



# How to Improve Data Quality on a Tight Budget

Many organizations may be tempted to forgo data quality management investments in weak economic times. But bad data quality could make things even worse for companies: lost revenues, unnecessary costs, lower profits. In this e-book, you'll get advice on managing data quality and tips on low-cost methods for improving it. You'll also learn about the potential benefits of forward-looking data quality strategies.

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# Opportunity for Advancement: Managing Data Quality in a Tough Economy

BY DAVID LOSHIN

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**D**URING UNCERTAIN economic times, there is a certain amount of belt-tightening expected across the board, and the IT department is not immune to this. Yet before you grab the knife to start slashing the budget, it is worth considering that reducing the investment in any program or infrastructure that supports the organization's business needs is a measure that will not only diminish needed agility during poor economic times but will also slow the organization's competitiveness when times start to get better.

Often, data quality management is seen as a good practice, but most organizations do not have the discipline to integrate its value proposition holistically across the organizational value drivers, whether they are focused on revenue growth or operational cost containment. Therefore, a recession

actually provides an excellent opportunity to assess two aspects of the relationship between data quality and the business. Companies can directly connect high-quality data to the organization's value drivers, weighted by the perception of existing economic trends.

## **DETERMINING DATA QUALITY'S IMPACT**

The first aspect is identifying specific business processes that will be positively affected by high-quality data. Data quality may affect different business processes in different ways. A data quality analysis should incorporate a business impact assessment to identify and prioritize risks. Those business impacts associated with bad data can be categorized within four general categories for assessing either the negative impacts suffered or the potential new opportunities for

increased value resulting from improved data quality:

- Revenue growth versus negative financial impacts such as decreased sales, higher costs to acquire new customers and reduced customer retention.
- Cost reduction versus unwanted outcomes such as increased operating costs, reduction or delays in cash flow and additional unnecessary charges.
- Risk management and confidence management issues, such as credit assessments, investment risks, competitive risks, capital investment and development, fraud and leakage, compliance risks, decreased organizational trust, low confidence in forecasting, inconsistent operational and management reporting, delayed or improper decisions, decreased customer, employee or supplier satisfaction and lower market satisfaction.
- Productivity impacts such as increased workloads, decreased throughput, increased processing time and decreased end-product quality.

Assessing the business impacts associated with data means working with the business users to understand their information needs and the corresponding data quality expectations. One can elicit information about the business impacts associated with data quality

by asking probing questions such as the following:

1. What importance does data have in achieving the organization's business objectives?
2. What data is critical to your business processes?
3. How confident are you in the accuracy of your data?
4. What changes to the data can improve business process performance?
5. In which aspects of data improvement should the company be investing, and in what time frame?

Any significant data issues that will affect the business are likely to be revealed during this process, and this provides you with the basis for further researching documented business issues and connecting them to any type of data flaw. It will provide a connection between data quality improvement and a potential for increase in value. At the same time, this provides an opportunity to reinforce conformance with business data quality expectations by validating data quality rules and the corresponding thresholds for acceptability.

This leads into the second aspect of data quality management: monitoring the level of efficiency of the data governance and data stewardship activities. As a data quality program matures, the management of issues transitions from a reactive environment to a proactive

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one, and this can be scored in relation to continuous monitoring of the quality of data. In the optimal environment, the data stewards allocate time to address the most critical issues as they are identified early in the processing streams. Less efficient organizations have stewards reacting to issues at their manifestation point, at which time these issues may have already caused significant business repercussions.

### DESIGNING A DATA QUALITY SCORECARD

Therefore, organizations that inspect, monitor and measure the performance of data quality initiatives on an ongoing basis, across all processing streams, can then populate a data quality scorecard reflecting the effectiveness of the program and the efficiency of its staff. Together, these two aspects reflect the value of the program and the way that it has been implemented. Focusing on both of these aspects provides a number of benefits:

- It can demonstrate the value proposition for maintaining the effort, even in the face of economic stress.
- It can provide long-term justification for continued funding and growth of

data quality management as the recession ends.

- It can help identify additional areas with an acute data quality improvement need that can help support the organization's survival during a recession.
- It will demonstrate an example of proactive value management to other organizations.

On the other hand, it may turn out that this data quality assessment will show that the organization does not get a reasonable return on its data quality management investment. In this case, it provides an opportunity to reduce operating costs associated with the areas of missed expectations. While this is unlikely, it does demonstrate a level of accountability that should pervade all management activities. It is more likely, however, that this process will only strengthen the view that a data quality management program is fundamental to the ultimate success of the business. ■

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# People, Process Issues Can Help Improve Data Quality on the Cheap

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**T**HE DESIRE TO IMPROVE data quality in an enterprise is often accompanied by an urge to run out and buy a set of data management tools with a price tag that may run into six figures, if not more. But with the U.S. and global economies continuing to limp along, many organizations don't have funds available to buy and deploy shiny new toys like that.

The good news is that data quality management is about more than just technology. It's also about people and processes, and analysts say that by focusing on those two areas, organizations can make significant data quality improvements without spending much money at all. Here are some of their tips on how to improve data quality when budgets are tight:

**Make sure employees understand the impact of poor data quality.** Data qual-

ity problems usually begin with human error, according to Ted Friedman, a research vice president and information management analyst at Gartner Inc. in Stamford, Conn. For example, a call center employee misspells a new customer's name when entering it into a customer relationship management application or a service technician makes mistakes when filling out an invoice form.

The data quality problems get bigger—and bigger—as those types of errors are propagated throughout companies via workflows, email and file sharing. To help put a stop to that, Friedman recommends that organizations regularly take the time to educate their employees about the impact that data quality mistakes can have on business operations.

“By and large, data quality issues are caused by people around the data just not doing the right stuff to make sure it gets entered and maintained in a

high-quality way,” Friedman said. But he added that if you give workers a better sense of the importance of data and how their behavior affects its quality and, ultimately, its business value, “you can begin to effect some change” in the way they treat data.

**Fill in the data quality holes in your business processes.** Another low-cost way to improve data quality is to take a close look at key workflows and business processes. More often than not, organizations will find “data quality holes” that can be filled with relative ease, Friedman said.

Such holes might be found lurking within seemingly harmless tasks that often are done manually. For example, he said, a customer emails a file to a salesperson, who then manually “massages the data” and enters it into a business application—introducing data errors in the process.

In connection with a data quality education effort, you might be able to avoid the errors by setting and enforcing data entry standards for the information that’s coming in, Friedman said. Another idea for improving the data’s quality, he suggested, “would be to potentially take the humans out of the process” by building a mechanism to automate the loading of the data into internal systems.

**Invest available money in developing data quality skills.** Organizations that don’t have the budget for buying a new

data quality platform should consider investing some of the data management funds they do have at their disposal in training data-savvy business users on quality skills and best practices, Friedman advised.

“You need some resources—some people with know-how,” he said. “You need somebody who understands really well the flow of data in the enterprise and how data is used in business processes.” Those employees could then help educate other end users about the downsides of bad data quality, he added.

**Learn from the data quality successes—and mistakes—of others.**

Do a Google search for “data quality case studies” and numerous tales of successful projects will pop up in the results—stories that offer another inexpensive way to learn tips and tricks for improving data quality in your organization.

Of course, data quality improvement has its roots in data quality mistakes, which can be instructive as well.

Jaime Fitzgerald, founder and managing partner of Fitzgerald Analytics Inc., a data management and analytics consultancy in New York, recalled the case of one company he worked with that ran into trouble with the way transaction files were being identified within various systems. The problems stemmed from a fundamental mistake: In one system containing 20% of the transaction records, a B value “meant

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something entirely different than it did in the other 80%," said Fitzgerald, who didn't identify the affected company. It eventually resolved the issue by creating a lookup table to correlate the correct values with one another, he said.

**Get your DBAs involved.** A competent database administrator (DBA) can be an invaluable participant in a data quality initiative in which budgetary constraints are a factor, according to Friedman. One way DBAs can help, he said, is by writing queries designed to expose patterns within data stores—patterns that may point to outliers or other indicators of data quality problems.

"Some of the basics of data quality measurement and data profiling can be done using things like simple SQL queries," Friedman said. For instance, a DBA could write a query that analyzes a database column and produces statistics about its minimum and maximum values or the number of times that each value found in the column appears there.

**Identify and clean up your most important data.** Many organizations fall into the trap of thinking that data quality is an all-or-nothing proposition, but it's really an ongoing process in which every little bit helps, Fitzgerald said. He

added that enterprises can get a lot of bang for their data quality buck by focusing on their most important data first and gradually expanding the initiative from there.

What should you start with? "It's often your customer data," Fitzgerald said. "But another way to look at it is to say that your most valuable data is the data that you most need to drive profits."

And in the end, even low-cost efforts to improve data quality likely will need to be justified from a financial or business standpoint. Any approach to data quality management—whether it's on a tight budget or not—should be solidly grounded in metrics, according to Friedman and Fitzgerald. That means data quality teams must determine ways to measure the results of their efforts—for example, to gauge the impact that improved data quality is having on the business.

"You can't just go to people and say that data quality is the right thing to do," Friedman said. "You need to measure and you need to show with facts how good or bad the data is and how that is impacting the business." ■

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# Pundits Highlight Need for Proactive Data Quality Management

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**O**RGANIZATIONS NEED to focus on being more proactive when designing or updating data quality management strategies, according to IT industry consultants and technology professionals.

Experts say organizations spend lots of valuable time cleaning up data quality problems in the data warehouse and business intelligence (BI) environment, when a more forward-looking strategy could save time, ensure more reliable information and ultimately help business workers make better decisions.

“You have to be proactive—I think you should take care of data quality [in] the design phase,” said Suvendu Datta, a data warehouse team leader with a large insurance company. Datta’s team is in the process of implementing a new data warehouse, along with new data quality policies.

But experts warn that the decision to

create an aggressive data quality management strategy comes with a special set of challenges. For one, it’s difficult to justify an investment in improving the data capture and validation processes that occur “upstream” from the data warehouse, said Rob Karel, who until March 2012 was a data management analyst at Forrester Research Inc. in Cambridge, Mass.

Upstream data quality projects can take years to perfect and their return on investment (ROI) may be difficult to measure, Karel said while he was still at Forrester. Instead, most organizations opt for data quality tools that are geared toward normalizing data in the warehouse. Such “downstream” tools are easier to justify because they produce tangible results more quickly, said Karel, who now works for a data management software vendor.

Yet while these downstream data quality tools do their jobs reasonably well, Karel thinks they’re no substitute



for capturing data properly in the first place. By taking the time to engineer more effective data collection and governance techniques, he said, organizations will greatly reduce inefficiencies and increase the level of confidence in business information.

## When focusing on individual processes, be sure to keep enterprisewide data governance goals in mind.

“The data in the data warehousing environment [isn’t] created there,” Karel said, “so any BI or data warehousing professional trying to build out a solution is at the mercy of the data coming in. They’re really just chasing their tail when implementing batch data quality within the data warehouse.”

Karel explained that many data quality problems arise at the point of data entry. For example, a call center agent might accidentally type in the wrong address or phone number of a new customer. These errors can then be propagated to any number of other source systems, such as customer relationship management or enterprise resource planning applications. It’s a tough problem to address, he said, be-

cause business units charged with collecting customer information tend to value speed over accuracy.

“The reason people don’t do [upstream data quality] is that it’s a heck of a lot more invasive. You’re actually changing the customer experience or changing the call center process or changing the account management process,” Karel said. “That could impact [customer] experience or increase average handle time.”

### A MORE PROACTIVE STRATEGY

Despite the obstacles, there are several steps organizations can take that will result in more proactive data quality management, according to experts.

The first step is to focus on the system that is causing the most headaches, Karel recommended. For example, if a CRM application is wrought with data quality issues, it is probably a good idea to focus on the information collection processes associated with that application.

“When you’re trying to be proactive, don’t try to identify every single point of data capture and update,” Karel said. “Try to identify which systems or applications or processes or teams are impacting the highest volume of valuable data and start using that as your pilot.”

But be careful not to take a siloed approach: When focusing on individual processes, be sure to keep enterprisewide data governance goals in mind. “Work collaboratively with the

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process owners [and] use that as a testing ground,” he said. “If you’re able to implement that effectively, then you can extend the same logic to other touchpoints.”

It’s also important to seek out the root causes of data quality problems and not simply the precipitating causes, added information quality consultant Larry English, founder and principal of Information Impact International Inc. in Nashville, Tenn. For example, if that call center agent repeatedly makes mistakes when capturing customer information, the root cause is likely a lack of proper training.

“If we don’t solve the root-cause problem, the process improvements that we attempt to implement may fail,” English said. “We must implement error-proofing techniques in the processes, both manual [and electronic] processes.”

### RETHINKING DATA QUALITY MANAGEMENT

Richard Ordowich is another consultant who believes that data quality management strategies tend to be too reactive. A senior partner at STS Associates Inc. in Princeton, N.J., Ordowich says organizations that want to be more proactive must adopt a culture of quality—and not just data quality.

“If the organization has established a quality culture, then evolving to a data quality program is possible,” Ordowich said in an email interview. “If the or-

ganization has no quality culture, then the concepts of data quality will be abstract, distracting and annoying.”

Simply writing new information capture procedures and putting them into a handbook will not be enough to change the culture of the company, the consultant continued. Instead, it takes training, collaboration and a willingness to make fundamental changes. “Manuals will be put on the shelf and ignored without the cultural adoption,” he said.

Once a culture of quality is established, organizations can begin the task of implementing proactive data quality measures. Analysts often say this is a good time to make sure that the responsibility for data quality falls on the shoulders of business users—the people who create the data. But Ordowich questions this conventional wisdom. Instead, he thinks organizations should consider making it the chief financial officer’s responsibility.

“CFOs have been dealing with data quality since the early days of the profession,” he said. “They are the most aware of the potential consequences of bad data since the result to them may be jail. If you can’t convince the CFO of the need for data quality, then perhaps the organization is not ready or the ROI is not adequately justified.” ■

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# Roots of Problems Key to Improving Information Quality

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**T**HE LEADING DATA profiling technologies are helpful in terms of finding flawed data, but they do very little to improve the processes and procedures that led to those flaws in the first place, according to information quality guru Larry English.

English—founder of consultancy Information Impact International Inc. and a well-known speaker, educator and author—says the key to improving information quality and related processes centers on being proactive and determining the root cause of problems. In this interview, English explains how quality principles from the world of manufacturing have been applied to information and talks about the difference between data and information quality. He also provides several tips for organizations that want to improve the quality of the information being delivered to their knowledge workers.

***Is it true that the most popular approaches to information quality stem from the manufacturing sector?***

**LARRY ENGLISH:** Here's the deal: There are proven quality management principles that have been applied to quality in manufacturing. Those principles [have] to do with the quality of tangible products and services, [but they have also been applied] to information processes. The only difference [with regard to information processes] is that the "product" is delivered information. Therefore, we have to focus on designing quality into the processes that create and maintain and deliver information to specific knowledge workers who depend on that information.

***Why do you think that data profiling tools do not add value to information quality processes?***

**ENGLISH:** You have the big software makers who are making data cleansing software, data profiling software, as-

assessment software, and all of this does not add value to the process. It is true that you need to find where you have defective data. But it's not just the data in the databases; it's the way that information is presented to knowledge workers. It's vitally important when we seek to improve [such processes] that we understand the root cause [of problems and] not just the precipitating causes. The problem with the data profiling tools is they don't tell you what the root cause is. There is no way to analyze that within their software.

**It's not just the data in the databases; it's the way that information is presented to knowledge workers.**

***The phrases data quality and information quality are frequently used interchangeably, but you make a clear distinction between the two. Could you explain the difference?***

**ENGLISH:** Information is the finished product. Data is the raw material. Generally, it is data that we capture and put in the database. But most knowledge workers will not have access to that, and if they did they probably would not be able to understand it just by extracting data values. Information, meanwhile, will generally be combined

and presented to the knowledge workers in a way that meets their needs to be able to perform their work effectively.

***How can organizations begin the task of improving information quality and information delivery processes?***

**ENGLISH:** You have to look at, on a priority basis, the most important sets of information that you have. For example, in the BP oil spill, the team that was working on the Deep Water Horizon rig made some changes to safety procedures, and those changes to the safety procedures were not implemented according to their process of making changes, nor did they have an opportunity to test the new procedure. As a result, there were errors and defects in that procedure that caused the explosion. [It's important to get] that information right and to be sure that if you make changes to processes you have the ability to test them and ensure that they [work].

***What else can organizations do to improve information processes?***

**ENGLISH:** To improve information processes, we use a proven technique that is called "Plan, Do, Check, Study and Act." You put the process in a controlled mechanism so that you can execute that process without endangering the current production information that you have, and if it works in that mode then we can come back and roll that out [to the] official production

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processes. [You] then monitor them to ensure that they stay in control. Statistical quality control charts are a key mechanism for identifying if there is variation in the production—that is, if there are defects in the information being captured that will subsequently cause other processes to fail.

**There is no blame in quality management. People are not the cause of defects.**

***Are people generally to blame for information quality problems?***

**ENGLISH:** There is no blame in quality management. People are not the cause of defects. If they are the cause of defects, it's a precipitating cause that is caused by an earlier problem which is the root cause. [The root cause] will probably be failure to provide the right resources and training for a person to do their job effectively. If there is a lack of following procedures, then you have to look and say, "Why was there a lack of following procedures?" ■

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