Deloitte's recent survey of US fresh food producers and retailers revealed they're implementing a spectrum of technologies and, they're implementing more basic technologies than advanced (see figure). We found that while 8 out of 10 companies have fully implemented on-farm automation, quality sensors, and advanced cold-chain management, implementation of big data and analytics, digital price tags, and artificial intelligence (AI) is low. But does aggressive implementation of advanced technologies guarantee growth and success?

Survey findings also revealed that effectiveness of technology implementations can only be determined by how well technology is integrated in core business strategy. We compared the percentage of revenue from fresh foods and the annual budget for technology and supporting processes and calculated companies' effectiveness in applying technologies to fresh food operations—enter “Leaders” and “Learners” of the technology maturity curve. While both Leaders and Learners matched in their implementation of basic technologies and were in early stages of adopting advanced technologies, there were nuanced differences.

Leaders had a more integrated approach—they had smaller, centralized, and efficient teams to manage their focused investment in fresh food technology. Also, they focused their efforts on fresh foods than on a diversified portfolio.

---

**Implementation of technologies by fresh food producers and retailers**

<table>
<thead>
<tr>
<th>Basic technologies</th>
<th>Advanced technologies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cold chain, online detection, and temperature-monitoring systems</strong></td>
<td><strong>Big data and analytics to identify actionable insights and trends</strong></td>
</tr>
<tr>
<td>20%</td>
<td>5%</td>
</tr>
<tr>
<td>78%</td>
<td>78%</td>
</tr>
<tr>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td><strong>Quality sensors for real-time monitoring of the environment (time, temperature, vibration, gas, etc.)</strong></td>
<td><strong>Digital price tags (digital shelf)</strong></td>
</tr>
<tr>
<td>18%</td>
<td>6%</td>
</tr>
<tr>
<td>80%</td>
<td>80%</td>
</tr>
<tr>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td><strong>Automation for improved on-farm handling, procurement, and processing</strong></td>
<td><strong>Dynamic and real-time pricing (markdown pricing)</strong></td>
</tr>
<tr>
<td>4%</td>
<td>7%</td>
</tr>
<tr>
<td>14%</td>
<td>14%</td>
</tr>
<tr>
<td>80%</td>
<td>80%</td>
</tr>
<tr>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td><strong>Automation and robotics at the manufacturing unit</strong></td>
<td><strong>AI-based warehouse management to monitor fresh food stocks</strong></td>
</tr>
<tr>
<td>5%</td>
<td>7%</td>
</tr>
<tr>
<td>20%</td>
<td>20%</td>
</tr>
<tr>
<td>27%</td>
<td>27%</td>
</tr>
<tr>
<td>42%</td>
<td>42%</td>
</tr>
<tr>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td><strong>Smart packaging to maintain freshness and provide information to the consumer</strong></td>
<td><strong>Blockchain to track the movement of fresh foods through supply chain</strong></td>
</tr>
<tr>
<td>5%</td>
<td>20%</td>
</tr>
<tr>
<td>9%</td>
<td>9%</td>
</tr>
<tr>
<td>25%</td>
<td>25%</td>
</tr>
<tr>
<td>35%</td>
<td>35%</td>
</tr>
<tr>
<td>27%</td>
<td>27%</td>
</tr>
</tbody>
</table>

Note: Percentages may not total 100% due to rounding. Source: Deloitte analysis of the 2019 Future of Fresh Survey data.
Based on current market conditions, it will likely become increasingly important for fresh food producers and retailers to identify and invest in technologies to improve efficiency and the ability to respond to consumer needs quickly. For example, digitizing the core operational processes can pave the way for easier implementation of AI-based warehouses and smart supply chain management technologies, helping companies derive decisive insights through data analytics and much more. Technology can be instrumental in helping fresh food companies predict and model various demand scenarios and shorten response time. In an unprecedented business environment such as today’s, with spikes in demand within certain categories and not others, being nimble can be a foundational requirement to survive and thrive.

Endnote


Acknowledgments

The authors would like to thank Kavita Saini, manager, Deloitte Support Services India Pvt. Ltd.
About the authors

Barb Renner  |  brenner@deloitte.com

Barb Renner is vice-chairman and the US Consumer Products leader, Deloitte LLP. She has more than 25 years of professional experience serving large multinational clients through a variety of leadership roles. Renner works directly with consumer and industrial product clients focusing on their regulatory environment, supply chain, technology and processes, and other issues and opportunities. She has also served in key leadership roles with Deloitte's Women's Initiatives and Junior Achievement.

Brian Baker  |  brianbaker@deloitte.com

Brian Baker is a managing director in Deloitte's Retail and Consumer Goods practice, Deloitte Consulting LLP. His experience includes process design and evaluation, program assessments, systems implementation, managed services, and value delivery programs. Baker's career experience covers multiple retail areas including: inventory management, procurement of both perishable and nonperishable goods, replenishment/allocation, promotional planning, pricing, third-party logistics, and import procurement. In addition, Baker has more than 15 years of store management experience, focusing on perishable departments. Baker has worked with leading national and regional grocery retailers in the areas of process redesign, supply chain solution implementation, SAP, and JDA software packages. He has additional experience with direct store delivery, scan-based trading, open-to-buy management, hard lines, importing, and store operations.

Jagadish Upadhyaya  |  jupadhyaya@deloitte.com

Jagadish Upadhyaya is an assistant manager at Deloitte Support Services' Center for Industry Insights, and supports research for consumer products. He has over 15 years of experience in conceptualizing and designing research projects, project management, and advanced statistical analysis. He has rich experience in writing high-impact thoughtware backed by detailed research and analytics. Upadhyaya has led client-specific multidisciplinary market research teams focusing on analysis of real-time market data and identifying trends in the consumer products and retail space.

Nithya Swaminathan  |  niswaminathan@deloitte.com

Nithya Swaminathan is a senior manager—chief of staff at Deloitte's Consumer Industry Center, Deloitte Services LP. She is focused on developing and operationalizing the consumer research agenda that spans across retail, consumer products, travel, hospitality, and auto sectors. She has over 13 years of client-service experience at Deloitte Consulting helping some of the largest brands in retail and consumer products leverage innovative solutions to become insight-driven organizations.
Deloitte's supply chain strategy team helps senior executives align supply chain capabilities and operating models with their business strategies. We take an integrated view of the supply chain, unlocking hidden value in the connection points between functions and value chain partners.

This approach incorporates process, organization, technology, and performance measurement to help executives understand the trade-offs between cost and flexibility in response to margin pressures they may be facing. We also address those trade-offs to achieve the desired balance between cost service levels across the supply chain.

About the Deloitte Consumer Industry Center

The Deloitte Consumer Industry Center is the research division of Deloitte LLP’s Consumer Industry practice. The center’s goal is to inform stakeholders across consumer business and manufacturing ecosystem of critical business issues, including emerging trends, challenges, and opportunities. Using primary research and rigorous analysis, the center provides unique perspectives and seeks to be a trusted source for relevant, timely, and reliable insights. To learn more, visit us at deloitte.com.

Contacts

Barbara L. Renner  
Partner  
Deloitte Tax LLP  
+1 612 397 4705  
brenner@deloitte.com

Brian Baker  
Managing director  
Deloitte Consulting LLP  
+1 785 580 8812  
brianbak@deloitte.com

Kyle Tanger  
Managing director  
Future of Fresh & Sustainability  
Deloitte Consulting LLP  
+1 571 239 3360  
ktanger@deloitte.com

The Deloitte Consumer Industry Center

Stephen B. Rogers  
Managing director  
Client and Market Growth in the United States  
Deloitte Services LP  
+1 203 563 2378  
stephenrogers@deloitte.com
Deloitte Insights


Follow @DeloittelInsight

Contributors
Editorial: Kavita Saini, Preetha Devan, and Nairita Gangopadhyay
Creative: Sylvia Chang and Ruchi Thakur
Promotion: Alexandra Kawecki

About Deloitte Insights
Deloitte Insights publishes original articles, reports and periodicals that provide insights for businesses, the public sector and NGOs. Our goal is to draw upon research and experience from throughout our professional services organization, and that of coauthors in academia and business, to advance the conversation on a broad spectrum of topics of interest to executives and government leaders.

Deloitte Insights is an imprint of Deloitte Development LLC.

About this publication
This publication contains general information only, and none of Deloitte Touche Tohmatsu Limited, its member firms, or its and their affiliates are, by means of this publication, rendering accounting, business, financial, investment, legal, tax, or other professional advice or services. This publication is not a substitute for such professional advice or services, nor should it be used as a basis for any decision or action that may affect your finances or your business. Before making any decision or taking any action that may affect your finances or your business, you should consult a qualified professional adviser.

None of Deloitte Touche Tohmatsu Limited, its member firms, or its and their respective affiliates shall be responsible for any loss whatsoever sustained by any person who relies on this publication.

About Deloitte
Deloitte refers to one or more of Deloitte Touche Tohmatsu Limited, a UK private company limited by guarantee ("DTTL"), its network of member firms, and their related entities. DTTL and each of its member firms are legally separate and independent entities. DTTL (also referred to as "Deloitte Global") does not provide services to clients. In the United States, Deloitte refers to one or more of the US member firms of DTTL, their related entities that operate using the "Deloitte" name in the United States and their respective affiliates. Certain services may not be available to attest clients under the rules and regulations of public accounting. Please see www.deloitte.com/about to learn more about our global network of member firms.

Copyright © 2020 Deloitte Development LLC. All rights reserved.
Member of Deloitte Touche Tohmatsu Limited