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Toward a Data-Driven Culture

By Jeff Lawton

When Jack Welch decided in 1995 that General Electric Co. (GE) would become a firm known for its relentless focus on quality, he selected Six Sigma techniques and tools to improve processes. He knew Six Sigma would need to permeate every facet of work at GE to become ingrained in GE's culture and that cultural transformation would be neither cheap nor easy. He tied employee bonuses to Six Sigma metrics, permitted promotions to management only to those with basic Six Sigma certification, and granted stock options only to those with advanced certification. Three years and \$1 billion in sponsorship, communications, business process re-engineering, new tools and training later, quality defined GE's culture from the shop floor to all of its business processes. GE became the most valuable company on the planet.¹

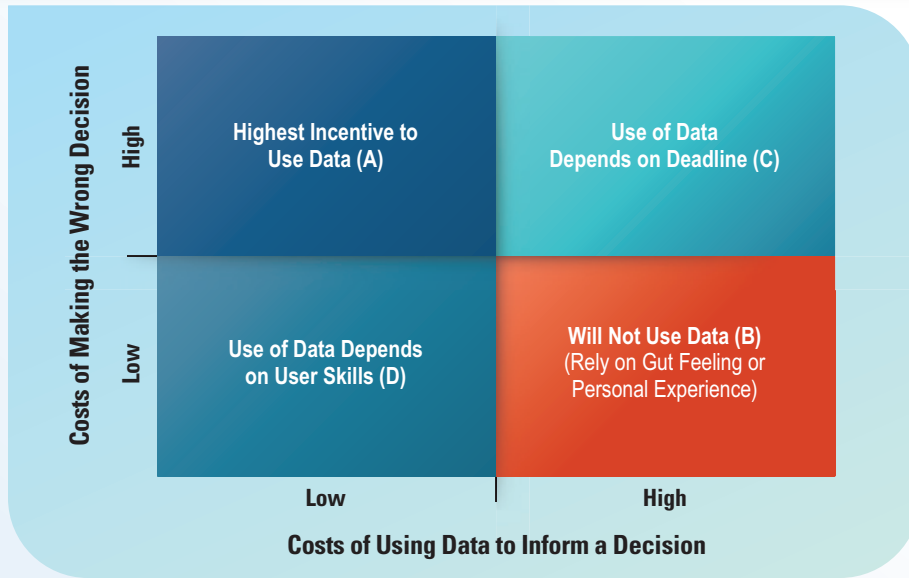
While a commercial sector success story, GE's cultural transformation to incorporate quality is akin to contemporary needs of government agencies to integrate data-driven decision-making into their cultures.

Challenges are inherent in using data as a strategic asset, but with a data-driven culture model as a framework, agencies can devise strategy and initiatives to support it.

In the public sector, citizen demands for transparency and accountability can best be satisfied with the application of data. Government agencies can address taxpayer concerns by working to leverage data for better policy-making, value creation, and insight into reducing fraud, waste, and abuse. For example:

- Transportation agencies can use data to inform infrastructure decisions — what and when to build or repair based on actual conditions. The Texas Department of Transportation provides vegetation data to contractors from the state's ecological mapping systems to help them plan, build and manage roadways.²
- Health agencies can use data for information on emerging types of claims and direct their research and funding accordingly. Under the CARES Act, the Department of Health and Human Services (HHS)

Figure 1. The Data-driven Culture Model



distributed billions of dollars to eligible healthcare providers for COVID-19 response.³

Environmental agencies can use data to inform pollution prevention or improvement policies based on actual pollutant information. The City of Boston used data to re-plan school bus routes and reduced total annual mileage by 1M miles for a daily reduction of 20,000 pounds in carbon dioxide emissions.⁴

Nevertheless, a 2016 PwC study found only 21% of government organizations describe their decision-making as highly data-driven, while 64% say it is somewhat data-driven, and 15% call it rarely data-driven.⁵ Furthermore, while nearly all organizations have invested in the use of data to drive better decision-making in some capacity, only about a third of them have forged a “data culture.”⁶

The Data-driven Culture Model

Data culture is one in which agency employees rely upon data for everyday facets of their work. They are motivated both internally (e.g., policies, procedures, rewards) to do so. Data cultures view data usage as a team sport — not just the job of a specialist, such as a data scientist. The lack of a data-driven culture may be the number one

challenge facing today’s organizational leaders.⁸ It is not enough for an agency to supply staff with tools and declare themselves data-driven. The culture can only change with effort and intention.

“At the heart of any data-driven organization is the internal culture of the business with respect to the way it views and acts upon data.”

~ Mark De Saulles⁷



Driving culture in an agency is a complex, multidisciplinary process. The data-driven culture model (DDCM) simplifies the process by framing it across two variables, each characterized as either low or high:

▣ **The cost of making the wrong decision (Y axis).** This variable represents the totality of repercussions should an agency make a sub-optimal or incorrect decision. Examples include failure to comply with a mandate, negative press, loss of citizen confidence, and recovery and remediation efforts.

▣ **The cost of using data to inform a decision (X axis).** This variable represents all actions a government employee needs to take to produce useful data to inform decision-making. Examples include searching for the right data, obtaining access, making sense of it, preparing it for use, and analyzing it to support the action in question.

The intersection of these variables, with either low or high values, creates four quadrants, shown in **Figure 1**. Each quadrant represents the agency’s total decision space and the likelihood an employee will use data to inform those decisions:

▣ **Highest Incentive to Use Data (A).** There are significant negative consequences to being wrong. Fortunately, it is easy to use data to inform the decision. Maximizing this quadrant will create the greatest likelihood of a data-driven culture.

❖ **Will Not Use Data (B).** Nobody's head will roll if the decision is wrong. If it even exists, data would be prohibitively expensive and timely to process in support of the decision. Accordingly, agency employees will make decisions with intuition instead. It is essential to minimize decisions that fall in this quadrant for a data-driven culture.

❖ **Use of Data Depends on Deadline (C).** The costs are high to use data, but the decision needs to be the right one. As long as there is time for it, the agency will use data.

❖ **Use of Data Depends on User Skills (D).** The cost is low to use data, but so are the consequences of being incorrect. Employees will consult data if their skill sets allow for it.

With DDCM, agencies can manipulate two levers to create a data-driven culture:

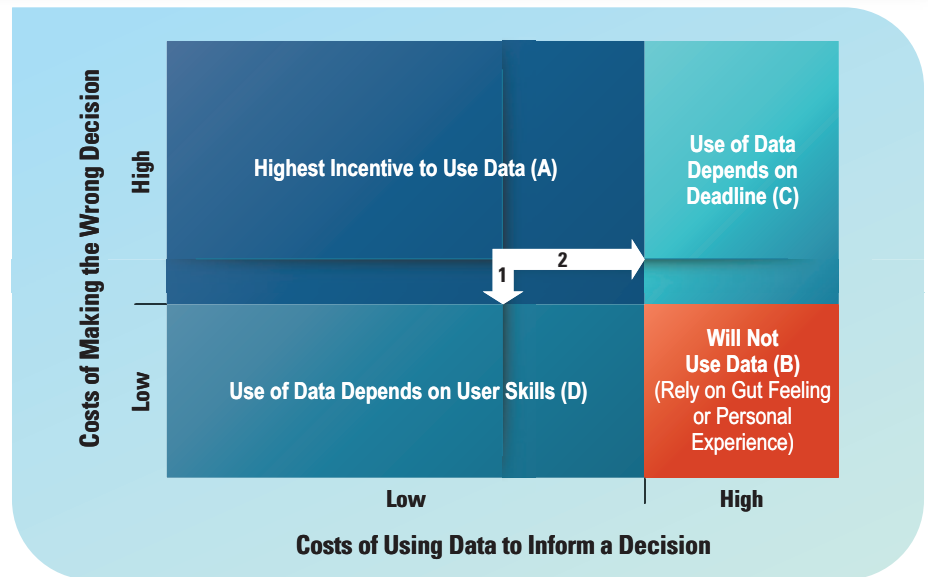
1. Increase the cost of making the wrong decision.
2. Decrease the cost of using data to inform a decision.

Either action increases quadrant A at the expense of quadrant B, as shown in **Figure 2**.

Increasing the Cost of Making the Wrong Decision

Arrow 1 in Figure 2 shows the increased cost of making the wrong choice — it shifts quadrants A and C. Additional costs can be imposed externally. For example, consider the costs imposed on the private sector through the California Consumer Privacy Act, which permits stiff fines and penalties in the tens of millions of dollars and forces firms doing business there to reconsider their data cultures. Also, companies are creating automated self-service solutions to handle mandated data deletion and extraction. This change gives customers the ability to make decisions about the use of their customer data.⁹ Likewise, the passage of the Foundations for Evidence-Based Policymaking Act of 2018 increased costs for federal agencies by mandating governmentwide goals and imposing evidentiary requirements.

Figure 2. The Two Levers of Data-driven Culture



Agencies can also raise costs through internal means, primarily by holding employees accountable in a personal way. When faced with any decision of significance to the agency, such as awarding a contract or setting an IT strategy, agencies can create higher costs with actions such as:

❖ **Performance reviews.** Create a metric, such as “use of data to support decisions,” that quantifies the degree to which the employee used data to inform judgments and does not reward luck.

❖ **Embed data input into processes.** Define a framework that classifies all types of decisions that will require data as input. If personnel use forms to support their conclusions, update the documents to include a section to specify how and when they used data in decision-making.

❖ **Set expectations.** Senior leaders, all the way to the top, must demand employees use data to inform decisions. They will expect nothing less, reinforce this message repeatedly, and practice what they preach.

❖ **Recruit data-driven candidates.** In hiring interviews, include mandatory questions that probe candidates’ skills and inclination in data usage. Update post-interview documentation

with a corresponding section the interviewers must complete.

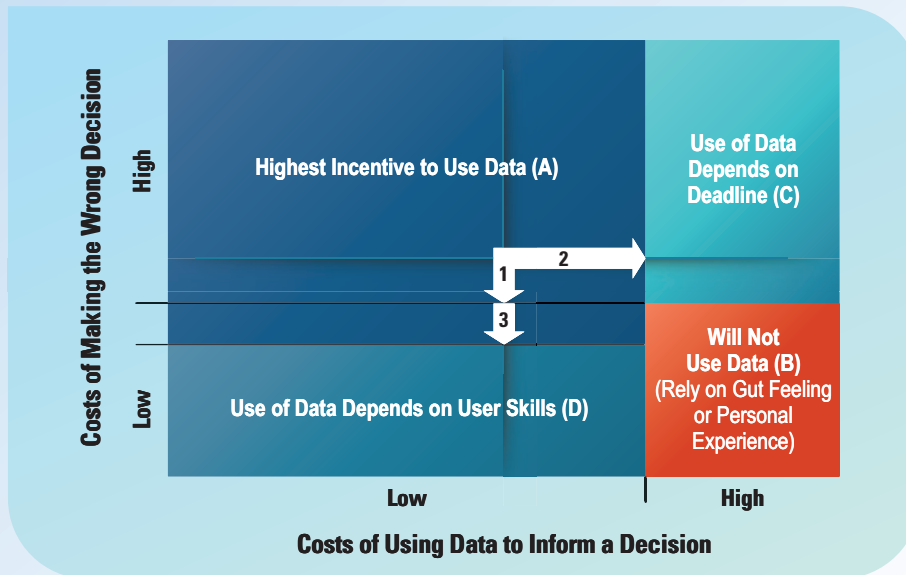
Note that this method does not suggest a rewards system. According to behaviorist Alfie Kohn, “Rewards do not create a lasting commitment. They merely, and temporarily, change what we do.”¹⁰ They do not motivate employees over the long term.

Decreasing the Cost of Using Data to Inform a Decision

The more effective lever for moving toward a data-driven culture is decreasing the cost of using data to inform a decision (See **Arrow 2 in Figure 2**). These actions move more decisions into quadrants A and D. Every time employees consult data, transaction costs follow. The idea here is to drive those costs as close to zero as possible with actions such as:

❖ **Data governance.** The intersection of policies, procedures, people and technologies, governance provides positive and formal control over change in the agency data environment. It creates both accountability and stewardship of data as an asset. Agencies can offer executive sponsorship, charter a data governance council empowered to make data decisions, create data policies and processes, establish control over the change of the policies and procedures, and designate data stewards.

Figure 3. Improve User Skills to Increase Cultural Adoption



✦ **Enterprise data architecture.** The collection of models and standards to describe the data an agency collects, stores, arranges, integrates and deploys is data architecture. Agencies can identify entities of interest (e.g., customers, products or services) and state definitions for use in all departments in an enterprise data model. Agencies can standardize data terminology, map the data model to existing agency data systems, identify where needed data is insufficient and determine how to fill data gaps.

✦ **Metadata management.** The creation, control and dissemination of the meaning of data so users can better understand it, metadata management is critical in any self-help data system. Agencies can collect metadata from agency data systems, centralize it in a searchable repository (e.g., Google search across all data), and document any selected data element's lineage.

✦ **Data quality.** Data must fit its intended purpose. To be trusted and to reduce costs of scrubbing data before use, data must be valid, complete, consistent and timely. Agencies can define taxonomies and hierarchies for all data elements, assess data quality regularly, perform root cause analysis on recurring errors, and create and execute remediation plans.

✦ **Master data management.** This step makes sense of entities' data (e.g., customer, supplier, product, part, account) when records are spread across or duplicated among multiple agency systems. Agencies can study where such records are stored and hybridize them into the best, most complete entity data.

✦ **Data warehousing and business intelligence.** Warehousing is collecting processes, technologies and tools that integrate data across all agency systems, transform it to meet data standards, and centralize it. Agencies can develop intelligent solutions that remove burdensome manual preparations and automatically draw data from multiple systems, integrate it, and prepare it for use.

✦ **IT portfolio management.** Consistent, objective, measurable management of IT applications, infrastructure, and projects that affect data consumption will effectively reduce costs. Agencies can identify the kind of data management their IT function needs across departments, address funding gaps, and align future budgets. This action should resolve data management gaps, consolidate data management tools, monitor their use, and show when they become obsolete.

Other Ways to Drive a Data Culture

Increasing the cost of making a wrong decision and decreasing the cost of using data to inform a decision can move an agency toward a data-driven culture. But these actions are not the only ones that agency leaders can perform. In Figure 2, the two quadrants that leaders might optimize are:

- ✦ Use of Data Depends on Deadline (C)
- ✦ Use of Data Depends on User Skills (D)

Two sets of actions come into play here. Giving employees more time to use data by extending deadlines would optimize quadrant C. However, agencies rarely have any remaining deadline flexibility, so the solution is to improve individual users' skills to optimize quadrant D, as shown in Figure 3.

The skills and experience of each employee are unique. As shown by Arrow 3 in Figure 3, leaders must tailor to the individual any actions to improve a user's data skills. Possible actions include:

✦ **Individual assessments.** Each employee assesses personal skills (e.g., use of agency tools, foundational analytics abilities, data preparation) from the CEO to the interns. If leaders want to drive culture change, assessments must be a shared experience of all personnel.

✦ **Customized training.** A training curriculum with a sufficient number of classes (e.g., writing SQL queries, database basics, advanced analytic techniques) is devised and sequenced in a logical order to provide custom training plans to meet individual needs. All employees must complete the curriculum and follow up with periodic refreshers.

✦ **Tool provisioning.** No data management tools address all needs. Rather than seeking that one tool, obtain a small number of tools that perform well, such as query and reporting, visualization, exploration, preparation and cataloging.

📦 **Immediate application.** Hold training as close to users' actual application as possible for efficacy.

Concluding Thoughts

How do you know when your agency has adopted a data-driven culture? Consider a suite of indicators. Is data management training completed on schedule? Do work files contain data as evidence? Also, look for the presence of data innovation — value creation from repurposing existing data (within permissible use policies, of course.) Data innovation arises when employees are thinking about ways data can improve productivity or exploring new data sources without being told to do so. Innovation happens when they describe their work by the data they use or help and teach one another as they discover better ways to use data. Ultimately, employers need to engage with

their people to create data-driven cultures. Here at the beginning of a new calendar year, when many chief data officers are concluding their first official year on the job, it may be the perfect time to adopt new data-driven initiatives. 📌

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