Digital Knowledge Accelerates Benefits of Digital Transformation

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Surviving and Thriving in Increasingly Digital Economies

Digital transformation has become a strategic roadmap for many businesses. Nowhere is this more evident than within Fortune 500 companies operating in complex, global industrial markets. These include oil & gas, shipping, and manufacturing.

For these large organizations, transformation isn’t just about technology; it’s about evolving beyond 20th century business practices and leveraging disruptive innovation to survive and thrive in data-driven economies. Profitability, safety, customer satisfaction, operational efficiency, environmental stewardship, and more depend upon companies’ ability to digitally transform their businesses, and do so faster than their competitors.

From creating new business models to achieving margin-boosting operational optimization, companies are counting on data to quickly drive sustainable benefits across the enterprise, including:

• Profitability from quickly responding to new market opportunities and segments, either directly or via channels.

• Asset optimization through improved, proactive, and highly-automated management of infrastructure, resources, and capital.

• Higher satisfaction and retention by engaging customers with highly-valued products and services where and when they need them.
• Operational flexibility and responsiveness that comes from improving the agility, speed, and accuracy of decision making.

• Protection against commoditization of physical equipment sales via value-added aftermarket services to existing customers.

Data Is Everywhere, But Isn’t Enough

There is no lack of data to draw upon for digital transformation. Large industrial companies have a long history of collecting data, whether through systems or manually. Now, technology has broken down many barriers that have stranded data in siloes. A wealth of historic performance data can be more readily accessed. Interconnected equipment, devices, systems, and organizations are generating, collecting and sharing volumes of real-time data.

However, many industrial companies continue to struggle to apply their data to digital transformation. The volume, complexity, and speed of the data often overwhelm them. Value is delayed, limited, or, in some cases, never realized. Often, pilot projects with data resemble more traditional rip-and-replace application upgrades, where progress is painstaking and benefits take years to surface.

These struggles are due, in part, to organizational assumptions that some combination of data, data lakes, algorithms, and analytics engines are solutions in and of themselves. In ARC Advisory Group’s view, that is rarely the case, particularly for Fortune 500 industrial companies that must deal with the largest data sets imaginable. Data and the supporting technology are needed components for digital transformation, but aren’t enough.

Knowledge Is Key, But Remains Hidden

A mission-critical competency—human expertise—is often missing from the digital transformation equation. Human expertise drives the value within the data and ensures benefits are achieved in a timely manner and realized continually. It does so by determining what the data means and how, when, and why insights should be applied. Ultimately, human expertise optimizes the value of transformation and ensures accuracy and speed of its execution.
By providing the necessary context, expertise enables companies to apply insight specifically to achieve ideal outcomes: process efficiency, profitability, performance, safety, etc. However, this human expertise is often hidden from the organization; tightly locked up in cultures of tribal knowledge or stranded, as is the case with most unstructured data.

**Tribal Knowledge Continues to Confound**

Going back decades, capturing and applying knowledge has been one of the most continually pursued, mission-critical tasks undertaken by industrial companies. New technologies, training, and educational methods, as well as systems and work tools, have been used to try to capture and transfer tribal knowledge and best practices from individuals to organizations.

Entire boutique industries have risen (and fallen) trying to “crack the code” of tribal knowledge. Additionally, countless internal initiatives have been funded and then died on the vine. Caught between the need to create organizational knowledge and the perceived prospect of compromising job security of their high-value experts, companies have struggled to progress.

Now, many experienced individuals, including the often thousands of these subject matter experts (SMEs) in large organizations, are reaching retirement age. As a result, businesses face losing the collective experience and expertise of these workers while simultaneously competing in disrupted markets.

**Stranded Knowledge Persists in Digital Transformation**

In addition to dealing with the challenge of tribal knowledge, industrial companies have a long history of leaving actionable information stranded in data and their sources. This trend continues despite their improving ability to access this information. Vast amounts of knowledge lie trapped in sources that are often tightly siloed and collected, but rarely used, or not part of an “active” knowledge base application.

These data are usually a mix in structured and unstructured formats. Examples include photographs, audio, spreadsheets, paper-based work orders, emails, reports, maintenance logs, streaming video, confidence ratings, industry-specific standards and process flows, social media, etc.
At the end of the day, data is everywhere but knowledge remains largely hidden. If large industrial organizations cannot identify, access, contextualize, and share this critical expertise, which is their intellectual property, opportunity for transformation will remain limited.

**Digital Knowledge: Unlocking Human Expertise**

To remain competitive and thrive, industrial companies need to integrate human expertise into digital transformation. Doing so means overcoming the barriers inherent in tribal and stranded knowledge and capturing that expertise. Digital knowledge is the means for doing so.

Digital knowledge is the discipline of encoding human expertise and data from across silos, digitizing these insights, and then driving them into relevant decision flows. This enables the subject matter experts to make better and faster decisions that improve operations.

Implementing a digital knowledge strategy requires a specific, if relatively straightforward, methodology. This combines a knowledge-centric orientation, a range of analytics techniques, artificial intelligence (AI), and technology. Companies wishing to do so should:

- **Begin with the business problem and relevant subject matter experts, not data.** Lack of a business problem-centric orientation is often the undoing of many digital transformation projects. Companies too focused on data become overwhelmed by the volume and complexity. Reactively, digital transformation initiatives become a series of complicated IT projects, as leadership deems that group most capable of managing data issues.

- When companies begin digital transformation by first defining the business problem, the expertise and decision flows needed to solve it becomes central to the task. As they know the business best, SMEs drive the knowledge creation process, adding the necessary context and decision flows for solving the problem. By removing the gap between problem identification and the knowledge needed to solve it, companies accelerate the speed of digital transformation.
• **Let the data format and sources guide the analytic techniques.** When it comes to implementing knowledge-centric digital transformation, both simple and complex techniques can be applied. What is important is that the technique be suited to the data, rather than applying a one-size-fits-all approach. These data are likely to be a mix of structured and unstructured formats, including work logs, applications, event reports, images, emails, manuals, historians, the internet, etc. A range of techniques may be needed, from decision trees to cognitive analysis, for example.

• **Speed continual improvement by removing data science skill barriers for SMEs.** Once engaged in digital transformation, SMEs will want to continually innovate to improve and simplify aspects of the business that impact their role. However, they lack critical advanced data science skills. Eliminate that gap with tools designed to assist knowledge-centric analysis, such as semantic search (natural language processing), drag-and-drop data mashups and blending, guided and auto-generated models, and model libraries.

• **Amplify knowledge to create new value.** As decision flows become digitized and operationalized, the potential exists for connecting them to drive additional value. Secondary and tertiary interdependencies can be identified and leveraged, providing a more holistic, informed view of the business. The insights provided by the connected decision flows can create new value. For example, the flows can be pushed out as role-based recommendations to any affected personnel, including engineers, finance, and field workers.

**Driving Results with Digital Knowledge**

As with any business improvement transformation, achieving timely, measurable results determines success. Some of the world’s largest industrial companies—Chevron, GE, Maersk, and Shell—are using digital knowledge strategies to drive significant business benefits. Many are realizing results in half the time of prior efforts, all without having to bring in an army of consultants. Improvements include:

• Optimizing re-routing for container ships, gaining 99.7 percent time-savings, by reducing the development time for logistics contingency recommendations from six hours to 60 seconds.
Reducing unplanned equipment downtime weeks in advance by identifying unwanted events that lead to asset failure.

Reducing the root cause of returned parts by 67 percent.

Improving accounts receivable collections by 65 percent.

Reducing annual cost of equipment repairs in processing crude oil by predicting factors leading to corrosion.

In addition to the results, these large industrial businesses also leverage digital knowledge for many other initiatives that improve operations and reduce risk such as:

- Manufacturing: Field service profitability
- Manufacturing: Global investment allocation recommendation
- Manufacturing: Procurement optimization
- Manufacturing: Turbine shutdown prediction
- Oil & gas: Health and safety risk reduction
- Oil & gas: Well risk assessment
- Oil & gas: Pump failure prediction
- Oil & gas: Cybersecurity
- Oil & gas: Liquid natural gas demand and price forecasting
- Transportation: Logistics optimization and contingency management

These use cases and results are being delivered through Maana’s Knowledge Platform. Maana is a company that specializes in digital knowledge using its patented knowledge graph, a wide range of analytics techniques, artificial intelligence, machine learning, and semantic search.

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