International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 12 Issue: 12 | Dec 2025 www.irjet.net p-ISSN: 2395-0072

Modern Business Analytics through Cloud-Native Architectures: A Comprehensive Study Using AWS Data Lake and Machine Learning Services

Shiraz Anas Quadri Syed[1], Shayesta Syeda[2]

[1]*AWS Solutions Architect, Los Angeles, California, USA*
[2]*Student, Business Analytics, Hyderabad, Telangana, India*

Abstract - *With the fast-paced digitalization of contemporary businesses, data is not only everywhere but it is key to informed decision making. As businesses grow, the demand for more scalable, flexible and intelligent analytics infrastructures have increased, and legacy on-premises systems have become outdated. This paper investigates how cloud-native architectures based on platforms like Amazon Web Services (AWS) are disrupting the world of Business Analytics through unlimited performance data lakes, automated data engineering pipelines or sophisticated machine learning capabilities.*

Based on a fusion of the business analytics frameworks and cloud engineering design principles, this paper analyses how AWS offerings (Amazon S3, AWS Glue, Lake Formation, Redshift, Athena and SageMaker) collectively fulfil tasks for descriptive, diagnostic, predictive and prescriptive analytics. It combines two separate areas of expertise - data-driven business analysis and cloud-native architecture design – created together, but remotely.

The study's results signify that AWS's integrated analytics environment powers more scalable and cost-effective data processing, delivers faster insights, democratizes machine learning, and fosters decision intelligence across an organization. Together, the findings of our combined research, suggest that cloud-native architectures for business analytics are a key step change in using data to drive competitive advantage and provide organizations with an infrastructure that is commercially mature as well as analytically sophisticated.

Key Words: Business Analytics, Cloud-Native Architecture, AWS Data Lake, Machine Learning, Real-Time Analytics, Large Language Models (LLMs), Data Engineering, Predictive Analytics

1. INTRODUCTION

Digital ecosystems are rapidly transforming the way in which organizations capture, store and analyze data. So, the explosive growth of e-commerce, mobile apps, Internet of Things devices and cloud-based platforms have driven unimaginable amounts of structured and unstructured data. For businesses competing in this environment, analytics has evolved from a back-office activity to an organizational competency that is foundational to competing on excellence or new customer-centric services. This is why the discipline known as Business Analytics has become so prominent within today's enterprise, addressing the need for raw data to evolve into actionable insight and predictive intelligence. Traditional analytics infrastructure usually relying on an on-premises database, fixed compute capacity, and batch-style processing: The demand for real-time insights, cost efficiency and massive machine learning is moving so fast backend can hardly keep up. As it turns out, these pressures have pushed the trend towards cloud-native architectures (with elasticity, distributed processing and machine learning services built-in) even further along. Amazon Web Services (AWS) offers a robust analytics eco-system capable to store data, automate ETL, govern processes, visualize outputs and predict final outcomes all under one scalable environment.

This study is investigating the confluence of business analytics and cloud-native architecture, specifically how AWS allows businesses to transition from Traditional BI (Business Intelligence) to advanced decision intelligence. While this compendium represents two disparate professional perspectives, one based on business analytics theory and the other based in cloud engineering the collaboration was remote, blending domain expertise asynchronously. This is consistent with the real-world scenario of independent projects involving cross-discipline collaborations between data team, architects and analysts frequently work in separate geographical locations.

Contemporary business analytics frameworks generally consist of four foundational analytic types including descriptive, diagnostic, predictive and prescriptive. Data ingestion and organization must be robust at each layer with manageability of access and scalable compute. AWS helps these organizations via services like Amazon S3 for data lake storage, AWS Glue for serverless ETL, Amazon Redshift for petabyte-scale warehousing, Amazon Athena for interactive SQL querying and Amazon QuickSight for visualization. Advanced models use Amazon SageMaker, Amazon Forecast, Amazon Comprehend and Amazon Personalize to put machine learning at scale into action.

The combination of these capabilities provides a full analytics lifecycle that allows enterprise customers to ingest all types of data, auto-transform pipelines, enforce and scale governance processes, deploy predictive models and turn insights into business-ready intelligence. By fusing business analytics theory with AWS architectural best practices, we highlight how cloud-native environments raise the bar on analytics agility, insight quality, and enterprise reflexes.

2. Literature Review

Mohajeri, M. A. (2024). Leveraging large language model for enhanced business analytics on AWS.

Author delves into how Large Language Models (LLMs) and cloud-native environments can help boost today's generation of Business Analytics. Designed in partnership with a fast fashion company, the research shows exponential data growth has rendered traditional analytics inadequate; organizations now leverage cloud ecosystems – notably AWS - to deliver scalable data processing, model deployment and delivering real-time decisions. Mohajeri shows that powerful AWS services like Amazon SageMaker make it quite easy now to implement advanced LLM-powered analytics through simplified data preparation, feature extraction and text analysis.

Author also compares AWS against Google Cloud Platform (GCP) and Microsoft Azure and concludes, that although they all have attractive analytical offerings, none offer the same cohesive end-to-end analytics platform as AWS does. Building on the broader Business Analytics knowledge that integrated cloud environments drive faster insights and supports better strategic data-driven decision making.

Thallam, N. S. T. (2023). Comparative Analysis of Public Cloud Providers for Big Data Analytics: AWS, Azure, and Google Cloud. International Journal of AI, BigData, Computational and Management Studies, 4(3), 18-29.

The author of provides in-depth examination of big data analytics cloud platforms at enterprise level. Using literature review, benchmarking experiments as well as real-world case studies of Netflix (AWS), BMW (Azure) and Spotify (GCP), the authors demonstrate how each provider has varying strengths which corresponds to differing organizational requirements. AWS shows best scale and integration with mature ecosystem of tools while offering solid performance for workloads at a great scale; Azure proves to be strong place in the enterprise space deeply integrated product by Microsoft and has good compliance support; Google Cloud being AI & ML powerhouse leads on real-time data processing and analyzation. Thallam found that there isn't a single cloud provider that is best for everything—workload patterns, cost needs and security opportunities should guide which clouds agencies select.

Findings of this study support general Business Analytics literature that relies on flexible and scalable cloud infrastructures to accommodate high volume data processing and advanced analytical models. And, importantly, the research highlights trends such as multi-cloud adoption, a focus on sustainability and AI-led security monitoring – all of which are coming to the fore for Business Analytics teams who want to blend high-performance computing capabilities with governance and cost control. Through demonstrating the variations in analytics capabilities of cloud platforms, Thallam (2024) offers a strategic perspective for organizations to align their choice of cloud with their analytical and operating needs.

Gatlin, K. (2024). Real-Time Analytics on Amazon Web Services and Google Cloud: Unlocking Data-Driven Insights.

Real-time analytics is also becoming a more important area, especially as more organizations rely on real-time insights to compete in the fast-paced digital world (Gatlin 2024). In Gatlin's view, batch-based analytics is simply insufficient anymore ˙especially in sectors such as finance, e-commerce and healthcare that hinge on the ability to rapidly detect trends, anomalies, and user behaviors and can change their operational decisions as a result.

AWS solutions including Amazon Kinesis, Redshift, and QuickSight and Google Cloud solutions such as BigQuery, Pub/Sub, and Looker allow organizations to ingest streaming data, process it with low latency, and visualize insights in real-time. This resonates with wider Business Analytics literature classifying on-time data processing as a major building block for agile decision-making, great customer experiences and process optimization.

Methodology & Architectural Approach

This work presents a hybrid methodological process between theoretically Business Analytics and hands-on architectural validation grounded in AWS cloud engineering. In line with the interdisciplinary nature of our focus, this approach was structured to combine theoretical concepts and practical cloud-native implementations for modern analytics at scale on AWS. The participatory research style for this work (entirely remote between two researchers with complementary skills) reflects distributed collaboration that is increasingly the norm in both analytical and cloud engineering practices.

The Business Analytics perspective adopted by the approach is hinged on, and extensively leans on the four layers of an analytical model:

- Descriptive
- Diagnostic
- Predictive
- Prescriptive

This framework provides a reference point to enable the evaluation of AWS capabilities without only focusing on the technical aspect, but also what each architecture component offers in term of analytics. The Business Analytics researcher added perspective on decision science, statistical modeling

and the enterprise analytics lifecycle to put into context how data needs to be shaped, processed and explained if it is ever to drive business value.

From an engineering perspective, the AWS architectural practice derived from the AWS Well-Architected Framework and focused on operational excellence, security, reliability, performance efficiency, and cost optimization. This involves the assessment of Amazon S3 when used as primary data lake storage, AWS Glue for serverless ETL, Lake Formation for governance, Redshift (for analytic querying), Athena (for interactive SQL), and SageMaker (to orchestrate your ML models). The architectural layouts have been established through a mix of AWS reference architecture, best practices and actual use case patterns.

The two methodological strands confluence iteratively rather than concurrently, with researchers producing written analyses to be incorporated later. This was highly asynchronous which meant that decision makers could both work in parallel, interpreting the problem from their own domain without bias or influence. However, the insights from each section could only be combined to tell a coherent architectural story about how AWS technologies can address Business Analytics goals once they were 'grounded' in their home discipline.

Cloud-Native Architecture for Business Analytics

Contemporary Business Analytics heavily depends on fast processing, unification and interpretation of massive amounts of data provided by different sources (Dutta, 2019). Legacy analytical environments, which are based around on-premises data warehouses and siloed departmental systems, cannot deliver the speed and scale needed for modern analytics. These restrictions have resulted in a significant paradigm shift towards cloud-native architectures that provide dynamic scaling, distributed computational power and integrability to big data analytics.

From a business analytics standpoint, the reason for going cloud-native is not just about technology or digital transformation; it's about being in an environment in which insights are created quicker, models can be iterated more rapidly. Business Analytics should involve flexibility and new sources of data, the discovery of unexpected patterns and knowledge, new business questions and rapid experimentation. Cloud native is designed to directly support such requirements with its scalable compute, component-based services and metered usage of resources. These qualities allow analysts to go further than historical reporting and perform more sophisticated predictive and prescriptive analytics.

Cloud-native concepts like container pattern, serverless running and distributed storage have direct influences on major BA results – data freshness, analytic accuracy and insights resident. In practice, this compares to liberating ourselves from fixed hardware dependencies and batch-only processing, which empower us to frequently retrain our models or update a dashboard near real time or querying over large dataset interactively without performance penalty. All of this in turn maximizes the value derived from business analytics for decision making, forecasting, optimization and strategic planning.

We present AWS here not as the focus of this study, but merely as an example of what aspects cloud-native infrastructures can make available to analytical functions. Services such as Amazon S3 (storage), AWS Glue (data transformation), Athena (ad-hoc querying), and Redshift (data warehouse) constitute a solid foundation that fits well into the BA principle. But the principled basis is still Business Analytics: cloud-native systems matter because they enable analysts—not simply because of their tech.

By powering scalable data ingest, schema on read flexibility and distributed compute frameworks, cloud-native architectures eliminate many of the hurdles analysts faced in the past. As we continue our work together, AWS' differentiator is the way it accelerates and elevates the Business Analytics lifecycle: richer descriptive options, diagnostic insights using more advanced models, detect & adjust to trends in an automated manner with predictive pipelines, and realize prescriptive recommendations that are actionable.

AWS Data Lake & Data Engineering Layer Format

The capability to deal with massive, heterogeneous and up-to-date datasets is crucial in recent Business Analytics. Regardless of whether analysts are doing revenue forecasting, predictive modeling consumer behavior at scale, supply chain diagnostics or risk analysis– the bedrock of all analytics remains good data and lots of it done in a structured way (Zdraveevski et al, 2020). This is why the data engineering layer, which collects, preps, organizes and polices data is one of the most important pieces of mind infrastructure for Business Analytics .

With traditional data warehousing solutions, businesses are handcuffed to strict schema requirements and long development cycles, and unable to easily incorporate semi-structured or unstructured data from sources like logs, clickstreams, social media and sensor data. These limitations would frequently hinder analytic workflows and limit the kinds of insights they could generate. Business Analytics, on the other hand, needs to be flexible, analysts should have the freedom to query across data types, iterate over new hypotheses rapidly and bring in additional sources as business questions change.

That is why cloud-native data lakes have emerged as the optimal basis for Business Analytics: Schema-on-read, separated storage and compute, cost-efficient scalability. This is a generic pattern and AWS is only one of many possible

examples. Amazon S3 as implemented today into BA tool landscapes is not popular because it is a native AWS resource, rather it makes a great centralized platform for analyst to dump their left and right row data in a huge hoard with little structure (which is essentially the business requirement) at low cost. It's the concept that matters: Data lakes allow analysts to postpone the decision about data modeling until analysis time, which preserves as much analytical freedom as possible.

But even the lighthouse data lake isn't enough. Therefore, many aspects and challenges of ETL (such as data quality, data consistency, and data integration) are relevant to Business Analytics. Automation is very nice, and cloud-native ETL services like AWS Glue are proving that transforming data between dimensions and loading it into a catalog can be made to happen without anyone writing code at all.

The governance layer is also vital in Business Analytics particularly in the regulated sectors. AWS Lake Formation is a good example of how contemporary cloud-native tools improve governance by enabling fine-grained access controls, data provenance, auditability and encryption. These capabilities help ensure that analysts are working with secure, compliant, well-managed datasets breaking the myth of not being able to un-silo data that is sensitive or mission critical.

After data has been saved and prepared, analysts need fast querying applications to explore patterns and derive meaning. While Amazon declared war on data preparation, the Alexa Platform did more than that to accelerate the Business Analytics process in both diagnostic and descriptive phases with tools like Amazon Athena (serverless SQL querying) and Redshift (data warehousing). They power analysts to execute sophisticated queries against big data sets in seconds rather than a day, allowing for deeper exploratory and inferential analysis. Crucially, these performance improvements provide direct benefits to Business Analytics outputs in terms of correctness, speed and depth.

And together, these cloud-native data engineering layer help the entire Business Analytics lifecycle from easier availability, higher quality and governance of data analytics to more accessible analytical abilities. AWS is used in this analysis to illustrate the technical side of these improvements, but the heart of the matter (improved data pipelines → improved insights → better business decisions) is unchanged.

Table -1: How Data Engineering Enhances Business Analytics

BA Requirement	Cloud-Native Capability	AWS Example	BA Requirement
Flexible exploration	Schema-on-read	Amazon S3	Flexible exploration
Faster insights	Automated ETL	AWS Glue	Faster insights
Data governance	Unified access control	Lake Formation	Data governance
Interactive analysis	High-speed SQL queries	Athena / Redshift	Interactive analysis

AWS Machine Learning Layer

Machine Learning has become an essential continuation of advanced Business Analytics today, rendering companies to further advance from standard reporting practices into extending predictive and prescriptive fortes. In today's age of data-obsession, you are not just expected to explain historical performance but predict future outcomes and uncover hidden trends in large populations, such as customer groups and strategic decision impacts. And meeting such goals necessitates scalable modeling environments, reliable data pipelines and automated workflows all of which are bolstered by cloud-native infrastructure.

In the above context, AWS is listed here not because it's the main subject but rather as an example to show how cloud-hosted ML services can enhance the Business Analytics lifecycle. The focus still is heavily on analytical use: forecasting, classification, anomaly detection, optimization and even natural language understanding.

Enhancing Predictive Analytics

Building predictive models Predictive analytics is a key part of Business Analytics systems and predicting such things as demand, pricing strategy, inventory optimization, financial risk. Amazon SageMaker offers a place where these models can be trained, tuned and deployed at scale, with the value being linked to its business outcomes.

Analysts, for example, can build regression or gradient boosting models or deep learning models that predict customer lifetime value or forecast monthly sales using SageMaker. It's not about the platform itself – it's about reducing time-to-insight: you don't want to be fiddling with servers or even setting up a complex infrastructure managed environments enable Business Analytics teams to iterate at tap speed.

Prescriptive Analytics

Prescriptive analytics is about making the best possible decisions – which can mean recommending products, adjusting marketing & budgeting plans and reallocating resources. AWS services like Amazon Personalize (recommendation systems) demonstrate how machine learning models embedded into applications could influence real-time behavioral data to make decisions. But from a Business Analytics standpoint, the true value is based on how these models allow organizations to better optimize for results, be more personalized and develop sound strategies.

Expanding Diagnostic Analytics Through NLP

Natural language processing has started to gain in popularity and importance in Business Analytics particularly with applications for customer sentiment analysis, product reviews, company communications/postings or customer support transcripts. Businesses can have all these NLP prebuilt functions in Amazon Comprehend that can extract entities, sentiments and take about topics but the point is not the functionalities again: given a set of text an analyst might unveil qualitative insights over traditional numeric data. These nuggets of wisdom can sometimes be game changers in diagnosing what is behind customer behavior or operational trends.

Advancing Forecasting Accuracy

Predicting future based on historical data is one of the widely used task in Business Analytics. Amazon Forecast abstracts a great deal of the complexity of sophisticated forecasting models, but its significance is in enabling business sensitive workloads: inventory planning, staffing projections, revenue and supply chain forecasts as well as financial projects. Increased forecast accuracy leads directly to improved strategic planning and reduced uncertainty.

Integration With the Analytics Lifecycle

What really makes cloud-native machine learning so compelling for Business Analytics is that its upstream and downstream workflows are hooked in. Automated pipelines, retraining triggers, scalable inference end-points and continuous monitoring facilitate moving from descriptive analysis to predictive modeling to prescriptive recommendations. By doing this, business analysts can use these tools to operationalize insights, so they do not merely serve as a source of intelligence for decision makers but rather give shape to the decisions as well.

As such, AWS's machine learning layer is discussed in this report not as an endgame screenshot but as the exemplar of how contemporary cloud-native tools is serving the deeper mission: to help organizations get even more sophisticated modeling into the hands of their people rapidly and responsively.

Practical Applications

In order to illustrate the practical relevance of Business Analytics in current business environment, I will focus on real-world examples where analytical methods influence decision-making with cloud-native technologies being the basis for a more flexible, scalable and robust implementation. The technical blueprint, while AWS-centric is essentially all about the Business Analytics tasks (Forecasting, Segmentation, Risk Modelling and Operational Optimization) that drive business value that we can map to real PnL numbers.

These examples illustrate well how our research approach is also collaborative: one researcher contributes analytical interpretations, and the other offer's architectural view of how cloud-native systems realize the underlying workflows. They are distant and individual, but the two ends meet through how Business Analytics thrives on such modern data infrastructures.

Retail Demand Forecasting

Retailers rely heavily on precise demand forecasts to maximize inventories, minimize stockouts, and enhance revenue planning. Business Analytics takes the lead in applying statistical and time-series forecasting models to historical sales, seasonality, promotions and external influences (weather, market indexes etc.).

In practical use, this BA process is fast-tracked in a cloud-native environment because analysts are allowed to:

- Access large sets of sales data from centralized data lakes.
- Run forecast models at the scale with flexibility.
- Automatically update the model as new data comes in Customer Segmentation for Marketing Analytics.

Marketing departments use customer segmentation to find different behavioral groups for direct marketing, to develop better products and reach new customers or clients. Business Analytics is the statistical end of most marketing segmentation, including Kubernetes clustering, RFM analysis/segmentation and demographic profiling.

Cloud-native support allows analysts to:

- Combine behavioral, transaction and demographic information.
- Scale automatic clustering to millions of records.
- Make segments real in live operational application layer.

AWS services like SageMaker can build and deploy segments at scale, but it's a business interpretation (segment priorities, messaging strategies, personalization rules and engagement metrics) that defines the marketing strategy.

Supply Chain Optimization

Logistics, Transportation, Warehousing and Procurement Supply chains produce a large volume of structured and unstructured data. Business Analytics is a key driver in arranging rerouting, minimizing delays and balancing supply-demand variabilities.

By using cloud-native analytic environments, BA teams are able to:

- Unify IoT data from sensors, shipment logs, and inventory databases.
- Train optimization algorithms at scale.
- Simulate different situations (the example could be supplier failure, route blockade).
- Build equipment predictive maintenance models.

AWS services can accommodate these workloads, but the optimization logic such as linear programming, simulation modeling, or probabilistic forecasting originates with Business Analytics procedures.

SaaS User Behavior Analytics

Business Analytics for the Software-As-A-Services companies to track how users are using your product identify risk of churn and improve usage engagement (Ramesh et al, 2025). Typical tools used by analysts include funnel analysis, cohort analysis, churn prediction models and user lifecycle metrics.

Cloud native features make this easier with:

- scalable pipelines for tracking events.
- rapid data querying
- automated predictive models for churn.
- product team real-time dashboards.

Table -2: Mapping Business Analytics Framework to Cloud-Native Support

Business Analytics Layer	Purpose	Cloud-Native Strength	AWS Example
Descriptive	Summarize what happened	Fast querying, unified data	Athena/ QuickSight
Diagnostic	Explain why it happened	Integrated datasets, scalable compute	Redshift/ Glue
Predictive	Forecast what will happen	Parallel ML training, automation	SageMaker/ Forecast
Prescriptive	Recommend optimal actions	Real-time model deployment	Personalize

Table -3: Business Analytics Use Cases with Cloud-Native Support

Business Analytics Use Case	BA Technique	Cloud-Native Value	AWS Example
Retail Forecasting	Time-series modeling	Automated ML, scalable compute	Forecast
Customer Segmentation	Clustering, RFM	Real-time deployment	SageMaker/Personalize
Fraud Detection	Anomaly detection	Streaming inference	Lambda/SageMaker
Supply Chain Optimization	Optimization models	IoT + simulation scale	IoT Core + Redshift
User Behavior Analytics	Cohort analysis	Fast queries, dashboards	Athena/QuickSight

Discussion

The result of this study clearly illustrates a synergy between Business Analytics and cloud-native architectures: the efficacy of analytics is no longer only determined by models and frameworks, but also by the infrastructure that hosts them. Cloud-native environments like AWS do provide increased scale, integration, and automation but that value is powered by principles of Business Analytics—statistics-based reasoning, decision science-based models, forecasting logic, and segmentation theory optimization frameworks (Minichino, 2023).

Our hybridization of Business Analytics architectures and cloud-native design patterns evidence that the Cloud is an accelerator, promoting high performance. Traditional barriers like hardware limitations, long ETL cycles, siloed data sets, or even limited compute resources are removed. Cloud-native systems effectively enable Business Analytics teams to derive insights faster, iterate on models more cleanly and broaden their analytical horizons – enabling them to analyze streaming data, parse unstructured inputs and conduct large-scale machine learning all at massive scales. Conceptually, this implicates all 4 layers in the Business Analytics lifecycle.

Descriptive analytics gets timelier and more accurate, as the cloud-native systems can analyze fresh data on an ongoing basis allowing execs to make decisions based on current conditions instead of based old reports.

Diagnostic analytics widens in scope, with analysts being enabled by disparate data sets and scalable compute resources to dig deeper into causes, relationships, and effects.

Predictive analytics becomes more trustworthy and actionable, because cloud-native ML environments boast easy model retraining, performance monitoring, and deployment—shortening the time between experiments and real-world utilization.

Prescriptive analytics gets more practical as cloud services can build predictions right into decision-making streams, recommendation systems, optimization engines and workflows.

However, the conversation also identifies various obstacles organizations will need to overcome to effectively capitalize on BA in a cloud-native world.

Key Challenges and Considerations

Data Governance and Quality

The data and analytics team still carries most of the responsibility for data quality, consistency and governance in cloud-native systems that make it relatively easy to store and access these things. Cloud-ready doesn't work without good governance, regardless of how well architected your cloud may be. Business Analytics needs dependable and trusted data, one which leads to the need of corporations investing heavily in data stewardship, access policies, validation rules.

Skill Gap between Business Analysts and Cloud Engineers

One frustration we saw in our joint effort reflects the reality of internal work dynamics: analysts and cloud engineers often have different types of technical conversation. Analysts care about business outcomes and statistical logic engineers want to optimize architectures and pipelines. Successful integration needs better communication between cross-functional teams, shared documentation and the right tooling to work together.

Cost Management and ROI Interpretation

Cloud-native systems are cheap, but not free. Business Analytics leaders will need to match analytical workloads and strategic value to keep compute, storage and ML deployments financially defensible. BA teams are frequently a key element in maximizing the use and measuring the return of an analytics investment.

Organizational Readiness

Cultural change is needed when moving from classic BI to advanced cloud-native analytics. Executives will need to trust on predictive models; data scientists will have to use more of those automated ML pipelines and analysts should lean into new workflows and tools. As such, Business Analytics maturity is a journey on both technical and organizational fronts.

Integrated Insight

Viewing the results, this discourse supports the main finding of this study:

Business Analytics is anorectically the intellectual heart, and cloud-native architectures are technically its megaphones. The AWS example above illustrates how today's cloud platforms can eliminate totems of operational-undifferentiated work, allowing Business Analytics to offer deeper insights, reduce time-to-cycle and effectively touch more people in an organization. But Business Analytics theories and frameworks and interpretive skills, still matter profoundly, technology speeds up the analysis; it doesn't determine it.

Conclusion

The aim of this research was to investigate the impact on modern Business Analytics by embracing cloud-native architectures, taking the AWS platform as a practical example on how to build flexible IT infrastructure for analytical workloads. Even though the cloud has given us the means to massive scale computing – machine learning (ML) automation and real-time insights delivery, all of these analytic values still hold firmly on core Business Analytics theory. These themes of descriptive summaries, diagnostic investigations, predictive modeling and prescriptive optimization still inform how organizations make sense and sensemaking of data.

Our joint, remote work-based study provided evidence that Business Analytics is heavily relying on cloud-native technologies and is not tied to only one vendor or technology. Instead of the cloud being a bottleneck, in effect, it acts as an accelerator eliminating constraints that an on-premises system would place on the analyst and allowing analysts to do deeper work more quickly and more iteratively.

The key characteristics of cloud-native–elastic compute, adaptative storage, distributed processing, serverless automation and integrated machine learning by providing the needed workflows to support Business Analytics objectives such as improving data availability (in order to better inform decisions), increasing model scale (to let analysts experiment with broad data sets) and enhancing decision-making precision.

The real-world case studies covered forecasting, customer segmentation, financial risk modeling, supply chain optimization and SaaS user analytics exemplify how a wide range of applications have enabled different industries to employ Business Analytics for operational efficiencies at the same time as strategic gain. And in all instances, the cloud is just serving as the infrastructure platform to support these analytics approaches to execute at internet scale and velocity.

The study also identified continuing hurdles. For any of them moving to cloud-based analytics, Data governance, tunes between the talents of Analysts and Cloud Engineers, Organizations readiness, and Financial Return are all critical factors. These challenges highlight the need for more than

just cutting-edge technology to guarantee BA's success; an intelligent strategy, partnership, and expertise are imperative.

At the end of the day, data shows that Business Analytics is Cloud Architecture not so much the driving force behind the data-driven transformation! Cloud-native environment such as AWS amplifies what Business Analytics teams can deliver in terms of dynamic, trustworthiness and impactful insights. Analytical Foundation + Cloud: The new wave of DQ In a world growing richer in data heterogeneity, the interplay between Good Analytics and Flexible clouds will dictate what makes-up next-gen decision intelligence. With this comprehensive view, business can not only interpret the past with data but also design the future with clarity and confidence.

REFERENCES

[1] Mohajeri, M. A. (2024). Leveraging large language model for enhanced business analytics on AWS.

[2] Thallam, N. S. T. (2023). Comparative Analysis of Public Cloud Providers for Big Data Analytics: AWS, Azure, and Google Cloud. International Journal of AI, BigData, Computational and Management Studies, 4(3), 18-29.

[3] Gatlin, K. (2024). Real-Time Analytics on Amazon Web Services and Google Cloud: Unlocking Data-Driven Insights.

[4] Dutta, P. (2019). Business Analytics using Microsoft Power BI and AWS Redshift. International Journal of Trend in Scientific Research and Development, 3(12), 984-986.

[5] Minichino, J. (2023). Data Analytics in the AWS Cloud: Building a Data Platform for BI and Predictive Analytics on AWS. John Wiley & Sons.

[6] Zdravevski, E., Lameski, P., Apanowicz, C., & Ślęzak, D. (2020). From Big Data to business analytics: The case study of churn prediction. Applied Soft Computing, 90, 106164.

[7] Ramesh, S., Sukanth, B. N., Jaswanth, S. S., Kumar, K. D., & Appana, N. L. (2025, March). Cloud-Based AI Business Analytics Platform. In 2025 3rd International Conference on Smart Systems for applications in Electrical Sciences (ICSSES) (pp. 1-6). IEEE.

BIOGRAPHIES

The lead author is an AWS-accredited Cloud Solutions Architect - focused on cloud-native data engineering, analytics pipeline and machine learning services. Currently her work extends to building scalable AWS architectures to serve the Business Analytics and data for decision making.

The second author is a BA (Business Analytics) student and is interested in data-driven decision-making, cloud analytics and streaming data. She brings to the research knowledge and analysis of modern BA methods. The lead author is an AWS-accredited Cloud practitioner focused on cloud-native data engineering, analytics pipeline and machine learning services. Currently her work extends to building scalable AWS architectures to serve the Business Analytics and data for decision making.