Executive Summary

Since Aberdeen Group’s last food safety research report, *Food Safety and Traceability* (December 2010), food and beverage companies have had time to understand the impact of the Food Safety and Modernization Act of 2010 (FSMA10). While passed about a year ago, there are many issues and processes still to be worked out or implemented from the act. Based on research conducted during September and October 2011 on 104 food and beverage companies, Aberdeen’s *Food Safety and Traceability 2011* report, Aberdeen’s sixth annual report on the topic, focuses on general traceability capabilities and performance in the food and beverage industry, with a special focus on the FSMA10.

Best-in-Class Performance

The Best-in-Class in Aberdeen’s *Food Safety and Traceability 2011* report significantly outperform Laggard companies in many key performance criteria; this differentiation is summarized below:

- 20% more products produced in compliance
- 34% more complete and on-time shipments
- 34% higher Overall Equipment Efficiency (OEE)
- 37 hours quicker track and trace response time

Competitive Maturity Assessment

Survey results show that the firms enjoying Best-in-Class performance shared several common characteristics, including:

- Nearly twice as likely as Laggard companies to have visibility into, and assigned responsibility for adverse events
- More than twice as likely as Laggard companies to have prepared their own systems and processes for standards like GS1
- Nearly 40% more likely than Laggard companies to automate the collection of traceability data

Required Actions

In summarizing the specific recommendations in Chapter Three of this report, to achieve Best-in-Class performance, companies must:

- Establish food safety and traceability as a key item on the executive team’s agenda for focus and improvement
- Perform mock recalls to prepare their organization for handling a real adverse event
- Automate the collection of traceability data to improve productivity, compliance, and error-proofing

Research Benchmark

Aberdeen’s Research Benchmarks provide an in-depth and comprehensive look into process, procedure, methodologies, and technologies with best practice identification and actionable recommendations.
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Chapter One: Benchmarking the Best-in-Class

Business Context

Aberdeen Group’s previous Food Safety and Traceability report (December 2010) published just as the Food Safety and Modernization Act of 2010 (FSMA10) was passed. And since that time, there have continued to be high profile adverse events related to the food and beverage industry, including cases of food poisoning that resulted in fatalities. So while Aberdeen’s 2011 research on the same topic will cover general food safety and traceability in the food and beverage industry, it will also look at the impact of the FSMA10 on companies.

The Customer and Compliance Drive the Agenda

Among the 104 food and beverage companies surveyed by Aberdeen in September and October 2011, two key factors continue to push the food and beverage industry: the customer and compliance. And comparing Aberdeen’s 2011 data with the data collected for its 2010 study on the same topic shows that product quality and customer satisfaction loom large over nearly two-thirds of Aberdeen’s survey sample (Figure 1). This can be somewhat attributed to the overall growth in the economy and companies being concerned about their market position and brand exposure.

Figure 1: Top Business Pressures - Comparing 2010 and 2011

- Need to ensure product quality and consumer satisfaction: 62% (2011) vs 47% (2010)
- Need to comply with government regulatory requirements (Food Safety Bill, FDA, DOT, DoD, EPA, EU, CPSC, USDA, FSIS, and others): 57% (2011) vs 55% (2010)
- Need to reduce the number and severity of quality, non-compliance, and recall events: 31% (2011) vs 31% (2010)
- Need to maintain or achieve a competitive advantage: 22% (2011) vs 26% (2010)

Source: Aberdeen Group, November 2010 and October 2011

However, the story becomes a bit different when we compare the pressures facing top-performing organizations (referred herein as Best-in-Class – see Table 1 for definition) in Aberdeen’s 2011 study compared to average or bottom-performing companies (referred to as all others). That
comparison shows that top-performers are more driven by compliance and regulatory needs than all others, whereas all others are still primarily driven by consumer and brand issues (Figure 2). While compliance is second for all other companies, it does show that many food companies are still in the process of understanding the new FSMA10. Also note that for all companies, the actual prevention of adverse events is way down on the list. This provides a glimpse that food companies tend to be reactive right now and not really in a preventative mode.

**Figure 2: Top Business Pressures for Food and Beverage in 2011**

<table>
<thead>
<tr>
<th>Business Pressure</th>
<th>Percentage of Respondents, n=104</th>
</tr>
</thead>
<tbody>
<tr>
<td>Need to comply with government regulatory requirements (Food Safety Bill, FDA, DOT, DoD, EPA, EU, CPSC, USDA, FSIS, and others)</td>
<td>52% Best-in-Class, 53% All Others</td>
</tr>
<tr>
<td>Need to ensure product quality and consumer satisfaction</td>
<td>52% Best-in-Class, 69% All Others</td>
</tr>
<tr>
<td>Need to reduce the number and severity of quality, non-compliance, and recall events</td>
<td>33% Best-in-Class, 31% All Others</td>
</tr>
<tr>
<td>Need to maintain or achieve a competitive advantage</td>
<td>29% Best-in-Class, 20% All Others</td>
</tr>
</tbody>
</table>

Source: Aberdeen Group, October 2011

"We track and trace all raw materials and packaging materials going into a batch. In our ERP system we can track one step up and one step downstream, meaning we have data for all batches of raw materials going into products, can follow this through our process and also data for where all our batches of finished goods are distributed."

~ Alte Petersen, Production Manager, Rieber & San ASA, Large European Food Manufacturer

**The Maturity Class Framework**

Aberdeen analysis found Best-in-Class companies are gaining significant competitive advantage when compared to Industry Average and Laggards. Aberdeen classified research participants into one of three performance categories. These include the top 20% of performers (the Best-in-Class), the bottom 30% of performers (Laggard), and the remaining 50% (the Industry Average). The four key criteria that were used to measure and categorize the performance of respondents are:

- **Percentage of products in compliance**, is measured as a percentage of products produced that were in compliance to processes against total products produced
- **Complete and on time shipments**, is measured as the percentage of shipments delivered on-time and complete versus the original commitment
- **OEE** is a composite metric accounting for availability, performance, and quality
• **Response time to non-conforming shipment;** given that a non-conforming product has shipped, this is the average time needed to locate and hold the product after detection.

Table 1 details the average performance of Best-in-Class, Industry Average, and Laggard companies across these four metrics.

**Table 1: Top Performers Earn Best-in-Class Status**

<table>
<thead>
<tr>
<th>Definition of Maturity Class</th>
<th>Mean Class Performance</th>
</tr>
</thead>
</table>
| **Best-in-Class:** Top 20% of aggregate performance scorers | ▪ 99% production compliance  
▪ 89% OEE  
▪ 99% on time and complete shipments  
▪ 2.3 hours response time to non-conforming shipments |
| **Industry Average:** Middle 50% of aggregate performance scorers | ▪ 97% production compliance  
▪ 77% OEE  
▪ 94% on time and complete shipments  
▪ 8 hours response time to non-conforming shipments |
| **Laggard:** Bottom 30% of aggregate performance scorers | ▪ 83% production compliance  
▪ 68% OEE  
▪ 74% on time and complete shipments  
▪ 39 hours response time to non-conforming shipments |

Source: Aberdeen Group, October 2011

These KPIs provide both an operational view of companies and also a view into the effectiveness of traceability systems. As we can see there is a very large discrepancy between all the maturity classes, with a stark difference between Best-in-Class and Laggards.

**The Best-in-Class PACE Model**

Ensuring food safety and traceability across a global supply chain can be a daunting task. Table 2 summarizes some of the strategic actions, business process capabilities, and technology enablers Best-in-Class companies have implemented to address these market pressures.

**Table 2: The Best-in-Class PACE Framework**

<table>
<thead>
<tr>
<th>Pressures</th>
<th>Actions</th>
<th>Capabilities</th>
<th>Enablers</th>
</tr>
</thead>
</table>
| ▪ Need to comply with government regulatory requirements | ▪ Build in compliance and traceability to production processes  
▪ Improve visibility of quality across design to delivery business processes | ▪ Standardized procedures for handling customer complaints  
▪ Standardized escalation procedures for quality, non-compliance, and recall events are across the enterprise  
▪ Perform mock recalls to improve and evaluate organizational response | ▪ ERP  
▪ SCM  
▪ Traceability Engine  
▪ Manufacturing Operations Management  
▪ Quality Management System  
▪ Traceability and Genealogy  
▪ HACCP |
### Operational Pressures and Best-in-Class Strategies

While Figure 2 showed the pressures that food companies are feeling, center primarily around regulatory compliance and customer satisfaction (i.e. product quality), Figure 3 shows the strategies those companies are putting in place to address those pressures.

**Figure 3: Top Strategies that Impact Manufacturing Operations**

In reaction to increased regulatory pressures, you can see that all companies are trying to build compliance into their processes. It is close to universal for the Best-in-Class - as almost three-quarters of those companies have that strategy in place. Even the strategy for improving visibility of quality across business processes is fairly even between the Best-in-Class and all others (all others consists of Industry Average and Laggard companies combined). This strategy in particular is tightly related to both consumer satisfaction and compliance.

"We had to put in a MOM system. We were doing business around the globe with scattered and disconnected systems. We always felt we were making decisions with only half the information we needed."

~ Manager, Large Aerospace Avionics Manufacturer
While FSMA10 is less than a year old as a formal legislation, according to 64% of survey respondents, it has had a measurable impact (Figure 4).

Figure 4: Impact of FSMA10

According to Aberdeen’s research, the strongest impact of FSMA10 is on increased documentation and record storage. However, secondarily, FSMA10 has also resulted in more diligence with regard to suppliers as well as investment in document management and workflow systems to keep up with FSMA10 requirements (Figure 5).

Figure 5: What Has Been the Key Impact for FSMA10

In the next chapter, we will see what the top performers are doing to achieve these gains.
Chapter Two: Benchmarking Requirements for Success

Best-in-Class performance does not just happen because someone buys a new system. You have to take into account what a company is capable of in terms of its organization, business process, knowledge management, and performance management. It’s when the capabilities are combined with technology enablers that Best-in-Class performance happens. And keep in mind that the direction is set for what capabilities are important at the strategy level, which in turn is driven by the pressures a company is feeling.

The following is a case study of a company that not only saw FSMA coming, but was proactive in addressing operational changes.

Case in Point

Trans Ocean Products is a large seafood processor in Washington state and a market leader in the processing and marketing of surimi and other seafood products. Mike Zapien is the production manager for Trans Ocean and has some unique insight into traceability and how Trans Ocean has approached it.

He explained that the company has been preparing for increased regulatory pressures for some time. They even started before FSMA passed, knowing that something would eventually become legislation. They have increased the number of internal audits and people qualified to conduct an audit, and they have significantly expanded their ability to track their product into distribution. Trans Ocean has also moved over 75% of its paper documentation to electronic form.

One key change they have made is in the implementation of an error-proofing system. In the Lean environment, this is known as a Poka-Yoke. Following the same strategy as Lean manufacturing, they have put systems and processes in place to assure, through barcodes and machine lockouts, that all ingredients are correct and all processes are followed.

They have also implemented processes and technology that have reduced their window of traceability from 12 hours in a manual process to less than 30 minutes. That means when a potential adverse event happens, Trans Ocean only has to quarantine 30 minutes of production versus 12 hours, or a shift and half. This allows more selective quarantining and significantly minimizes the potential for disruption in the distribution and retail channel.

Competitive Assessment

Aberdeen Group analyzed the aggregated metrics of surveyed companies to determine whether their performance ranked as Best-in-Class, Industry Average, or Laggard. In addition to having common performance levels, each class also shared characteristics in five key categories: (1) process

Fast Facts

How long does it take food companies to respond to requests for documentation?

√ 57% - less than 24 hours on specific lots
√ 29% - between one day and one week on specific lots
√ 14% - more than a week on a specific lot
(demonstrated ability to standardize processes and ERP implementation); (2) **organization** (executive commitment and assigned ownership of ERP implementation); (3) **knowledge management** (providing visibility in order to drive decision-making); (4) **technology** (effective use of modules of and extensions to ERP, along with providing users with immediate access to data, regardless of location); and (5) **performance management** (the ability of the organization to measure its results to improve its business). These characteristics (identified in Table 3) serve as a guideline for best practices, and correlate directly with Best-in-Class performance across the key metrics.

### Table 3: The Competitive Framework

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Best-in-Class</th>
<th>Average</th>
<th>Laggard</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Process</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business process incorporates compliance with food safety and traceability management systems (ISO 22000 or SQF)</td>
<td>62%</td>
<td>57%</td>
<td>40%</td>
</tr>
<tr>
<td>Business processes are in place to support the use of industry standards and tools like those offered by GS1</td>
<td>64%</td>
<td>20%</td>
<td>30%</td>
</tr>
<tr>
<td>Industry associations and standards (such as United Fresh and the Produce Traceability Initiative) form the foundation of how traceability programs are deployed</td>
<td>32%</td>
<td>20%</td>
<td>13%</td>
</tr>
<tr>
<td><strong>Organization</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All levels of the organization have visibility and defined responsibility in the case of a quality, non-compliance, or product recall event</td>
<td>86%</td>
<td>57%</td>
<td>45%</td>
</tr>
<tr>
<td>Cross-functional continuous improvement teams are focused on improving enterprise quality processes</td>
<td>71%</td>
<td>60%</td>
<td>53%</td>
</tr>
<tr>
<td>Compliance and traceability is a key item on the executive’s agenda in your company</td>
<td>76%</td>
<td>74%</td>
<td>45%</td>
</tr>
<tr>
<td><strong>Knowledge</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traceability data is automatically collected across operations</td>
<td>67%</td>
<td>53%</td>
<td>42%</td>
</tr>
<tr>
<td>Mobility tools are used to enable the collection and display of critical traceability data</td>
<td>29%</td>
<td>27%</td>
<td>20%</td>
</tr>
<tr>
<td><strong>Performance</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal audits are performed regularly and benchmarked to improve performance</td>
<td>95%</td>
<td>86%</td>
<td>67%</td>
</tr>
<tr>
<td>Mock recalls are performed regularly and benchmarked to improve performance</td>
<td>81%</td>
<td>70%</td>
<td>41%</td>
</tr>
</tbody>
</table>

Source: Aberdeen Group, October 2011

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**Acronyms**

- **QMS** Quality Management Systems
- **PLM** Product Lifecycle Management
- **SCM** Supply Chain Management
- **ERP** Enterprise Resource Planning
- **FDA** Food and Drug Administration
- **SOP** Standard Operating Procedures
- **GMP** Good Manufacturing Practices/Principles
- **HACCP** Hazard Analysis & Critical Control Points
Capabilities and Enablers

Based on the findings of the Competitive Framework and interviews with manufacturing executives, Aberdeen’s analysis demonstrates that there are a number of different business capabilities and technology enablers driving Best-in-Class performance.

Process

If there is one area that is well defined in the food industry it is how to manage business processes. From Standard Operating Processes (SOP) to Good Manufacturing Principles (GMP), food companies are required to have processes documented, defined, and followed. These SOPs must follow standard industry formats defined in GMP. This is an area that Best-in-Class companies are leading the industry - Best-in-Class companies have visibility into and control of these processes. Figure 6 shows that Best-in-Class companies are almost universal in being able to track their hazard control points, while all other food companies are at less than half.

Figure 6: Tracking of Compliance Processes

<table>
<thead>
<tr>
<th>Process</th>
<th>% Respondents (n = 104 food companies)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOP</td>
<td>50% Best-in-Class, 51% All Others</td>
</tr>
<tr>
<td>GMP</td>
<td>50% Best-in-Class, 36% All Others</td>
</tr>
<tr>
<td>HACCP</td>
<td>75% Best-in-Class, 49% All Others</td>
</tr>
</tbody>
</table>

Source: Aberdeen Group, October 2011

Being able to track, through a traceability system, all the operating procedures and control points allows much more rapid and productive internal auditing, and reduces the risk from external auditing by any government agency. It also helps companies manage and track changes occurring in the process and can lead to a full error-proofing system.

From Table 3, we also see that industry standards play a large role in the food industry. This is the only way to effectively and efficiently track raw materials and distribution in the channel. Interestingly, the Best-in-Class outpace all others by two to three times in preparation for and adoption of the GS1 standard, as defined in the sidebar. This means that the majority of

Fast Facts

GS1 is an international standards body that put in place several identification keys and standards that allow member companies to more easily share data. The following are the purview of GS1:

- Member organization (manufacturers, retailers, and distributors) codes
- Country codes
- Global trade item number to identifying specific items
- Location number
- Other identifiers to allow tracking between trading partners
Best-in-Class companies know it’s coming, but have yet to drive the actual execution of GS1.

**Organization**
One of the first steps when putting in place a traceability strategy is having the organization defined and accountable. Aberdeen’s data shows that companies implement strategies all the time without defining their organization or responsibility within the organization. As shown in Table 3, Best-in-Class companies are almost twice as likely as all others to have set their organization to handle adverse events. The key word in the survey was “responsibility.” Best-in-Class companies have almost universally defined (86%) who is responsible for action throughout the organization.

One other key aspect of the organization that Best-in-Class and Industry Average companies have been shown they understand is leadership with respect to traceability. Three-quarters of those companies indicated that traceability is a key agenda item for senior management. Compare that to less than half for Laggard companies. Without traceability being on the executive agenda, it will typically be limited in its application to local sites without corporate guidance.

**Knowledge Management**
The biggest potential downside to any type of regulation may be productivity. As more documentation is needed and more audits are performed, workers are pulled away from their operations jobs. Table 3 shows that Best-in-Class companies are over 30% more likely than Laggard organizations to address this issue through automating the collection of traceability information. This relieves the productivity burden from the operations group. But it does one other key thing; it also error-proofs the collection of the data. Automatically collecting the data removes the likelihood of misprinting, misreading, and transposing information by human operators.

Many times the major gap in collecting traceability data automatically is the access to computing devices at the point where data needs to be collected. Table 3 once again shows that Best-in-Class companies are almost 30% more likely to be using mobile devices to collect that data. This allows those companies to fill in a lot of gaps and provide one more layer of error-proofing.

**Performance Management**
Performance management is critical in food safety and traceability. Being able to look at your own performance and make adjustments will go a long way toward reducing the risk of an adverse event and improving performance in reacting to one. Recalls are just a way of life in a lot of food companies. Being prepared means rigorously testing the company’s ability to react to one of these adverse events, including testing systems, processes, and organization. Best-in-Class companies are twice as likely as Laggards to hold regular mock recalls to put itself through the paces of reacting to a

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**Fast Facts on Enterprise Apps**
The food industry lags behind all other industries in adoption of enterprise applications. For example; ERP in all manufacturing is 74%, while in food companies it is only 69%. Below is adoption of these applications in food:

- 54% for SCM
- 25% for PLM
- 62% for QMS
- 69% for ERP
recall; it is almost a universal capability (86%) for Best-in-Class companies and close to it for Industry Average companies (70%).

**Enabling Tracking through Traceability**

From a technology standpoint, safety and traceability is really about what you can track within your traceability systems. Figure 7 shows tracking of customer-facing processes in food companies.

**Figure 7: Tracking Customer-facing Processes**

While warranty management is typically not a key process, it does show up in almost a quarter of all companies. But most interesting is that Best-in-Class companies are twice as likely to be tracking customer complaints within their traceability system. This allows them to connect consumer issues with operating performance and changes. This can also explain why all other companies are feeling more consumer pressure, as shown Figure 2.

Another tracking concern for food companies is certifications and qualifications. Each person operating a process must be qualified and all raw materials must be certified as analyzed and passed inspection. This can become a documentation nightmare very quickly. As Figure 8 shows this is another area where Best-in-Class companies outstrip all others.

"Product and ingredients can be accurately, rapidly and effectively identified and located in the event of a product recall. Currently finished product is traced through a variety of software programs. Ingredient traceability is still manual, although several plants have tried commercially available programs."

~ Director of Quality, Large North American Food Packager
Figure 8: Tracking Qualifications and Certifications

![Bar chart showing the percentage of employees with qualifications and certificates tracked through traceability systems.]

Source: Aberdeen Group, October 2011

Best-in-Class companies are almost 30% more likely than all other companies to be able track qualifications and certificates through their traceability system. This allows them to more quickly document and, most important of all, retrieve the information they need for audits. In fact, part of the FSMA10 portion of our study asked specifically about the documentation capabilities for food companies. Figure 9 shows while there are still a number of companies using paper, most now have some form of electronic document management capability.

Figure 9: Impact FSMA10 on Documentation

![Bar chart showing the percentage of respondents using different types of documentation systems.]

Source: Aberdeen Group, October 2011

“Traceability is defined by our company as being able to trace the product from the time that it comes in the door to the time that the product is consumed by the customer. Lotting, tracking product with the pack date, receiving returns correctly, and paperwork all work together to ensure traceability of product.”

~ Charles Gilbert, Director of Food Safety, Grand Western Brands, small North American Food Distributor
Part of the FSMA10 portion of our study asked specifically about the impact of FSMA10 on risk management capabilities. Figure 10 shows that over a third of all food companies have had no change in how they manage risk.

**Figure 10: Impact FSMA10 on risk management**

- 36% of respondents have had no change in how they assess risk.
- 21% now perform informal periodic risk assessments and audits of their operations.
- 43% have implemented a formal risk management and assessment process that continuously evaluates their operations.

Source: Aberdeen Group, October 2011

But, as one would expect with the new regularity environment that FSMA10 creates, a majority of respondents, 64% have felt the need to improve their risk management capabilities. In fact, almost half (43%) have implemented a formal risk management program that is continuously evaluating operations.
Chapter Three: Required Actions

Whether a company is trying to move its performance in food safety and traceability from Laggard to Industry Average, or Industry Average to Best-in-Class, the following actions will help spur the necessary performance improvements:

**Laggard Steps to Success**

- **Get your organization in order for traceability.** Best-in-Class companies are almost twice as likely to have a defined organizational structure to handle adverse events as Laggards. Having everyone know what their responsibility is for an adverse event will speed up reaction time and improve overall reaction performance.

- **Use internal audits to improve performance.** Industry Average companies are almost 30% more likely than Laggards to have a regular audit schedule and use those audits for continuous improvement. Not using your own audits as a way to benchmark and improve your performance will always make audits look more like a paperwork burden than a continuous improvement tool for operations.

- **Don’t avoid mock recall.** Mock recalls provide critical experience to the organization in the case of a real event. Industry Average companies are almost twice as likely as Laggards to perform mock recalls.

**Industry Average Steps to Success**

- **Get ready for GS1 and other industry standards.** While not universally adopted yet, Best-in-Class companies are twice as likely to have prepared their organizations to take advantage of industry standards for traceability, such as GS1. Those standards will make it much easier to track product through the distribution and retail channels.

- **Automate the collection of traceability data.** Industry Average companies are doing a good job of this with 57% already having this capability - but Best-in-Class companies are over 20% more likely to have this automation capability. The next step for Industry Average companies is to drive further automation to error-proof the process and improve productivity.

**Best-in-Class Steps to Success**

- **Accelerate the adoption of traceability standards.** Best-in-Class companies far outpace all others by a factor of two in the adoption of GS1, but still only a third of Best-in-Class companies have gone beyond preparation and have actually adopted the
standard. Driving standards like GS1 into the organization and ecosystem will allow better traceability outside the four walls.

- **Adopt more electronic storage.** Only a small minority of food companies have centralized storage with remote access. Being able to provide not only your own people with access, but also any regulatory body, will reduce the internal burden and workforce impact on audits and responses to requests for documents from outside the company.

- **Use more mobile tools.** Even though Best-in-Class companies were more than two-times as likely to be using mobile tools and devices to automate collection of traceability data, less than a third of the Best-in-Class actually use it themselves. Mobile devices and tools like mobile barcode and RFID readers can be used to fill in the data gaps in areas of the operations that are inaccessible to wired technology.

**Aberdeen Insights — Summary**

As there becomes more clarity about FSMA and how it will be enforced, food companies will have to adapt quickly to changing regulatory environments. Not only that, but as more high profile adverse events happen, risk discussion from insurers and the financial community may well play a bigger role than any regulatory body. Best-in-Class companies have already shrunk the response window to an adverse event down to almost two hours. This shows that Industry Average and Laggard companies can drive their windows smaller as well. Industry Average and Laggard companies that fail to continuously improve their ability to handle adverse events will eventually answer to investors, consumers, and the FDA.

"ERP has brought more visibility to our manufacturing and service organization. Earlier our time to invoice was 100 days, now it is reduced to less than 15 days. Inventory accuracy was in the 80%. Now it is in the 90%. We expect to reduce purchasing costs and other operations costs by improving our usage."

~ Manager, Large Oil and Gas Company
Appendix A: 
Research Methodology

Between September and October 2011, Aberdeen examined the use, the experiences, and the intentions of more than 100 food and beverage companies about their use of traceability and food safety systems, as well as the impact of the Food Safety and Modernization Act of 2010.

Aberdeen supplemented this online survey effort with interviews with select survey respondents, gathering additional information on Manufacturing Operations Management strategies, experiences, and results.

Responding enterprises included the following:

- **Job title / function**: The research sample included respondents with the following job titles: CxO or President (9%); Vice-President (8%); Director (19%); Manager (39%), Staff (11%), Consultant (7%), Other (5%)

- **Industry**: The research sample included respondents exclusively from the following industries: Packaged Food (49%); Service and Distribution (34%); Juice (29%); Frozen Foods (23%); Process (14%); Dairy (24%); Beef (20%); Soft Drinks (10%); Pork (17%); Poultry (19%); Fish/Seafood(13%); Bakery (15%); Produce (13%); Others include water, alcoholic beverages, and misc. meats

- **Geography**: The majority of respondents (72%) were from North America and South America. Remaining respondents were from the Europe (17%) and Asia Pacific (11%).

- **Company size**: Large enterprises (annual revenues above US$1 billion) – (41%); Midsize enterprises (annual revenues between $50 million and $1 billion) – (41%); Small businesses (annual revenues of $50 million or less) – (18%).

### Study Focus

Responding food company executives completed an online survey that included questions designed to determine the following:

- The degree to which product quality and traceability is deployed in their operations and the financial implications of the technology
- The structure and effectiveness of existing product quality and traceability implementations
- The impact of the Food Safety and Modernization Act of 2010
- The benefits, if any, that have been derived from product quality and traceability initiatives

The study aimed to identify emerging best practices for compliance and traceability usage in food industry, and to provide a framework by which readers could assess their own management capabilities.
Table 4: The PACE Framework Key

<table>
<thead>
<tr>
<th>Overview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aberdeen applies a methodology to benchmark research that evaluates the business pressures, actions, capabilities, and enablers (PACE) that indicate corporate behavior in specific business processes. These terms are defined as follows:</td>
</tr>
<tr>
<td><strong>Pressures</strong> — external forces that impact an organization’s market position, competitiveness, or business operations (e.g., economic, political and regulatory, technology, changing customer preferences, competitive)</td>
</tr>
<tr>
<td><strong>Actions</strong> — the strategic approaches that an organization takes in response to industry pressures (e.g., align the corporate business model to leverage industry opportunities, such as product / service strategy, target markets, financial strategy, go-to-market, and sales strategy)</td>
</tr>
<tr>
<td><strong>Capabilities</strong> — the business process competencies required to execute corporate strategy (e.g., skilled people, brand, market positioning, viable products / services, ecosystem partners, financing)</td>
</tr>
<tr>
<td><strong>Enablers</strong> — the key functionality of technology solutions required to support the organization’s enabling business practices (e.g., development platform, applications, network connectivity, user interface, training and support, partner interfaces, data cleansing, and management)</td>
</tr>
</tbody>
</table>

Source: Aberdeen Group, November 2011

Table 5: The Competitive Framework Key

<table>
<thead>
<tr>
<th>Overview</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Aberdeen Competitive Framework defines enterprises as falling into one of the following three levels of practices and performance:</td>
</tr>
<tr>
<td><strong>Best-in-Class (20%)</strong> — Practices that are the best currently being employed and are significantly superior to the Industry Average, and result in the top industry performance.</td>
</tr>
<tr>
<td><strong>Industry Average (50%)</strong> — Practices that represent the average or norm, and result in average industry performance.</td>
</tr>
<tr>
<td><strong>Laggards (30%)</strong> — Practices that are significantly behind the average of the industry, and result in below average performance.</td>
</tr>
</tbody>
</table>

In the following categories:
| **Process** — What is the scope of process standardization? What is the efficiency and effectiveness of this process? |
| **Organization** — How is your company currently organized to manage and optimize this particular process? |
| **Knowledge** — What visibility do you have into key data and intelligence required to manage this process? |
| **Technology** — What level of automation have you used to support this process? How is this automation integrated and aligned? |
| **Performance** — What do you measure? How frequently? What’s your actual performance? |

Source: Aberdeen Group, November 2011

Table 6: The Relationship Between PACE and the Competitive Framework

<table>
<thead>
<tr>
<th>PACE and the Competitive Framework – How They Interact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aberdeen research indicates that companies that identify the most influential pressures and take the most transformational and effective actions are most likely to achieve superior performance. The level of competitive performance that a company achieves is strongly determined by the PACE choices that they make and how well they execute those decisions.</td>
</tr>
</tbody>
</table>

Source: Aberdeen Group, November 2011
Appendix B:
Related Aberdeen Research

Related Aberdeen research that forms a companion or reference to this report includes:

- **Manufacturing Operations Management: Capitalizing on the Economic Recovery**: March 2010
- **Food Safety and Traceability: Ensuring Compliance and Enabling Supply Chain Visibility**: December, 2010
- **Food Safety and Traceability: Keeping Consumers Healthy and Happy**: November, 2009
- **Closed Loop Quality Management: Improving Customer Focus from Design to Delivery**: July, 2009
- **A Platform Approach to Manufacturing Operations Management**: March, 2009
- **Compliance and Traceability in Manufacturing**: December, 2007

Information on these and any other Aberdeen publications can be found at [www.aberdeen.com](http://www.aberdeen.com).

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