BECOMING A DATA-DRIVEN ENTERPRISE
Data Industrialization

DATA AS A PRODUCT

Today, data is everywhere—in industry, in business, in our day-to-day lives. And it's growing all the time.

As digitalization takes ever greater hold, and as millions of new data-rich devices connect in new ways, the volume of data available to the enterprise is growing exponentially. It's enabling unprecedented levels of insight. In fact, becoming data-driven is the new table-stakes for enterprise success.

So, what does it mean to be a data-driven enterprise? It means maximizing the value of your data, and treating it as an asset differentiated by its completeness, lineage, and quality. It means using data as the basis for critical business decision-making through transparent and high-quality analytics as opposed to tribal knowledge. In short, it means thinking of your data, and the analytics that rely on it, as a "product"—one that's essential for driving business outcomes, whether that's a medical device manufacturer creating new medical-grade data services to support patient healthcare decisions, an oil and gas producer achieving greatly enhanced efficiency in its plants, or a media and entertainment company serving personalized content to its customers.

Adopting a product mindset around enterprise data requires its viability, and the analytics models that derive actionable insights from it, are examined, measured, and refreshed continuously. A product lifecycle approach is necessary—one that considers everything from conceptualization and design to manufacture and roll-out, as well as ongoing support. Technology-siloed, application-focused data architectures must become outcome-centric architectures, in which data is reused multiple times to support partner ecosystems, data-enhanced products, and multichannel interactions with the user community.

Above all, this mindset calls for a deliberate strategy to industrialize enterprise data and models.

DATA MATURITY MODEL

Accenture has developed a data maturity model that charts the enterprise's journey to data industrialization.

It helps a business shift away from the idea of "single-use data", where data is tightly coupled to particular schemas and formats, requiring major rework to make it suitable for use beyond the original business case. And it helps them instead tap into the best available data at any time for highly relevant actionable insights to support optimized business decision-making.

The data maturity model has five stages, covering initial ad-hoc data use through to a fully industrialized approach:

00

Ad-Hoc.
Siloed activity. The enterprise lacks a product mindset and treats its data as a second-class citizen. Data is tightly coupled with applications, with limited capacity for internal sharing thanks to a lack of data strategy, architecture, delivery, or risk management.

01

Organize.
Sparking excitement. The enterprise recognizes the value of its data as an asset. It begins to decouple data from applications and develop a data-product mindset through a business vision and data strategy.
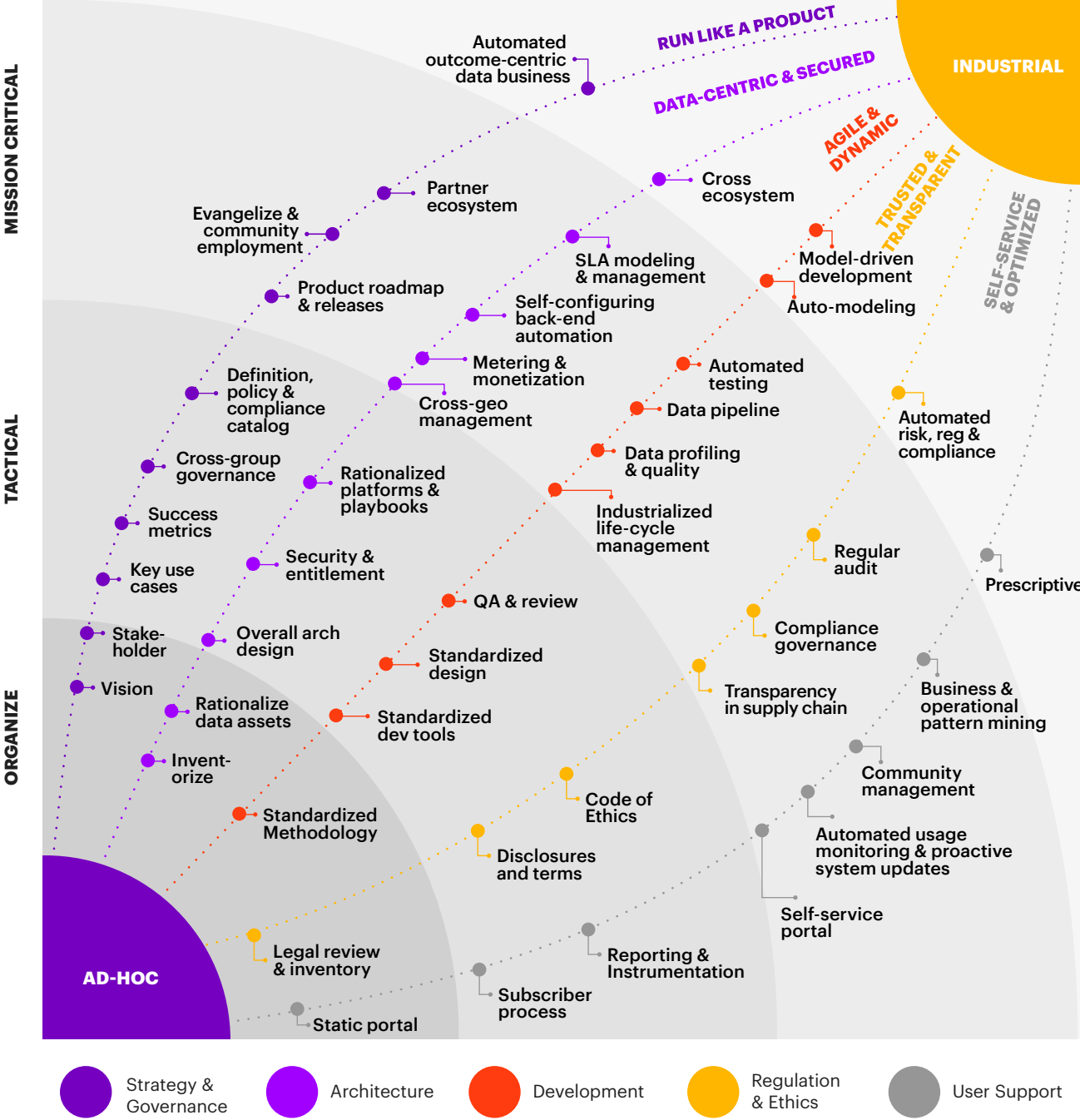
02

Tactical.
Building momentum. The enterprise proves the value of its metrics and data-driven methods, standardizing its tools, templates, and methods to create an essential foothold as a data business.

03

Critical.
Moving to production. The enterprise builds well-defined and automated methods for developing its data products, establishes a well-structured data product catalogue, and provides self-service capabilities across the organization. It transforms data into an independent digital asset for the business and expands its use out into the connected ecosystem.

04

Industrial.
Data as differentiator. Data is treated as a first-class citizen, and drives optimal business outcomes. The competitive positioning of the enterprise is differentiated by the quality of its data products in the digital ecosystem.

The model charts these five stages across the dimensions of strategy and governance, architecture, development, regulation and ethics, and user support.

Accenture's Data Maturity Model

MISSION CRITICAL

TACTICAL

ORGANIZE

RUN LIKE A PRODUCT

DATA-CENTRIC & SECURED

AGILE & DYNAMIC

TRUSTED & TRANSPARENT

SELF-SERVICE & OPTIMIZED

INDUSTRIAL

AD-HOC

Automated outcome-centric data business

Partner ecosystem

Evangelize & community employment

Product roadmap & releases

Definition, policy & compliance catalog

Cross-group governance

Success metrics

Key use cases

Stake-holder

Vision

Rationalize data assets

Invent-orize

SLA modeling & management

Self-configuring back-end automation

Metering & monetization

Cross-geo management

Rationalized platforms & playbooks

Security & entitlement

Overall arch design

Standardized Methodology

Cross ecosystem

Model-driven development

Auto-modeling

Automated testing

Data pipeline

Data profiling & quality

Industrialized life-cycle management

QA & review

Standardized design

Standardized dev tools

Code of Ethics

Disclosures and terms

Legal review & inventory

Automated risk, reg & compliance

Regular audit

Compliance governance

Transparency in supply chain

Prescriptive

Business & operational pattern mining

Community management

Automated usage monitoring & proactive system updates

Self-service portal

Reporting & Instrumentation

Subscriber process

Static portal

Legend:
- Strategy & Governance
- Architecture
- Development
- Regulation & Ethics
- User Support

Strategy and Governance

HANDLING DATA ASSETS LIKE A PRODUCT.

A mature data strategy recognizes that data and analytics models are products that differentiate the business in the digital ecosystem. The strategy should thus determine the business objectives (whether that's growing the customer base, creating personalized recommendations, or anything else) and outline how to obtain the data and models to best fulfill those objectives. This use of strategy to optimize delivery drives the other dimensions of the data industrialization journey.

In the context of strategy and governance, actions for the stages of the previously introduced data maturity model can be prescribed as follows:

01

Organize.
Define the product-centric vision of how data and models support business outcomes. For each data initiative, identify the business and technical stakeholders who will buy in to that vision's objectives, strategy, and tactics.

02

Tactical.
Apply the data-product mindset to key use cases, considering how to get the best data and models for the desired business outcomes. Identify success metrics and build a data committee to oversee development and release against the strategy. Define data policy and compliance requirements.

03

Critical.
Scale the data-as-a-product approach by defining a roadmap, including subsequent launch cycles, and building a larger partner ecosystem.

04

Industrial.
At full maturity, the enterprise runs its data and models like a product, shifting to selling data outcomes, and extending out into the digital ecosystem of related data products.

TRANSFORMING A BUSINESS FROM FARMING EQUIPMENT TO FARMING INSIGHTS.

Consider a farming equipment manufacturer's journey from selling equipment and associated maintenance services to running enterprise data and models as differentiating products. By adding IoT sensors to their farm equipment, they can collect data for new remote diagnostics, optimization, and predictive maintenance services. By taking a product mindset, a new digital opportunity then opens up. With the smart farming equipment's unique visibility of the land being farmed – and the farmer's approach – they can now provide information services on critical factors like soil, planting, and equipment. The company can thus become a player in an ecosystem focused on maximizing farming productivity, working with futures markets, chemicals companies, insurers, and others, to transform itself into a provider of unique farming insights as digital products.

Architecture

FROM APPLICATION-CENTRIC TO DATA-CENTRIC.

An industrialized data architecture is data-centric rather than application-centric. Its technology stacks, mechanisms, and orchestrations are focused on maximizing the security and value of data for the enterprise. It uncouples valuable data from applications, enabling its easy reuse – both by the business and by the wider ecosystem of partners.

01

Organize.
Take an inventory of existing data and model assets and back-end systems. Rationalize the services that will form the components of future enterprise-level data products.

02

Tactical.
Standardize the overall architecture. Evaluate best practices and technology stacks to enhance cost-effectiveness, performance, scalability, and security. Create common configurable and customizable methods for data onboarding and use.

03

Critical.
Build a common methodology to right-size the level of data management and protection for data whether it resides in the cloud or on-premise data centers. Apply metering and chargeback on service use and quality. Automate provisioning and scaling mechanisms.

04

Industrial.
The enterprise architecture is data-centric and secured. It not only supports publishing data out, but also enables the easy and flexible factoring of data and models from third parties to power a cross-ecosystem data business.

COMPETING ON THE MANAGEMENT OF MEDIA AND ENTERTAINMENT CONTENT.

A media and entertainment company competes on its ability to provide subscribers with content customized by genre, cast, director, language, or numerous other factors. It must store and process vast volumes of data – most of which is provided by others —adding subtitles or other local distributor logos as necessary. With an industrialized architecture, the company can store data in the most cost-effective system for its needs, factoring in geographic distribution to manage the transmission limits of available Internet bandwidth. Real-time updates can be handled, so unscheduled events like overrunning sports games can be reflected immediately in programming guides. Data is normalized and transformed into common schema objects, such as linking an original English-language movie with its Spanish version or its sequel. Enterprise data assets are thus standardized and suitable for reuse and discovery, enabling highly personalized recommendations that factor in both proprietary content and third-party content (ratings, user-generated reviews, interviews and articles from other platforms, etc.). A data-centric architecture makes it easy for the company to use and customize data from others and thus create new and enhanced products for their subscribers.

Development

BECOMING AGILE AND DYNAMIC.

An industrialized development process is agile and dynamic, streamlining innovation to create new data-powered business outcomes in a fast-evolving, ever-changing market. A commitment to the best data and models requires an iterative approach. It includes data and model lifecycle and DevOps processes that allow for rapid iteration to deploy, optimize, and redeploy new datasets and models to best support the business.

01

Organize.
Define standard methodologies, code templates, and use cases for the development, testing, deployment, and production of data and models.

02

Tactical.
As more data and model products are created, enforce formalized standards across architectural components, development tools, documentation, and quality assurance. Ensure data publication and consumption processes align with the business vision.

03

Critical.
Implement DevOps processes for data products, adopting data and model lifecycle management frameworks, configurable data pipelines, and automated testing and release cycles. Include continuous monitoring that guarantees data quality and model health. Use governance and audit features to provide validation and closed-loop feedback.

04

Industrial.
Custom data products are created, tested, and deployed by leveraging configuration and model-driven automated processes that enable the "citizen user" within the business. Automation implements champion-challenger analytical model comparisons scaling the number of training and retraining experiments to improve outcomes.

MANAGING MODEL DEVELOPMENT AT SCALE TO IMPROVE PLANT OPERATIONS.

To optimize plant operational efficiency, an oil and gas company developed a series of composite real-time models, involving data from numerous sensors fed into forecasting models, then into asset health and performance models, and then rolled up into an operations status used for decision-making – all created, governed, and maintained by cross-organizational business owners, data scientists, and domain experts. With each of these complex model pipelines deployed thousands of times across the plant, some inevitably required rework, retraining, and feature engineering over time. A model-specific DevOps process was implemented to industrialize develop-deploy-monitor cycles. Model failure was considered from the outset, requiring data scientists to specify the data quality conditions and accuracy and precision evaluations used to automatically monitor running models and trigger actions like retraining models or taking them out of deployment if needed. The result: an automated system to ensure model accuracy and a way to accelerate and scale model development ensures trust in the prescribed updates to plant operations.

Regulation and Ethics

ACQUIRING TRUST THROUGH TRANSPARENCY.

An industrialized approach to regulation and ethics supports the transparency of data use to help the enterprise build a trusted digital reputation in the market. It defines a code of ethics as a common language for eliminating risk, standardizing audit processes, and leveraging new technologies like blockchain to ensure compliance and transparency for all data stakeholders

01

Organize.
Create an inventory of the legal and regulatory rules applicable to data services.

02

Tactical.
Provide mechanisms to ensure informed consent is acquired from data owners and data subjects. Define a code of conduct, as well as policies and procedures, to ensure digital trust is established consistently for data services.

03

Critical.
Maintain a single logical view of data through a universal metadata model across the data supply chain. Log everything that happens to the data and make the footprint visible to data stewards. Implement transparency and explainability in AI models. Evaluate whether activities conducted on the data agreed upon usage standards. Audit regularly to assess security and risk control and monitoring.

04

Industrial.
Automated monitoring programmatically supports regulatory compliance, while proactively identifying ethical risks to the enterprise – and taking automated action to flag for human review. Transparency is baked into data use right across the value chain.

SPOTTING FINANCIAL FRAUD THROUGH TRUSTED DATA SHARING.

Consider a collaborative anti-money-laundering application used by multiple banks in a way that allows them to share costs and improve the detection of suspicious activity. In developing the application, guaranteeing trust and data transparency was key, enabling each bank to monitor and control how their data was being used. Beyond their legal agreements, each bank could programmatically track the lineage of their data and its use across the whole data supply chain. They could also control the models that were applied, whether they were shared models recommended by the application and other banks, or private models of their own. The result is a living system of trust and transparency, in which data access can be programmatically tracked and enforced based upon the agreed upon rules set by each bank.

User Support

OPTIMIZING WITH SELF-SERVICE.

An industrialized approach to user support rests on a product mindset that makes data and models easy and appealing to use. It extends self-service capabilities beyond the data experts to the whole enterprise in a user-friendly way, while also supporting closed-loop optimization. The ambition: to unlock the greatest benefits for the enterprise by using data to power insights for "citizen" users like the business analyst, the domain expert, or the operations engineer.

01

Organize.
Set up a static portal for users to discover and access enterprise data, and communicate it with their teams.

02

Tactical.
Foster innovation by proactively supporting the development of new use cases for the data. Calculate standardized cost-benefit measures, and incorporate business-level tools for defined reporting needs.

03

Critical.
Scale the data-as-a-product approach by defining a roadmap, including subsequent launch cycles, and building a larger partner ecosystem.

04

Industrial.
Prescriptive insight-driven actions are enabled across the enterprise. A mature, optimized and contextualized data/ insight service is available for all users as they need it, supported by knowledge graphs, AI-enabled interactions, and other technological innovations.

PRESCRIBING OIL AND GAS WELL PLANNING VIA INTERNET-SEARCH-LIKE EXPERIENCES.

Today, the process of creating an oil or gas well design is largely expert-led. A drilling engineer plans where and how to drill based on his or her experience. Even the data used to create a well offset report, which compares the well with previous designs, is often based on a combination of basic filter on the geographical region and the individual engineer's experience. There is much value to be had in augmenting this expert-led process with the wealth of data that lies beyond the engineer's immediate experience – provided that finding and processing that data is simple. Internet search provides a valuable example to follow. In automatically indexing content and then extracting and presenting it in a contextual way (in other words, presenting results differently when a search is about a company, a person, or a work of art, etc.), it presents content in a highly accessible and relevant way. By applying the same techniques, an oil and gas company can create a knowledge model that covers a well and everything that the drilling engineer needs to consider. It can then use automated techniques for extracting these insights from enterprise data, creating an Internet-search-like capability that equips the drilling engineer with the ability to make better data-driven decisions in their drilling plans.

INDUST RIALIZED DATA

As the volume of enterprise data explodes, and as the number of potential data use cases accelerates exponentially, an industrialized approach to data and models is quickly becoming a must-have capability.

In today's leading digital-native and data-driven enterprises, data and models are already treated as first-class citizens—capable of taking a truly differentiated offering to the market.

Accenture's data maturity model charts a path for traditional enterprises to develop this industrialized capability and take a lead in the digital ecosystem. This journey enables an ever-greater degree of automation and rapid delivery to create the best data and the best models to enable business outcomes.

Industrialization helps the enterprise fully leverage and monetize its data and model assets, generating the insights that can both drive the core business forward and create the entirely new outcome-driven digital business models that pivot into the new. In this way, companies that were once tied to particular products or services are transformed into robust data-driven companies. The journey to data industrialization is the key to unlocking the data-driven enterprise of the future.

CONTACTS

Teresa Tung, Ph.D.
Managing Director,
Applied Intelligence Innovation Lead,
Accenture Labs

Jean-Luc Chatelain
Managing Director,
CTO Applied Intelligence

CONTRIBUTOR

Fang Hou

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