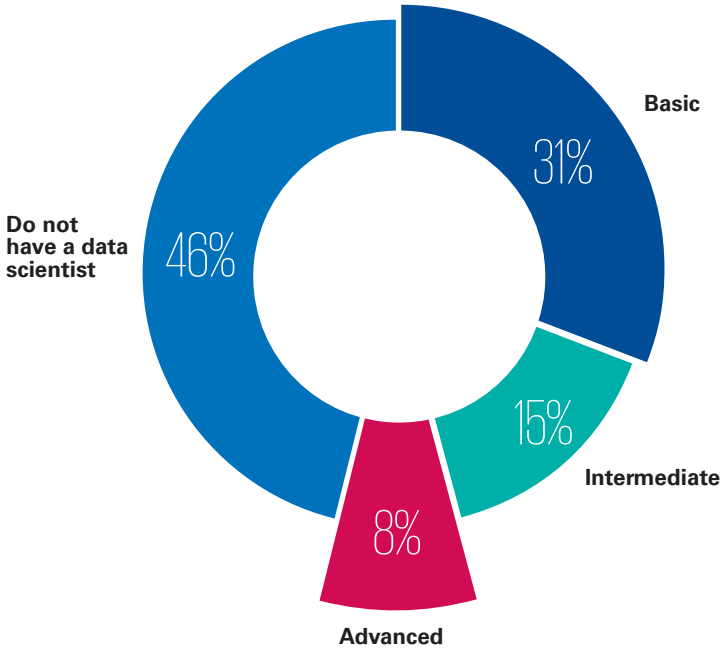
We however, believe that like most parts of a growing organization, the size of the D&A Team of the future will depend on the size of the organization's vision and strategy for D&A, scope of Use Cases and the spread of the Use Cases across various parts of the enterprise.

At full maturity, the Data & Analytics Team could include a diversity of capabilities including:

- Business Analyst
- Data Scientist
- Software Engineer
- Data Engineer
- Visualization Specialists

Data & Analytics competencies across all organizations

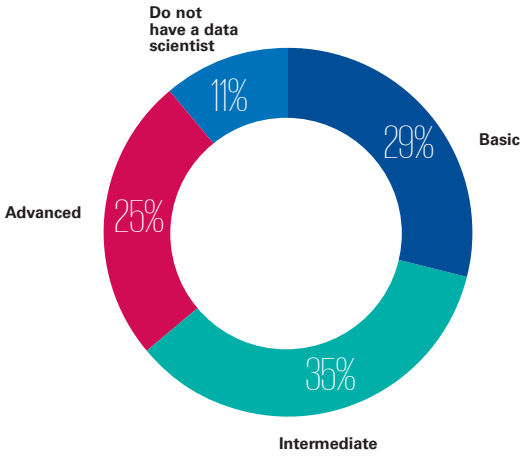
46% of organizations have No data science professional



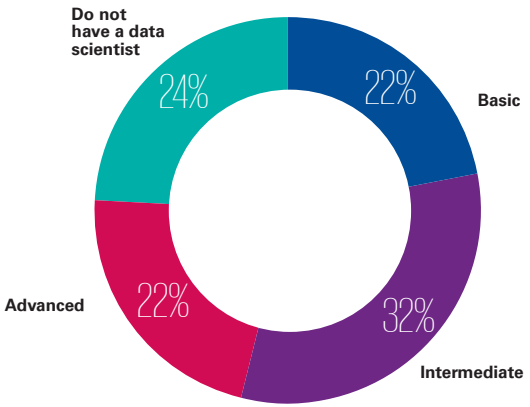
Data scientists are the core of any data and analytics team. Products developed by the team are built on the insights and trends they discover from data. They use programing tools like Python or proprietary tools for data cleaning, data exploration, model building and performance improvement. They work closely with data engineers for data availability and deliver their models to software engineers who integrates them into user applications in a seamless end-to-end workflow.

Data & Analytics competencies across all organizations

11% of organizations have No business analyst



24% of organizations have No data engineer

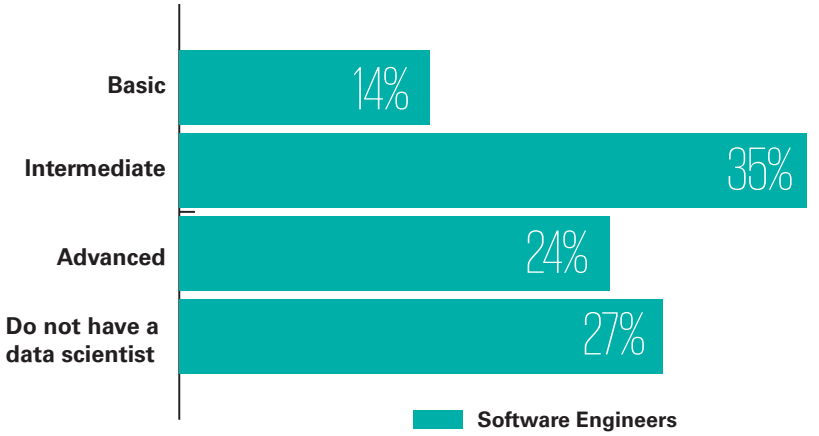


Business Analysts are professionals that understand the performance metrics used across the business and can identify business problems that can be addressed with data and analytics capabilities. They understand the business side of data and analytics applications and work on driving revenue from products developed by the software engineers.

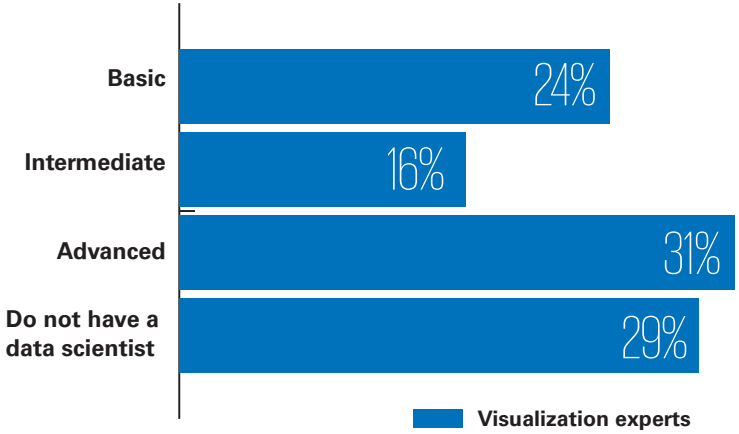
Data Engineers transform data from existing systems. They are familiar with technologies like SQL, Hadoop, Spark. Data extracted by these engineers are made available to data scientists for exploratory data analysis and model building, as well as to the visualization experts for storytelling and visual presentations.

Data & Analytics competencies across all organizations

27% **of the respondents claimed they do not have a software engineer in their organization.**



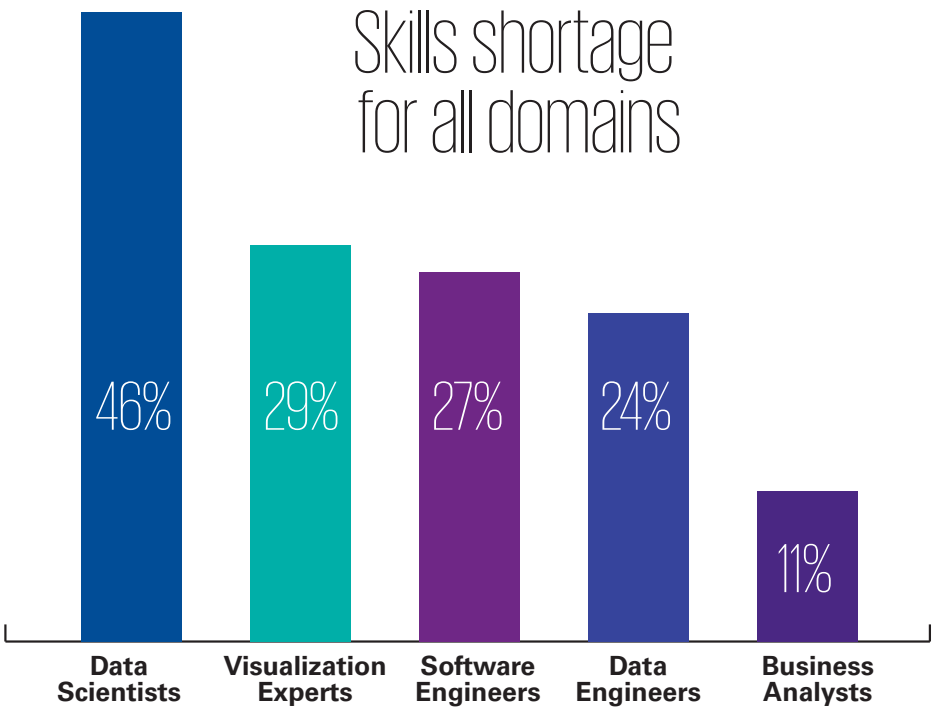
29% **of the respondents claimed they do not have a visualization expert in their organization**



Software Engineers are typically software programmers. They work with object-oriented programming languages and development technologies like Java, JavaScript, C#, C++ and Git. They expose machine learning models built by data scientists as an end-point in web and mobile applications that consumers or clients can use.

Visualization experts are professionals who are skilled in building automated dashboards and creating data visualizations. They are familiar with BI tools like Tableau and Qlik. The data used by these professionals needs to be extracted by a data engineer from existing databases.

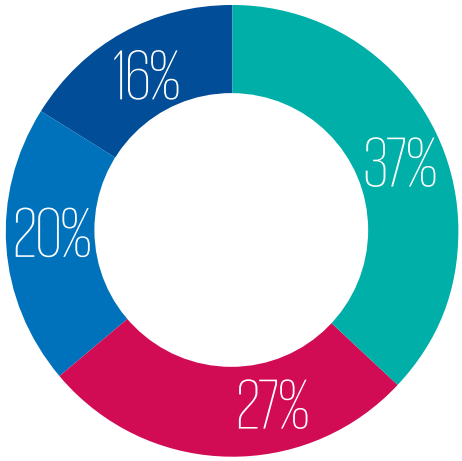
Data & Analytics competencies across all organizations



"Among the core data and analytics capabilities existing across all organizations, data science has the most pronounced competency gap. We believe this could be a function of the inadequate capacity and failure of our educational system to provide the right level of skills for this role.

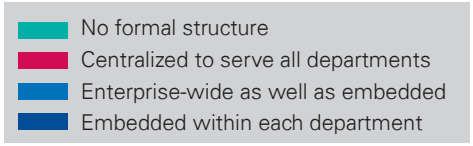
The onus is now on private, public or non-governmental organizations to raise the next generation of data scientists in the country. For example, Data Science Nigeria, a Nigerian NGO, has taken the initiative of addressing this inadequacy. With the goal of making Nigeria the No.1 data science and AI eco-system in the continent and globally, the non-profit organization has successfully built an end-end model of equipping students with the right skills, transforming them from complete beginners to setting them up for job opportunities.

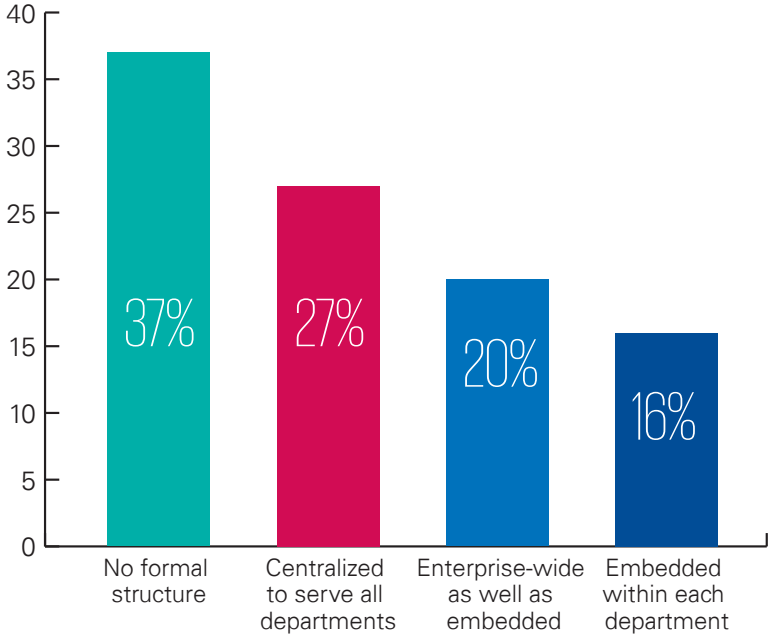
Structure of D&A Team



37%

Of the respondents have NO formal structure for their Data & Analytics team



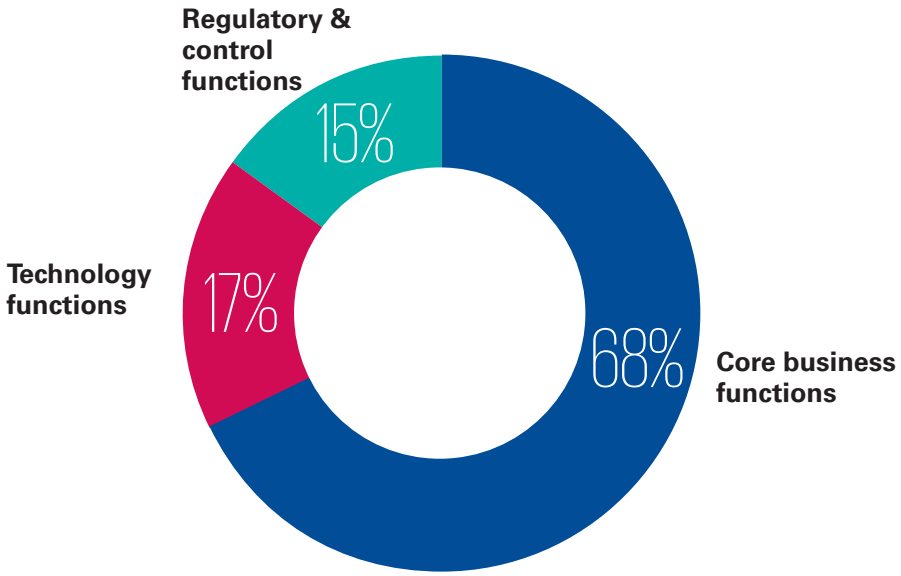


An organizational structure is the outline of the company's framework and guidelines for managing its operations. 37% of the organizations have no formal structure. With this, it would be difficult to provide direction and coordination to the team in order to drive the D&A capabilities of the organization as a whole.

However, when the structure of a data and analytics team is centralized, the organization's resources and capabilities are concentrated to support the business units in making decisions. Decision-making process becomes faster and more efficient. It also a good way to start for organizations that are starting small.

While this is good, employees from other departments are unable to contribute significantly to the D&A capabilities which is the primary advantage of an embedded structure.

Who Bears Responsibility?



68% of organizations would blame core business functions in advent of poor business decisions made by insights from data and analytics. This is because business experts, as owners of business decisions, would expect that the core business functions have a good understanding of the algorithms that influence the decisions in the first place.

Common Analytics Use Cases

Practical Use Cases of Predictive Analytics

Financial Services
Among many use cases, analytics in financial services can be aimed at predicting the needs and behavior of individuals or customer segments to further enhance all stages of the client lifecycle, increase customer value (usually as result of cross-selling, up-selling and increasing margins), help rekindle relationships with dormant customers and prevent undesirable behavior such as fraud and non-compliance.

We are getting to a point that leading financial institutions are complementing internal data (such as product/ service data, transaction history, contact history, mapping and optimization of customer pathways, etc.) with external data (such as people's behavior in groups and other influences unrelated to specific people, such as weather and traffic to enhance their predictive capabilities.

Retail
As more and more transactions occur over the Web or via mobile device, retailers have more information about the transactions and the events leading up to those transactions. They determine what a consumer is likely to buy based on history and segmentation. For example, if a customer exhibits these behaviors, we will present these offers/ products to them at these prices, because we will very likely turn that into a sale.

Manufacturing
Large industrial companies will place sensors on engines or other manufacturing devices. They will look at that data over time and run a set of analytics to understand the predictors that a machine, or a specific part in the machine, is about to experience a failure. As the machine starts to show signs that it is reaching a critical point, they will proactively replace a valve/filter, because predictive analytics told them what is about to occur. They will have the right set of materials on hand to fix problems, reducing a large inventory of spare parts. Downtime is eliminated for their machines, and the company can further benefit by right-sizing their maintenance workforce.

Telecommunications
Mobile telephone company assets that are used to provide wireless services are all tagged; they are in a database and in a fixed asset ledger. Occasionally, those assets need to go for repair, and they have an average life span of X number of years. You can take this data and combine it with statistical algorithms and analysis to determine the average life span of an asset, when it will need to go out for maintenance, and when it will need to be replaced.

Public organizations
Although, government institutions in Nigeria are yet to be 'infected with the data bug', there are several use cases of predictive analytics in government administration. For example, government or transportation agencies can use cameras to obtain traffic data. As a result, they can better optimize street lighting, traffic lights, and traffic flow and predict when roads are going to need maintenance. They can even understand the potential impact on traffic and where it should be diverted should a maintenance issue occur.

Turning Insight into Advantage

A data-driven organization embeds the ability to harness the power of data in every aspect of its business, including how decisions are made, how processes are operated, and how people are enabled.

Too much information

To predict the future, you will need data. This is not a problem since the volume of data continues to proliferate at an often overwhelming pace. The variety of data is also rapidly expanding, and the velocity, or speed at which data becomes available, is very near to real time. It's no surprise that many companies struggle with managing the data to which they have access, and that valuable information may be sitting idle.

Predictive analytics can put that data to work. By applying a set of mathematical algorithms to historical data, scores that indicate likely outcomes in the future can be determined. These predictive scores are used to monitor activities or events, providing insight into what is about to happen.

While data mining and warehousing is nothing new, predictive analytics may have been a little before its time. Unlike big data, it did not reach buzzword status until recently. Just a few years ago, it was a major undertaking to leverage predictive analytics, and many organizations believed it was beyond their reach. Data Scientists and mathematicians were required, along with really expensive technology systems, to support it. While the number of individuals within an organization who have the mathematical/statistical/analytical prowess to be able to run predictive models is still limited, predictive analytics and data management systems are now more accessible and more affordable.

There are many analytical services and applications in the market that, if desired, can be customized or integrated with those that have been developed in-house.

The bottom line? Enabling technology and people skilled in interpreting data has resulted in a convergence where predictive analytics can and should be an integral part of business operations.

What's in it for me?

Companies that are able to step back and think about how they are going to leverage data and predictive analytics to transform the way they run their business—how they can run it faster, leaner, and smarter and improve profit margins—will likely benefit the most. Ultimately, what they are doing is lowering costs, increasing effectiveness and efficiency, and becoming more nimble in how they react to opportunities in the marketplace. Organizations that do not take advantage of these capabilities face risks from competitors that have a deeper understanding of how best to run their companies.

"Today, the issue is no longer about owning the most data but, rather, about how to gain the most insight from it. In short, how to turn data into insights, and insights into real business advantage."

Transformation begins at the top. Leadership needs to map out how predictive analytics is going to impact all function and business processes and serve customers, as well as how it is going to be done seamlessly.

Predictive analytics is most effective when it permeates throughout the company, when all decision makers and all departments are working together. Having an end-to-end strategy is critical to harvesting the full power of predictive analytics—and to predicting the future.

How - No crystal ball required

Predictive analytics is not a function, and you cannot just insert it into existing business processes. An effective approach is to form a new department that is essentially a "shared service" around the collection, governance, and analysis of information. This department would provide predictive analytics capabilities and services to various functions/groups (e.g., engineering, customer service, and dealers.) Strong sponsorship from the top of the organization is required to ensure alignment with strategic objectives and to break down organizational barriers. Leadership needs to invest in and drive this transformation, as it is not an incremental step in the existing decision-making processes.

It is important to note that the real leaders are not the companies that are digitizing their information and rebuilding their current processes around that digitized information. They are the companies that are stepping back and asking, "What could the business process be now that we have this new information available to us? How can we do things differently?" It is much more than a marketing agency using new information to change the content of ads; it's about deciding whether to completely change the entire marketing process or target different consumers or use different channels, and it is based on sound mathematical analysis.

Not one and done

Once a company starts to use predictive analytics to make decisions, it can change the way it operates. However, to be successful in the long term, predictive analytics has to be an iterative, sustainable process. Ongoing maintenance is required as both internal and external factors are constantly changing, and models need to be reviewed and revised to accommodate these changes. Companies have to continually look at what is occurring in the marketplace and what new information is available. Access to new data sources means there will be new outcomes. You cannot build a predictive model once and say "I'm done"; what worked just last year may not work today.

We also sought to understand how Nigerian organizations have been building their Data & Analytics capabilities. We gauged the organizational hindrances to building capability, size and structure of D&A Teams as well as responsibility assignment for D&A initiatives.

What's standing in my way

Companies know that being data and analytics driven can help them identify opportunities as well as areas they need to address. However, when approached with a disruptive set of new information, many organizations are not structured or equipped to easily take that information and apply it effectively. Hindered by various existing data functions, processes, and roles built around often disparate and complex legacy systems, they lack the ability to be flexible and to react quickly.

Our experience shows that less than 40 percent of analytics teams work with business partners to set objectives up front. This means that many analytics teams may be working in their own silos without truly linking their activities back to business outcomes. While there are many people who can analyze data and provide answers about what happened, the number of individuals who can mine data and predict what is likely to happen is a much smaller universe of resources.

Only 47 percent of survey respondents believed their data analysts have the right skills to continuously push forward with data and analytics applications. As new and more sophisticated analytics techniques are deployed, this skills gap is very likely to grow. We found that by far the major hindrance to building D&A capability is the lack of deep understanding on the benefits and opportunities it presents for individual businesses and industry groups. This was also validated from engagements with industry leaders and direct discussions with individuals partly or wholly charged with the responsibility of embedding analytics in the ways of work in their respective organizations.

Another major hindrance to building D&A capability is the lack of senior leadership support in driving the rest of the organization to experiment with the more advanced analytics Use Cases. This in our view, is an extension to the aforementioned hindrance - limited knowledge and understanding on the full scope and applicability of Data & Analytics.

Data availability and quality is the third most prominent hindrance to building local D&A capability. We observe that while many businesses claim to have data (which is not

untrue in many instances), the data is not available in a form that can easily be used for basic and advanced analytics initiatives. This is further compounded in some organisations that have disparate data systems owned by different parts of the business, who rarely communicate on analytics initiatives.

To a lesser extent, other hindrances to building organizational D&A capability include:

- Inadequate budget
- Inadequate tools and supporting technology infrastructure
- Lack of requisite skills

We dug deeper to assess whether there were perception differences on the self-declared Data & Analytics capabilities of departments in Nigerian organisations.

A focus on the perception of departments in organization

Compared to other departments, the typical Finance, Customer and IT organization are more in tune with the requirements for enabling their processes with data and analytics capabilities. They demonstrate a deeper understanding and hunger for D&A. Also from the survey, we noticed that Risk & Compliance, Supply Chain, HR and Sales departments did not demonstrate as much interest or plans to leverage D&A capabilities to enhance decision-making in the respective functions.

KPMG believes that the opportunities for D&A Use Cases across many areas of an organization are varied and numerous, and it behoves on the leadership of each department to stretch the capabilities of their teams in leveraging analytics capabilities to enhance their operational routines and decision-making on an overall basis.

In the next 4 sections, we touch on applications of analytics in Fraud prevention, Finance, Human Resources and Customer Relationships

Building Data & Analytics Capabilities in Nigerian Businesses - Turning Insight into Advantage

Fraud Analytics and the Four Anchors of Trust
HR in the Analytics Age
Artificial Intelligence and the Finance Function
Can Analytics Build Trusted Customer Relationships in Banking

Fraud Analytics

Trust is the glue that holds society together and makes commerce possible. It permeates business life and touches every aspect of corporate behavior, even in the area of fraud and wrongdoing. People who defraud companies by misappropriating funds or creating false invoices or transactions are abusing a position of trust, whether it's within the company or between the company and outsiders, such as vendors, customers or business partners.

Companies that seek to detect fraud often deploy data and analytics (D&A) to search for anomalous or suspicious transactions. If a detection program is going to succeed, it must have access to reliable data and be trusted to perform according to the company's expectations. Executives must have confidence the analytics will work as intended. D&A can also be used to monitor the behavior and conduct of employees and third parties. This program, too, has to be trusted to be effective.

However, these are not easy objectives to achieve. Confidence in anti- fraud analytics can evaporate quickly if the process is not managed effectively. Getting it wrong can be worse than doing nothing at all, which is perhaps why many companies may be reluctant to deploy analytics programs. In fact, according to recent research by KPMG, very few companies are employing analytics successfully for the detection of fraud. Based on a global survey of KPMG professionals who investigated 750 fraudsters between March 2013 and August 2015, only 3 percent were detected using proactive, fraud-focused analytics, compared with 44 percent who were found by means of whistle-blower mechanisms and other forms of tip-off.

In this article, we examine some of the possible factors behind the low detection rate using analytics and the ways in which companies can build greater confidence and trust in the use of analytics to combat fraud.

Based on our experience in the field, we find that companies face significant issues in how they build and deploy trusted analytics against fraud. If an analytics-driven anti-fraud program does not successfully detect cases of wrongdoing in the early phases, management's confidence in analytics as a valuable tool to pinpoint fraudulent activity could well erode. In this article, we explore the four trust dimensions or anchors to help companies manage trust in an analytics-driven fraud detection program.

Why the low usage of such a powerful tool?

The low usage of analytics is a matter of concern because analytics can be an indispensable tool in the highly complex world of fraud detection. This is especially important considering the huge cost of fraud.

Why are larger numbers of companies not employing analytics successfully to catch fraudsters? Some corporate decision makers do not understand what analytics can do for them. Others balk at the expense. Still others may believe that until a major fraud occurs at their company, it is not worth the cost of investing in advanced analytics to detect potential wrongdoing before it occurs. We believe that this lack of adoption also reflects a 'trust deficit' — a lack of trust and confidence that the underlying data, the analysis and the business interpretation of the outcomes will be able to distinguish between legitimate transactions and fraudulent activity in an efficient and cost-effective manner. In other words, there is a general lack of trust in the processes for detecting those employees and business partners who are not 'trustworthy'.

If these trust issues are carefully managed, analytics can be a highly effective addition to any company's anti-fraud program, helping limit potential financial and reputational losses from fraud and misconduct and sending a message to would-be fraudsters that the risk of getting caught may be too high. This is why trusted analytics is an important tool in helping to mitigate security and reputation risk. KPMG's Trusted Analytics series, The Power of Trust in Analytics, explains that trusted analytics is based on four trust dimensions or anchors. Creating a trusted analytics program to monitor and detect fraud is best seen from the same perspective, as we discuss overleaf

Successful analytics requires high-quality components

The first trust anchor relates to the quality of the components in the analytics program. Which data to analyze should be directly related to detecting suspicious or questionable transactions or anomalies in the routines, including those that may be indicative of fraud. Therefore, the sources of data for analysis should include the processes in which an employee could possibly influence a transaction, such as employee expense reports, accounts payable and any transaction that includes the handling of cash. The data has to be accurate and up-to-date. The sources of the data need to be known and understood.

It has to be consistent and complete. The program's design should fit the task at hand and be modeled on the processes that are relevant, such as the types of transactions, the involvement of particular functions and so on. These considerations hold true for all types of analytics, including its use to detect fraud, mostly in the form of deliberately falsified information.

A critical step: knowing what is normal

Given the vast amount of data generated today, it is natural to think analytics can be of help in detecting fraud. The premise of most anomaly detection methods, even the new ones associated with machine learning, is to identify odd patterns in an otherwise homogeneous population. However, the success of these analytical techniques, especially if fraud is rare, depends on the ability to know what is normal. A successful fraud detection program through analytics must consider detecting both anomalies and knowing what is normal. When analytics-based fraud detection programs fail, it is often not because they lack analytical rigor but because the implementation platform lacks the knowledge of what is expected to be normal. It is much easier to eliminate the honest people, who tend to be more transparent, than to find those who commit fraud. This is akin to lowering the water level of a muddy river to be able to more clearly see the rocks at the bottom, a philosophy used effectively in lean manufacturing systems.

False positives must be carefully managed

The second trust anchor refers to the effective use of the process for analyzing transactions. Is the output accurate and useful in the sense of fulfilling its purpose? A successful anti-fraud analytics process has to walk a fine line between generating too many and too few red flags. Refining the algorithm to achieve this balance is a process of trial and error.

This is an example of engendering trust between the algorithm and the human. In a large, complex organization, it could take several months to achieve an optimal rate of fraud alerts. Careful calibration takes time and organizations must be patient.

Data analysts must therefore manage expectations, because decision makers tend to become frustrated if the desired results are not achieved quickly or easily. A wave of euphoria about the effectiveness of the program can easily give way to deep pessimism.

Too many false positives and it might cause corporate leaders, as we mentioned earlier, to lose confidence in the process. If each potential case is investigated aggressively, employees and other stakeholders could also lose faith in the program and trust in their employer.

If there are too few red flags and, as a result, cases of fraud escape detection, this is

equally harmful, if not more so. Executives will begin to doubt the effectiveness of the process and seek other methods to meet their objectives. On balance, it may be better to stray on the side of detecting too many false positives. This is because it can sometimes be comforting to know that the company is being vigilant, even if the anomaly investigated does not ultimately lead anywhere. This may actually build trust, not erode it.

Operational control must be sustainable

Based on our experience in the field, more companies are deploying data analytics for fraud detection. Yet, we also note that only 3 percent of successful detections used analytics. One reason for the gap is that the long-term operational control (trust anchor no. 3) of the analytics processes may not have been established, let alone optimized, with the result that the detection rate is less than expected. While it requires a high level of expertise and technology to integrate advanced analytics into business processes, such resources are indispensable. Lacking that skill, the organization may lose confidence in the ability of the program to perform as intended and the commitment to the program could wane.

For an analytics program to be effective, it is not sufficient merely to design an algorithm and then leave it untouched to operate indefinitely. Rather, it has to be updated regularly as circumstances change.

Programs must be alert for routines that are generating large populations of false positives, which require time and resources to examine.

The use of cognitive, machine-learning systems will provide companies with the means to continuously improve their analytics and make them more efficient for the purpose. These techniques require considerable time and effort by the company.

Anti-fraud analytics must be ethical

The fourth trust anchor of trusted anti-fraud analytics concerns the ethical integrity of the process. Is its use considered acceptable by such stakeholders as employees, suppliers, customers, business partners and regulators? This, we believe, is the most important of the four anchors because it addresses some of the most sensitive areas of the relationship between the company and its stakeholders, in which trust plays a vital role. This is not simply a legal matter. A company could be fully compliant with the law and yet, if it were to adopt a heavy-handed approach to fraud detection, it may undermine the trust of its employees in the organization and other parties that are included in the detection scope.

These issues are particularly relevant in the emerging field of behavioral analytics. Until recently, the use of analytics to detect fraud focused on transactions. In the future, however, a growing emphasis is likely to be placed on analyzing the behavior of employees.

This adds an additional layer of anti-fraud detection to the analysis of transactions by monitoring employees for possible behavioral anomalies that might lead to the perpetration of fraud.

Any anti-fraud program will be more effective if it operates with the consent and the trust of the company's stakeholders, most notably its employees, as well as third parties that do business with it.

This issue has to be handled carefully, depending on the culture in which the company is operating. In our report, Global profiles of the fraudster, many of KPMG's forensics experts around the world pointed out a prevalent culture among companies to trust their employees to do the right thing. There is a prevailing mentality that executives and most employees should be given the benefit of the doubt. According to the forensics experts, corporate leaders fear that if employees perceive that the company is using analytics to 'snoop' on them, this may undermine the trust between the company and its employees. This may make the management reluctant to deploy a behavioral analytics program.

How can this problem be surmounted?
Successful implementation of such a program starts with the leadership clearly explaining the purpose of the anti-fraud analytics program and its intention to protect the reputation of the company as a whole, not to victimize (or benefit) individuals or particular groups. It is often easier to explain this to employees after a significant case of fraud has been uncovered, when people are more open to the idea of preventing a recurrence.

Companies may also decide that portions of the data under analysis could be anonymized, and only if a pattern of business behavior raises a red flag would the information about the individual responsible for the pattern of behavior be disclosed to investigators. If the information gathered in this way is used for a purpose other than combatting fraud and word leaks out, trust in the program will evaporate quickly. The key element here is transparency: if corporate leaders explain its purpose clearly and operate it strictly in conformity with the stated intent, the program will enjoy the trust of all stakeholders.

Building a better culture
In this context, it is important to balance surveillance and transparency. An organization might conduct a strong surveillance program and a low level of transparency or any possible combination of the two, depending on the nature of the relationship between the company and its employees and other stakeholders.

An organization that handles a lot of sensitive information or in which individuals handle large amounts of money is likely to have a stronger surveillance program than one that does not. If an organization is transparent about the nature of the analytics program it uses to monitor its operations and processes and adheres strictly to the ethical management of its analytic processes, it is likely to be trusted in how it conducts its anti-fraud measures.

Societies and the companies within them are experiencing a trend toward greater transparency. Stakeholders are demanding more openness from companies and other institutions. Social media is providing channels for publicizing more private information about individuals and organizations than ever before. However, greater transparency has two different facets in the context of this article. If companies are open with their stakeholders about their anti-fraud programs and adhere closely to the stated purpose, then trust will strengthen. But if the program veers off course and it becomes known that information collected is used for a different purpose, then the trust will be lost very quickly. Ensuring enough transparency to protect and maintain trust while guarding against sharing too much information, so as to aid a fraudster in avoiding detection, is a very difficult balancing act.
People must be confident that the analytics algorithms work as intended and must trust each other to use them properly. It's a weighty task but, if successful, we believe it will build a stronger, more compliant culture in the organization.

The need for organisations to meet current customers' demands of fast and efficient services exposes them to risks of fraudulent transactions. Analytics has the ability to provide real-time fraud prevention and detection capabilities so that organisations can provide quality services without compromising on security says Saheed Olawuyi, the KPMG Advisory Partner leading the Forensic Services Unit

HR in the Analytics Age

Long on Info, Short on Insight

Most HR teams understand the potential value of HR analytics yet they continue to offer only generic and basic operational and transactional measurements – metrics that provide little in the way of predictive data or actual insights that could have a positive impact on the success of the organization.

This was confirmed in an Economist Intelligence Unit survey of 418 global executives commissioned by KPMG International in which 85 percent of respondents said their HR team doesn't excel at providing insightful and predictive analytics.

Rear view Mirror

Essentially, HR's current approach to analytics remains anchored in the present and in the past: staff turnover, employee engagement, diversity statistics and promotion rates. It's concerned with what's gone before, with the existing workforce and with its organization's immediate priorities, rather than providing executive-level leadership with tangible intelligence about what's going to happen tomorrow, next year or next decade – and why that will be important to the business.

Yet if HR is to harbor any hope of proving its business value to the organization, let alone taking up residence among the leadership team, senior HR managers need to approach analytics in a much more strategic way.

Applied properly, HR analytics can show connections, correlations and even causality between HR metrics and other business measures – all of which can be used to inform HR strategy and actions.

In other words, by creating a clear 'line of sight' between HR activity and your organization's bottom-line profitability, HR analytics can provide a tangible link between your people strategy and your organization's performance.

HR has traditionally not being a numbers-savvy function. This is however, set to change considering the importance people bring to a successful organization. HR analytics has the potential to significantly transform our understanding of employees, their motivations and impact they can make if channeled for optimal performance, says **Yetunde Kanu, the KPMG Advisory Partner leading the People & Change competency area.**

"I believe that well thought- out predictive HR analytics could become as important to the CEO as the balance sheet and P&L statement," **says Robert Bolton, a KPMG Advisory partner and HR Transformation expert in the UK.**

And now is the perfect time for HR to up its analytics game. The widespread adoption of HR management systems and the advent of cloud storage are making it easy for organizations to maintain all of their HR data in one place and to share and integrate it with other critical management information. Likewise, the software needed to carry out complex statistical analysis is now more affordable and readily available. Employers seem ready to take advantage of these developments – an Economist Intelligence Unit research found that 31 percent of global organizations plan to invest in data analytics during the next three years.

Why the current focus on analytics? KPMG believes three trends are creating this momentum. The first is that HR systems are increasingly integrated and allow easier access to both sides of the regression equation -- input measures on people's characteristics and output measures such as sales data. The second is the general buzz around big data and data analytics across the business world. Thirdly, and potentially most interesting, is the availability of social data."

The new breed of social HR systems is introducing social connections not only to recruitment and learning and development, but also to performance management and reward and recognition. This blurring of the lines between HR and knowledge

management offers exciting analytic possibilities that are genuinely new and ground breaking.

HR can seize on this opportunity to move its measurement up a level and transform itself from a fundamentally administrative and back office function into a strategic partner capable of showing company leadership how well the organization's people programs are aligned with the business strategy and how much value they're adding to the company's results.

Defining HR Analytics
Human capital measurement. Big data. Talent analytics. Strategic workforce analytics. HR analytics.These terms all refer to the synthesis of qualitative and quantitative data and information to bring predictive insight and decision making support to the management of people in organizations.

To put it another way, HR analytics can be seen as the application of statistical techniques (for example, factor analysis, regression and correlation) and the synthesis of multiple sources to create meaningful insights – for example, employee retention in office X is driven by factors Y and Z.

Artificial Intelligence and the Finance Function

Opening doors to the Creative CFO

We believe white-collar work is about to get much more interesting thanks to cognitive technologies. The finance function of the future is likely to need a huge injection of creativity as even high-skilled analytical jobs are replaced by smart algorithms, learning machines and artificial intelligence.

The rise of robots, artificial intelligence (AI) and other cognitive technologies over the next couple of years is likely to create new opportunities for delivering high-value, creative work in back-office functions.

Many people in white-collar jobs or in service industries have felt relatively insulated from the loss of work to robots. The new report challenges that complacency.

Many sectors and job types are now in the sights of new technologies, both basic and cognitive. For many corporate back-office functions, says the WEF, that means a focus on complex problem-solving, critical thinking and creativity.

Freedom from finance admin

KPMG's been working out how new technologies will change a critical business function: finance. The evolution of the CFO's domain using these tools is already obvious. Today's analytics packages, for example, mean that business analysts often do the legwork of trawling through spreadsheets looking for key data to inform decisions. But we can expect AI to push those analysts into more complex and judgement-led analysis.

And that's not the only "human" area in finance that's facing a radical shake-up. To understand how this will play out, we assigned the typical skills and capabilities in finance functions into two categories.

Tier One jobs, such as Collection Clerk or Accounts Payable teams, are mostly driven by process, transaction and systems. These areas have already been changing thanks to new business processes, technology and globalisation – and will be further automated. Much of the analysis currently carried out by relatively senior and skilled finance function experts at this level will be generated by basic automation.

Tier Two contains the skills and capabilities needed to deliver original thinking. "This tier is about generating insights for the front-office – and decision-makers – to drive business strategy and growth," says Nicholas McDonald, management consultant at KPMG. "CFOs designing their function for the near term may question how far robotics can go. Some may need to get comfortable with Tier One being fully automated and then determine how cognitive can get to the core of those activities which require additional human intelligence and judgement

Upskilling for the AI age

This isn't just about finance function capabilities and the growing sophistication of algorithms and machine learning. The human dimension is critical. How should CFOs handle radical shifts in skills and structures? How should they treat people who are currently adding value, when their roles are increasingly automated?

Not all roles, even in Tier One, will disappear entirely. The finance function will definitely be smaller in number of people than it is now. But the people who remain will have a higher quality skill set. Rather than reconciliation work, they will be doing analysis and insight work."

It's also going to mean recruiting (and retraining) finance function people with a broader range of soft skills – communication, strategic business partnering and commercial awareness. Additional technical skills will also be on the list. Even the smartest cognitive systems require expert oversight.

The WEF's ranking of the top 10 skills needed in the workforce of 2020 is a useful checklist. "Co-ordinating with others" and "negotiation" are both big fallers compared to 2015; "creativity" is the big

riser. Dropping off the list entirely by 2020? "Active listening" – where the researchers expect smarter data collection and analytics of unstructured data to yield insights that humans currently generate.

"Quality control" – where cognitive technology is expected to get better at spotting errors and exceptions in a range of areas currently entrusted to human supervisors – also fails to make the list. This raises interesting questions about the skills and roles of finance business partners, for example.

Practical steps

KPMG's experiences with clients on the future capabilities of finance functions came up with similar findings. The spread of artificial intelligence is rapidly increasing the focus on value from skills such as "developing commercial insight from financial analysis" and "using financial expertise to influence the business". It is cognitive technologies that are likely to create future value from excellence in transactions or expert analysis – not humans.

Confidence in cognitive tech will continue to accelerate. By 2025, KPMG expects that only human (some might say "emotional") roles such as "coaching" and "managing projects" will have escaped full automation.

That's going to mean building a pipeline of talent with the necessary financial knowledge and skills – but who can augment them in one of two areas. Either understanding the way cognitive technologies work and manipulating those tools; or having the creative, communication and people skills to ensure the impact of the new finance automation is properly acted upon.

It will be the CFOs who act now and embrace this change – even before seeing cognitive's full potential – who are likely to gain most. Those who wait may face mounting costs in upskilling their workforce as they try to close the talent gap. Agility is key. First movers will get the pick of the crop.

CFOs should consider their next steps, including:

1. Define current roles and finance function capabilities, then map this to new techniques.
2. Assess whether each role can be automated, semi-automated, or whether human skills need to be retained.
3. Start working with IT, HR and the business to design a roadmap for that new model. Invest in capabilities that will be critical for the future, now.

According to Patrick Iyamabo, Chief Financial Officer, First Bank of Nigeria, "Data is the new oil. The moment CFOs understand and do what needs to be done to tap into data, the sooner they can transform their organisations".

CFOs need to build and leverage their data and analytics capabilities such as machine learning and smart algorithms in order to take advantage of evolving market opportunities, enhance decision making and drive their strategy to achieve profitable growth in today's business environment defined by constant disruption , says Segun Sowande, the KPMG Head Partner for Management Consulting

Can Analytics Build Trusted Customer Relationships in Banking

Trust has always been central to the relationship between a bank and its customers. The Nigerian banking sector has historically been focused on gaining public trust over their competitors, knowing that a single error or the poor behavior of a few individuals could significantly impact confidence.
Analytics have inherent potential to create value and help build trust. Analytics can help create tailored services to customers, detect fraud, assess risk exposure, ensure consistency of service and predict market risks. The list goes on. The banking sector has vast quantities of data to drive these analytics and a respectable track record of adoption of new technologies.

But there is a flip side to this opportunity. Today, sector leaders are beginning to push the boundaries with the spread of machine learning and the use of increasingly complex algorithms which, in many areas, are replacing traditional customer relationships and human decision making. What happens when the foundation of customer trust is built by robo-advisors alone? And, importantly, should we look inside the 'black box' of analytics to understand the hidden opportunities and risks it may hold?

Increasingly, as banks become more data-driven, the trustworthiness of their data and analytics (D&A) will underpin trust in relationships with consumers and regulators. As we witness algorithms moving from the back office to the frontline, banks must attend to help assure trust in their analytics.

Technology, new business models and trust

The connection between trust and analytics is well understood within the tech sector — consider the opportunities and challenges associated with autonomous vehicles as we have seen in more advanced economies, for example. There is something similar taking place in the banking sector as it continues to struggle with issues of trust.

So how does a customer trust a bank to do the right thing? How does a bank trust its employees to do the right thing for the bank and for its customers? How do board members know they can trust the information in front of them? Some specific data challenges are already front-of-mind in banking, such as cyber security and data protection.

However, there are wider risks and opportunities as analytics take on more decision-making functions. In the future, analytics of various types will play a central role in multiple relationships of trust in banking — between board, shareholders and staff, between customers and brand, between regulators and the sector as a whole.

Let's take two trends as examples.
The first is the rapid growth in the FinTech

sector. FinTechs and digital start-ups recognize the tremendous opportunity analytics bring and have benefited from the trust gap between banks and their customers. In fact, we believe one of the biggest reasons that FinTech companies have been so disruptive to banks is that they leverage an inherent consumer trust in technology with offers of convenience and innovation in a sector that has largely been starved of new models for decades.

Traditional banks are now competing furiously. As the new FinTech organizations and non-traditional disruptors clearly demonstrate, advanced analytics can be harnessed to predict customers' needs and demands effectively. Prove that you know your customer and understand their needs and you can quickly build trusted relationships, especially among the emerging group of millennials who likely lack any ingrained attachment to more traditional methods of banking.

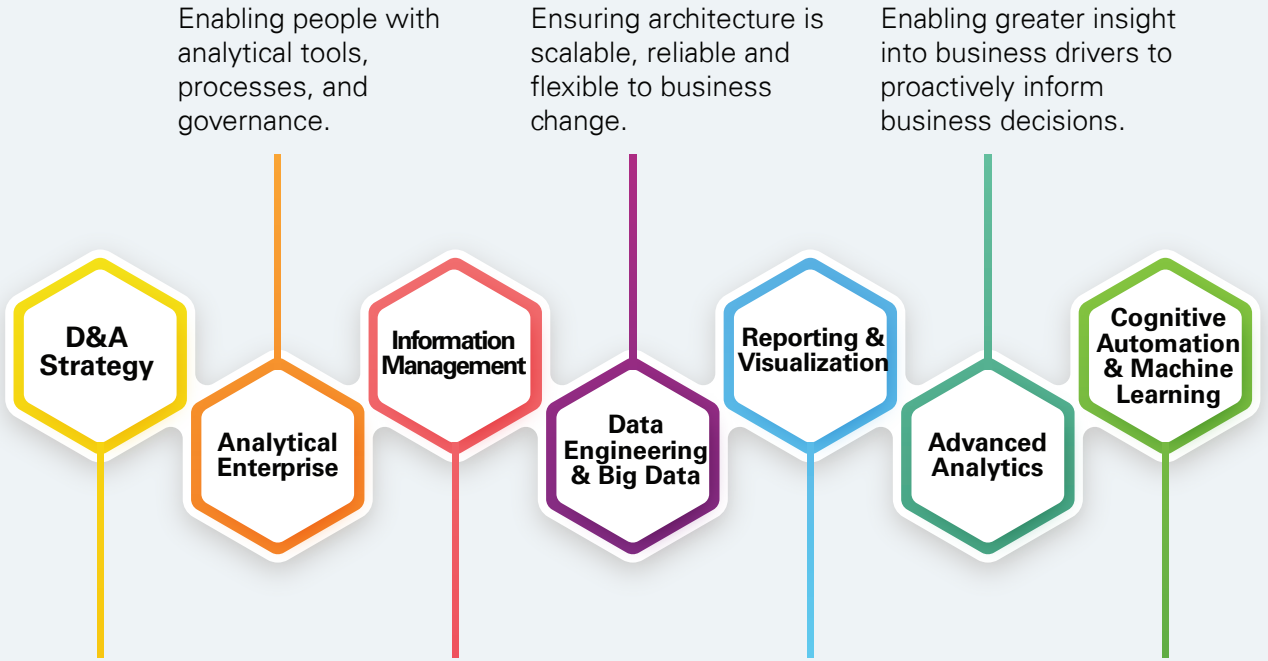
In parallel, a second trend that is bringing analytics and trust closer together — is the rapid development of risk analytics, which is creating new trust issues. Use cases in Risk analytics include prediction and evaluation of employee conduct, fraud and risk exposure. Predictive analytics for employee conduct are closely associated with building consumer trust and have been highly effective at identifying and reducing unethical behavior. However, the area of 'conduct analytics' is one in which we find increasing concerns about breach of trust between bank and employee, as too much intrusion can overstep the 'creepy line' and the wrong conclusions can damage reputation.

More generally, the stakes are rising. Predictive risk analytics have been shown to work well for common everyday risks, but are still largely untested on rarer colossal risks. If there is no clear history of events or agreed future scenarios which can act as a baseline for automated risk assessment, then it is easy for trust to be misplaced in complex but untested algorithms.

SPOTLIGHT ON THE KPMG NIGERIA INSIGHTS CENTRE

KPMG Data and Analytics capabilities

KPMG member firms employ more than 10,000 global Data & Analytics resources across seven inter-connected broad capability groups. With our sector experts and ecosystem alliances, we can provide a tailored set of capabilities for every client need.

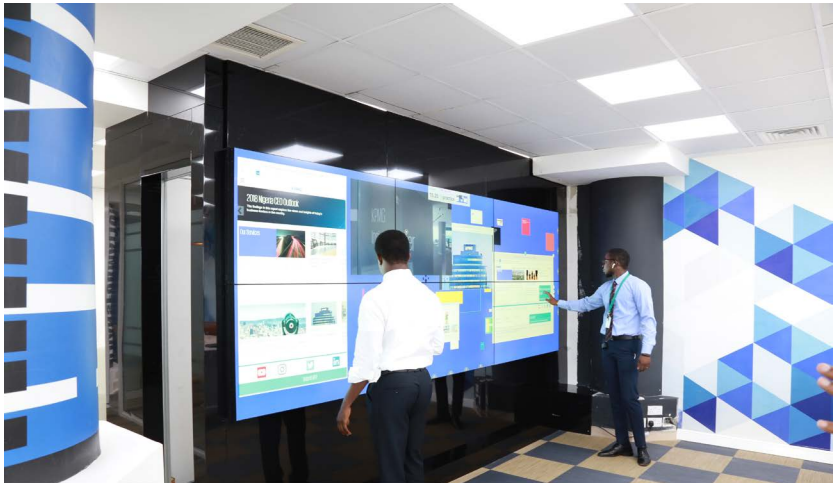


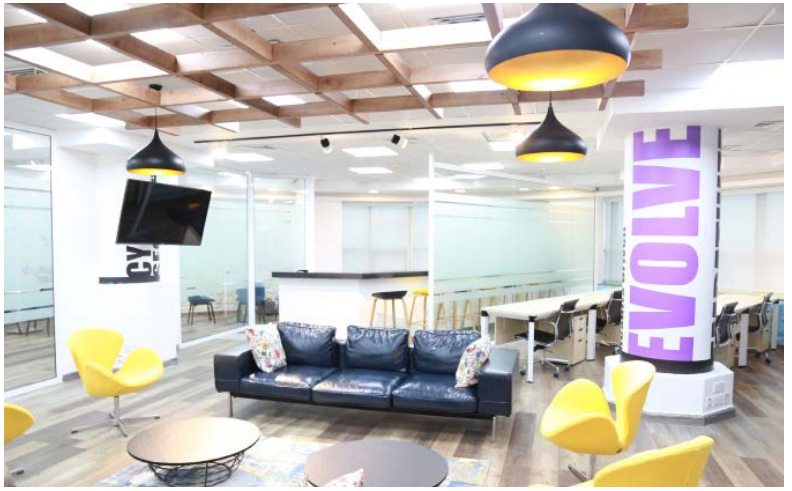
SPOTLIGHT ON THE KPMG NIGERIA INSIGHTS CENTRE

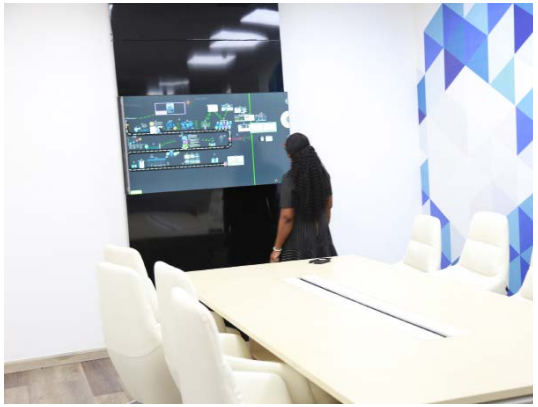
KPMG Nigeria Insights Centre

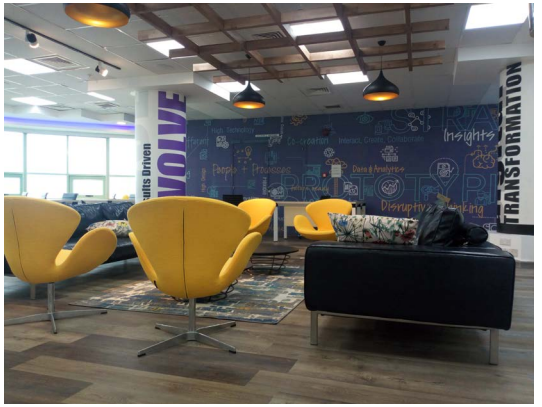
To better respond to D & A challenges and opportunities, KPMG Nigeria recently launched an Insights Centre - next-generation collaborative environments with interactive touch screen video walls and breakout screens that allow our clients to interact directly with their data and see D&A solutions come to life in ways they never imagined.

The Insights Centre provides the canvas and the tools for the participants –KPMG SMEs & Client SMEs –to expedite the client's innovation journey, from definition of the business need to identification and delivery of solutions.





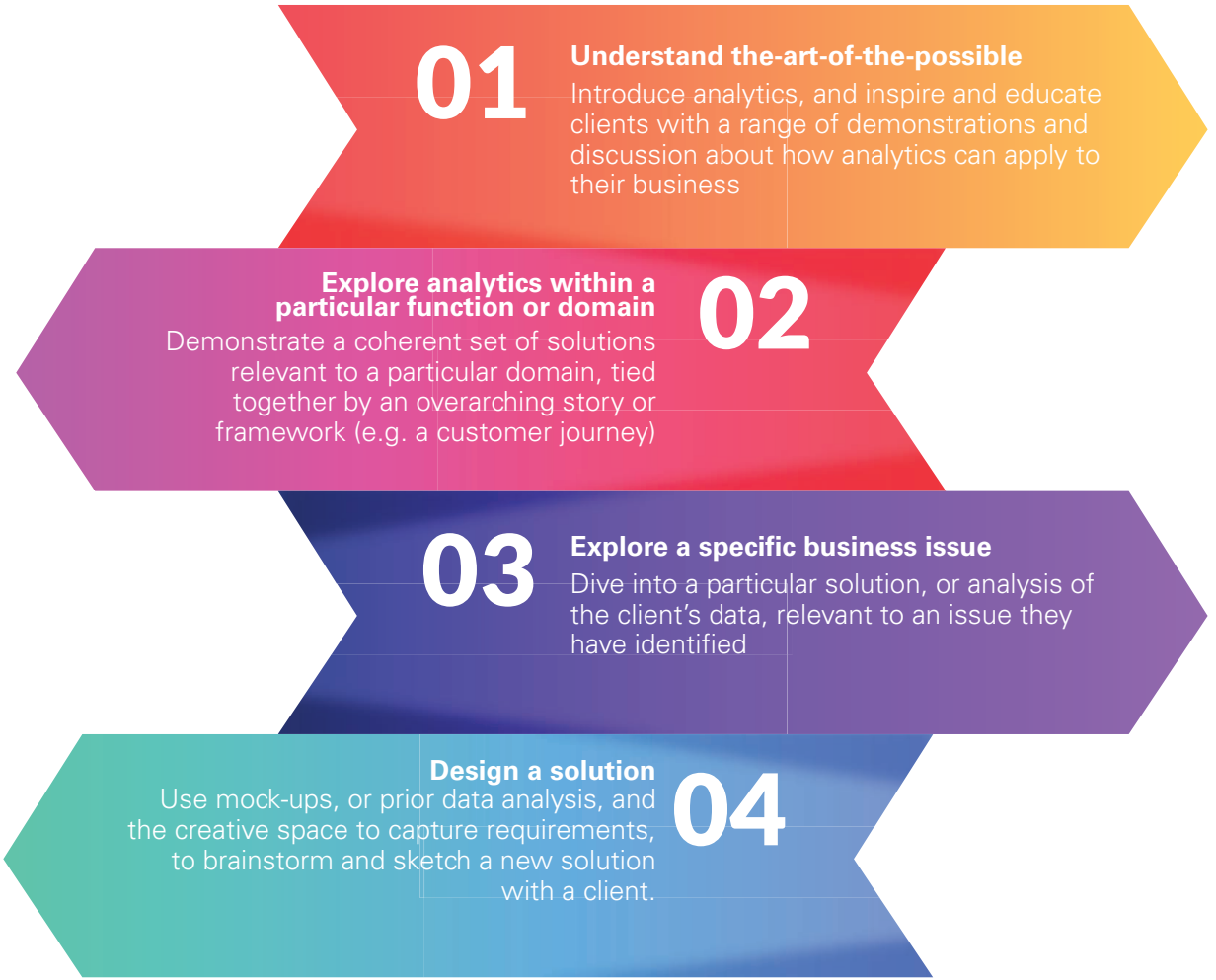




SPOTLIGHT ON THE KPMG NIGERIA INSIGHTS CENTRE

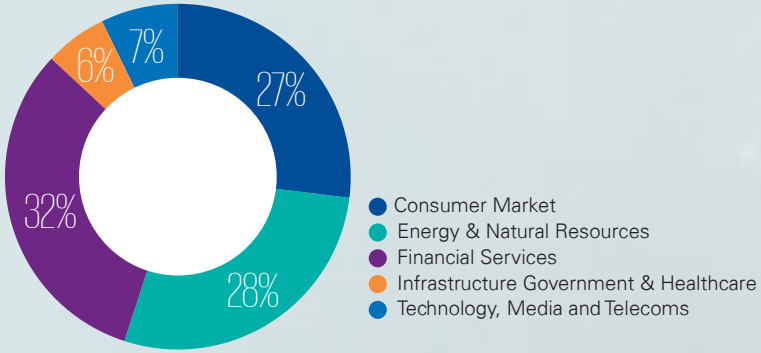
KPMG Nigeria Insights Centre

Specifically, the Insights Centre allows us to achieve the following for our clients…

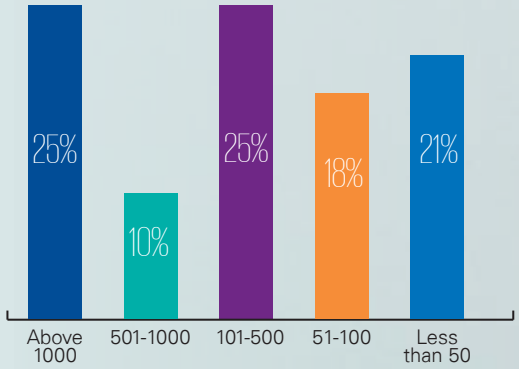


About the Survey

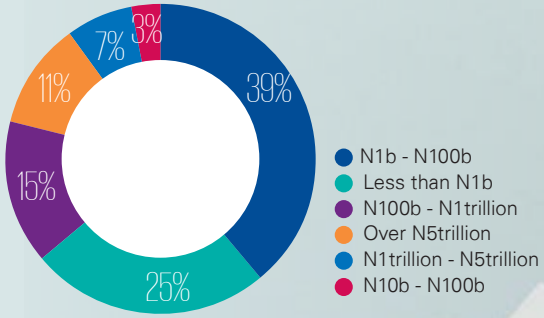
Survey Demographics - Industry



Survey Demographics - Staff Size



Survey Demographics - Total Assets



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