ADNOC Builds Agility and Resilience by Executing an Enterprise Digital Strategy

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To realize its 2030 goals, ADNOC recognized that it would need high-value initiatives at enterprise scale. It adopted a formalized enterprisewide strategy to progress beyond experimentation and scale digital innovation. ADNOCs approaches can guide IT leaders and CIOs in their digital strategies.

Overview

In 2016, Abu Dhabi National Oil Company (ADNOC) established a set of strategic goals to realize by 2030, including increasing oil and gas production by more than 60%. Digital transformation was identified as essential to achieving these. Individual operating companies began experimenting with digital technologies, generating important experience. As a group, ADNOC quickly saw that isolated, independent efforts would not achieve the scale of benefit required. To realize its 2030 goals, it recognized the need for coordinated, coherent, high-impact initiatives that delivered value at enterprise scale. The approaches ADNOC adopted provide useful lessons for oil and gas CIOs engaged with digital strategy execution or scaling digital innovations in their own organizations.

In 2017, a digital projects and innovation team was established in ADNOC headquarters — under a senior vice president for digital, reporting directly to the company’s executive office. This team's initial responsibility was to structure digital efforts into a coherent and governed framework, and single
overarching strategy. The central digital team is today organized as part of the Group Technology function, reporting to the CTO.

ADNOC has since operationalized a wide range of digital innovations. The flagship initiative is the company's Panorama Digital Command Center.

ADNOC's Panorama Digital Command Center integrates into one interface — the operations of the company in real time across the full value chain, from wells to transportation. With operational data displayed on a 51 meter wide screen, operators can drill down into operational data anywhere across the group of companies. Panorama acts as a single source of reporting, with fast and real-time data access to inform daily and long-term decision making. ADNOC states Panorama has generated over $1 billion in measurable value, and it has become an essential tool and enabler for the business.

Having all operational data integrated has also enabled ADNOC to develop several digital tools, including:

- **Predictive maintenance** — ADNOC has partnered with Honeywell to use artificial intelligence (AI) and machine learning (ML) in predictive maintenance for all rotating equipment, across the entire group of companies. This is estimated to be completed by the end of 2022.

- **Blockchain** — Blockchain in hydrocarbon accounting was successfully piloted and is now being rolled out across the group to enable faster reporting, immutable data records and better transparency.

- **Value chain optimization modeling** — ADNOC has developed a big data-based, linear programming tool providing a digital twin of its entire operations. This model can run optimization cases and “what-if” scenarios for individual business lines and the company’s entire operations.

Together these innovations give the ADNOC management team the ability to make faster decisions and enable the company to react rapidly to external market events.

ADNOC continues to accelerate its digital journey in support of its strategic business goals. At the time of writing, ADNOC's digital portfolio lists more than 200 projects at all stages of implementation.

**ADNOC Drives Digital With Central Oversight and Business Ownership of Initiatives**

ADNOC distinguished the following two main types of digital initiatives:

- **Strategic projects** that benefit and apply equally across operating companies (such as predictive maintenance). The digital team oversees and governs all of these digital initiatives and owns the execution of cross enterprise initiatives.

- **Initiatives** that are required for the unique, individual operating company or business unit-specific projects. These are owned by individual business units, which are responsible for their
Technologies involved include analytics, AI, ML, the Internet of Things (IoT), worker mobility enablement, drones and robotics, and others.

Initially, digital initiatives of both types were strongly driven by the central digital team. The digital team began by holding innovation workshops with operational teams to highlight challenges and potential solution options, then worked iteratively with operations teams to assess potential value.

Early on, the digital team took ownership of the resulting initiatives, including the responsibility for reporting progress to executive management. The digital team has since adapted its approach, finding that business ownership of initiative execution results in greater commitment and improves acceptance and adoption of the outcomes. Business units are now responsible for driving their own initiatives, reporting them to the relevant steering committee and their own business line directorates. A useful feature of this approach is to generate internal competition between business units. This generates momentum and a greater willingness to accept change among business teams who want to outperform their peers. The approach features as part of ongoing efforts to build a culture of innovation within ADNOC companies.

The central digital team is responsible for maintaining the enterprise digital strategy, strategy execution oversight, digital skills development, as well as the associated change management and communications efforts. It also conducts early-stage feasibility assessments and proofs of concept (POCs). The team continues to work with operating companies, as needed, to provide subject matter expertise, further raise awareness of digital opportunities, and provide direction and support for initiative execution, for example, helping an operating company develop an initiative's roadmap for solution development beyond the initial versions.

An Innovation Portfolio Is Maintained, Prioritized and Governed

The digital team also oversees the annual budgets for digital initiatives with a remit to ensure ADNOC is investing in the right opportunities. A key role of the team is to maintain the portfolio of digital initiatives and orchestrate activities between them, identifying where potential duplication of learning or effort may be occurring. If cross-operating company needs or initiative duplication is found, rationalized single initiatives may be created and developed collaboratively among the stakeholders. The digital team reports regularly to ADNOC’s digital steering committee chaired by the CTO.

Opportunities for innovation are assessed along two primary dimensions — their likely value and the feasibility or effort involved in execution. The digital team monitors initiative development and makes recommendations to the steering committee. The steering committee then decides which initiatives to continue and which, if any, to stop. The digital team reviews the entire portfolio every six months but prioritization of in-progress initiatives is maintained dynamically in-between reviews. The digital team monitors and adjusts prioritization based on the digital strategy and ongoing discussion with leadership in business units with active initiatives.
Table 1: ADNOC’s Approach to Scaling Digital Innovation

<table>
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Source: Adapted From ADNOC

**Initiative Implementation Is Business-Led With the Digital Team and External Partner Support**

The digital team is kept small. Typically the digital team initiates digital initiatives, conducting feasibility assessments and POCs, supported with resources from the digital data science team, IT and the business, as needed. For larger POCs and pilots, the digital team collaborates with the business unit to define and select an appropriate third-party partner to work with to build and implement any required solutions. Originally, ADNOC did not create a distinct or separate organization for digital solution development specifically. At the time of writing, ADNOC is setting up a new digital factory to move new digital projects rapidly to pilots.

Once an initiative is successfully piloted, the business owners take over responsibility for further implementation. ADNOC’s IT organization assesses the security and compliance requirements, and provides the tools and infrastructure needed for solution development and implementation. The digital team assists with developing a roadmap and strategy for the deployed solution.

Once implemented, solutions are maintained by a combination of IT and the providing third-party partner, sometimes with involvement from the data science unit. Business unit resources do not maintain solutions unless they created them, which can be the case, for example, with analytical models, algorithms or dashboards built using corporate business intelligence (BI) tools.

**Data Access and Change Management Are Critical Success Factors**

The ADNOC digital team identified the following two major challenges in developing and operationalizing digital innovations:

■ Access to data and data quality

■ Overcoming resistance to digital solution implementation in the business
Data Access and Data Quality Issues Cause Bottlenecks

Before the central digital team was established, timely availability of good quality data was found to be a common bottleneck in developing and scaling digital initiatives. In addition, access to required datasets was commonly restricted for reasons of confidentiality or security. In many cases, overcoming these hurdles took the digital team longer than initially expected and the overall pace of progress was slowed.

The whole area of data governance, including data management and data access, is an area of ongoing improvement in the group. More time is factored into planning for digital initiatives to address data issues, and the digital team has tuned its ambitions to recognize the complexity of obtaining access and improving data quality in many programs.

Multiple Approaches Required to Address Resistance to Implementation

ADNOC's digital team learned early on that pursuing digital initiatives driven by business need, along with business ownership and management of initiatives, were key accelerators for digital programs. However, even with these in place, early enthusiasm for the idea of digital innovation often gave way to an increasing reluctance to implement or adopt as the reality of the changes needed for new solutions dawned.

The reasons were often context-specific and diverse, but commonly included:

- Skepticism or lack of trust stemming from lack of knowledge or from hype surrounding digital solutions’ capabilities
- Realization of the extent of change in processes or working practices that solution implementation would entail
- Worry based on uncertainty about the impact on an individual’s career or livelihood

Many companies find that there is no quick answer to these challenges. ADNOC found that digital solutions often changed operating processes. This adjustment can be difficult and people can be reluctant to use new digital solutions, especially where existing systems that they trust are kept in place. ADNOC's experience is that to reduce skepticism and convince the business of the value of a digital innovation requires repetition, constant effort, strong communication, transparency and close collaboration over a period of time.

The digital team now adopts, often in combination, a wide variety of approaches to address business-unit concerns. These can range from effective lobbying of key decision makers, through clear financial benefit illustration, to communicating benefits in terms of improved workflows and job performance. Often, providing assurance that the digital innovation would not negatively impact the jobs or careers of individuals was important.
ADNOC's digital team now takes a step-by-step approach to give the best chance of early and successful solution adoption. This involves transparency in development, frequent explanation of the solution and, most importantly, repeated demonstration of the ways in which it solves problems or work challenges, or improves business outcomes. In many instances, existing solutions and new digital innovations are run in parallel for a time to clearly demonstrate the improvements in the new solution.

About This Research

We developed this case study to describe ADNOC's approach to organizing a digital transformation and scaling digital innovation. It is based on an interview with the company’s senior vice president of digital projects and innovation, and materials provided by the company.

Recommended by the Authors

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