The Internet Of Things In Retail: Great Expectations

Benchmark Report

Nikki Baird and Steve Rowen, Managing Partners

August 2015

Sponsored by:

at&t

Supported by:

software AG
Executive Summary

Key Findings

This is RSR’s first-ever study of the Internet of Things (IoT), such a broadly-used buzzword in the retail industry that we must first define the context in which it was used during for this project. We framed our questions with the 138 qualified retailers who took this survey as collections of networked sensors that impact operations – not consumer-facing technologies like smart refrigerators, home security systems, dishwashers or other appliances.

The following are some of the highlights of what they told us:

- Historically, IoT has been presented as a solution for cost challenges – in preventive maintenance scenarios, for example. However, within the Business Challenges section of this report, retailers firmly reject the challenges related to cost or margin in favor of the challenges related to growth – specifically, responding to consumer challenges that might hinder growth. We examine them beginning on page 5.
- One of the most startling outcomes from this research is survey respondents' professed interest in both connecting with consumers via their personal internet-enabled devices like smartphones, watches, or appliances, as well as offering new services to consumers based on consumer-driven data from those IoT-based devices. To enable these kinds of services, retailers need a whole new data structure for their business – one that we explore within the Opportunities section (page 9).
- Despite their optimism, retailers face significant internal challenges before they’ll be able to leverage any of the opportunities they perceive from the Internet of Things. Indeed, it’s hard to take advantage of a new technology when 53% of retailers say their business leadership doesn’t even understand what it is. And that’s just the tip of the iceberg. Learn more about the surplus of Organizational Inhibitors they face on page 14.
- Retail Winners believe virtually every component of their enterprise stands to gain from next-gen IoT technologies. In fact, within the Technology Enablers section of this report (page 18), we find compelling evidence that Winners are already poised to get a serious leg up on their competitors.

Based on our data, we also offer several in-depth and pragmatic suggestions on how retailers should proceed. These recommendations can be found in the Bootstrap Recommendations portion of the report.

We certainly hope you enjoy it,

Nikki Baird and Steve Rowen
# Table of Contents

Executive Summary ........................................................................................................... i
Research Overview ......................................................................................................... 1  
  The Internet Of Things: Juggernaut Or Joke? .............................................................. 1
  The Good News ............................................................................................................. 1
  A Cautionary Note ....................................................................................................... 2
  Retail Winners And Why They Win .......................................................................... 3
  Methodology ................................................................................................................ 4
  Survey Respondent Characteristics ......................................................................... 4
Business Challenges ...................................................................................................... 5  
  The Customer Dominates ......................................................................................... 5
  Will IoT Pay? ............................................................................................................... 7
Opportunities .................................................................................................................. 9
  IoT Is About Omni-Channel After All. ..................................................................... 9
  The Real-Time Opportunity ...................................................................................... 10
  Directing IoT Investments ....................................................................................... 11
  IoT Optimism ............................................................................................................. 12
Organizational Inhibitors ............................................................................................. 13
  A Whole New World .................................................................................................. 13
  Harnessing The Power Of Data ............................................................................... 14
  Worth The Struggle .................................................................................................... 15
Technology Enablers ..................................................................................................... 17
  A Bright Future .......................................................................................................... 17
  A Look Ahead ............................................................................................................. 18
  A Long Road Ahead ................................................................................................... 19
BOOTstrap Recommendations ...................................................................................... 21
  This Is Not A New Channel ...................................................................................... 21  
  Educate Anyone Who Is Interested Internally ......................................................... 21
  And Speaking Of Technology ................................................................................... 21
  Get Specific ................................................................................................................. 22
  Know Your Role ......................................................................................................... 22
  Remember The Customer ......................................................................................... 22
  Finally, Don’t Panic! ................................................................................................. 23
Appendix A: The BOOT Methodology© ...................................................................... a
Appendix B: About Our Sponsors ............................................................................... b
Appendix C: About RSR Research ............................................................................. d
Figures

Figure 1: Drastic Changes Ahead ........................................................................................................... 1
Figure 2: Doing A Lot, But Not Together ................................................................................................. 2
Figure 3: Change Is Coming .................................................................................................................... 3
Figure 4: Revenue Beats Savings ........................................................................................................... 5
Figure 5: Knowing Customers vs. Fearing Customers .............................................................................. 6
Figure 6: Unrealistic ROI Expectations? .................................................................................................. 7
Figure 7: Customer Engagement and Fulfillment .................................................................................... 9
Figure 8: The Need For Speed ................................................................................................................. 10
Figure 9: Even Faster ............................................................................................................................. 11
Figure 10: Enabling Departments ........................................................................................................... 12
Figure 11: Hill To Climb ........................................................................................................................ 13
Figure 12: Data, Data, Everywhere ......................................................................................................... 14
Figure 13: The Poison As Cure? ............................................................................................................. 15
Figure 14: Winners Press On .................................................................................................................... 17
Figure 15: Now What? ........................................................................................................................... 19
Figure 16: Lots Of Headroom ............................................................................................................... 20
Research Overview

The Internet Of Things: Juggernaut Or Joke?

In the latter days of the first Internet Bubble, as it became clear that the bubble was running out of air, there was a stampede of investment into mobile. Mobile was going to be the next great disruptor, and because there was too much money chasing too few investment opportunities, mobile quickly drowned under the weight of all that attention.

The investors weren't wrong, they were just early – about ten years too early, for it wasn't until the iPhone and its adoption that we really began to see the promise of mobile brought to reality.

Today, the Internet of Things, or IoT, has several parallels to mobile back in 2001. It's such a broad buzzword that we must define exactly what we mean by IoT below. In another sign of the hype around IoT, at the National Retail Federation Big Show in January 2015 IoT demonstrations trailed only smart dressing rooms as broadly displayed demonstrations of relevant future technologies, and often the two technologies were demonstrated together.

Many of those demonstrations featured processes or use-cases that were interesting, but not necessarily valuable. And yet, vendors continue to be very excited about the opportunity for IoT, both in general but especially for retail. And so RSR felt the time was ripe to assess whether retailers feel the same way. The result is this report.

The Good News

We were very specific in defining IoT as collections of networked sensors that impact operations, and not consumer-facing technologies like smart refrigerators. Even with these constraints, retailers believe that IoT will have a major impact on their business and on consumer products in the next three years (Figure 1).

Figure 1: Drastic Changes Ahead

<table>
<thead>
<tr>
<th>IoT Perceptions In Retail</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Internet of Things will drastically change the way companies do business in the next 3 years.</td>
<td>42%</td>
<td>38%</td>
<td>16%</td>
<td>3%</td>
<td>2%</td>
</tr>
<tr>
<td>The Internet of Things will have a dramatic impact on consumer products in the next 3 years.</td>
<td>39%</td>
<td>41%</td>
<td>16%</td>
<td>4%</td>
<td>1%</td>
</tr>
<tr>
<td>My company has no idea how the Internet of Things will impact our own operations in the next 3 years.</td>
<td>13%</td>
<td>21%</td>
<td>22%</td>
<td>30%</td>
<td>14%</td>
</tr>
</tbody>
</table>

Source: RSR Research, August 2015
We were even more surprised to find that retailers feel relatively prepared to meet the challenge – 66% of respondents are at least neutral if not outright optimistic about being ready to take on IoT’s impact on their operations.

That optimism is reflected in their belief about their relative maturity when it comes to running and executing IoT projects. A startling 72% of respondents report that they have projects of some kind underway (Figure 2).

*Figure 2: Doing A Lot, But Not Together*

<table>
<thead>
<tr>
<th>IoT Maturity</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Differentiating: We have multiple, mature sensor-related projects and use them to drive capabilities that differentiate us from our peers.</td>
<td>7%</td>
</tr>
<tr>
<td>Performing: We have a comprehensive strategy in place for managing sensor-based capabilities, and are beginning to implement that strategy</td>
<td>29%</td>
</tr>
<tr>
<td>Competent: We have successfully implemented at least one sensor-based project, and are actively seeking new projects</td>
<td>36%</td>
</tr>
<tr>
<td>Inefficient: Different internal organizations are piloting, implementing, or rolling out sensor-related projects, but there is no central management of the capability</td>
<td>11%</td>
</tr>
<tr>
<td>Inconsistent: We are undergoing education on the opportunities (including some pilot projects)</td>
<td>7%</td>
</tr>
<tr>
<td>No capability: We aren’t doing anything related to Internet of Things</td>
<td>10%</td>
</tr>
</tbody>
</table>

*Source: RSR Research, August 2015*

**A Cautionary Note**

However, there is a wide range in what retailers report "doing something" means, especially when it comes to projects as complex as those involving IoT. Another way to look at Figure 2 is to say that 64% of respondents are doing nothing at all, or are doing it in an uncoordinated fashion, with different internal groups doing different things. While a little more than half of that group (36%) is starting to move to more coordinated projects, there is still a long way to go before retailers can really all claim to be mature when it comes to IoT’s applications in their businesses.

In many ways we are reminded of the RFID bubble of the early 2000’s. Almost every retailer of any size was doing something, but with the exception of Walmart’s famously unsuccessful supply chain mandate, those projects amounted to little more than pilots. Will IoT, a larger and more diverse collection of sensors and applications, turn out the same? Retailers’ optimism here (as opposed to the general grumbling about RFID when Walmart issued its mandate) is a key difference from days past.

So where do retailers see the opportunities for IoT internally? Operational efficiency? Customer-facing activities? And what is holding them back from making IoT investments? That is what we set out to discover.
**Retail Winners And Why They Win**

In our benchmark reports, RSR quite frequently cites differences between retailer over-performers in year-over-year comparable sales and their competitors. We find that consistent sales performance is an outcome of a differentiating set of thought processes, strategies and tactics. We call sales over-performers “Retail Winners.”

RSR’s definition of these Winners is straightforward. Assuming industry average comparable store/channel sales growth of **4.5 percent**, we define those with sales above this hurdle as “Winners,” those at this sales growth rate as “average,” and those below this sales growth rate as “laggards” or “also-rans.”

One trend that will emerge throughout this report is that Retail Winners are more aggressive about the opportunities they see for IoT applications to their businesses. That aggressiveness has translated into a higher perceived maturity – 40% of Retail Winners report that they are “performing” when it comes to IoT, vs. only 21% of peers. But they also expressed an interesting difference in perspective when it came to their preparedness for IoT’s impact (Figure 3).

**Figure 3: Change Is Coming**

<table>
<thead>
<tr>
<th>IoT Perceptions in Retail &quot;Strongly Agree&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Winners</strong></td>
</tr>
<tr>
<td>The Internet of Things will drastically change the way companies do business in the next 3 years.</td>
</tr>
<tr>
<td>The Internet of Things will have a dramatic impact on consumer products in the next 3 years.</td>
</tr>
<tr>
<td>My company has no idea how the Internet of Things will impact our own operations in the next 3 years.</td>
</tr>
</tbody>
</table>

*Source: RSR Research, August 2015*

Retail Winners are far more positive about the degree of change coming. But they are also less confident that they know how it will impact their business. These retailers report they are doing projects, working their way up the learning curve. But it seems like the more they learn, the more they discover what they don’t know. One conclusion to draw from this: the learning curve for IoT is vast and steep, and retailers – most especially Retail Winners – believe they have only progressed along the slight incline at the start of the curve.

This sense for deep waters beneath their feet combines with Winners’ overall optimism about IoT to create some interesting tensions as they tie their business challenges to their technology investments, which we will explore in this report.
Methodology

RSR uses its own model, called The BOOT Methodology® to analyze Retail Industry issues. We build this model with our survey instruments. See Appendix A for a full explanation.

In our surveys, we continue to find the kinds of differences in thought processes, actions, and decisions cited above. The BOOT helps us better understand the behavioral and technological differences that drive sustainable sales improvements and successful execution of brand vision.

Survey Respondent Characteristics

RSR conducted an online survey from June – August 2015 and received answers from 138 qualified retail respondents. Respondent demographics are as follows:

- **2014 Revenue (US$ Equivalent)**
  - Less than $50 million: 20%
  - $51 million - $249 million: 5%
  - $250 million - $499 million: 15%
  - $500 million - $999 million: 14%
  - $1 Billion to $5 Billion: 24%
  - Over $5 Billion: 23%

- **Products sold:**
  - Fast moving consumer goods: 23%
  - Apparel, footwear and accessories: 21%
  - Hard goods: 13%
  - General merchandise: 25%
  - Hospitality, retail services, entertainment: 13%
  - Brand manufacturers: 6%

- **Headquarters/Retail Presence:**

<table>
<thead>
<tr>
<th></th>
<th>HQ</th>
<th>Retail Presence</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>81%</td>
<td>85%</td>
</tr>
<tr>
<td>Canada</td>
<td>0%</td>
<td>28%</td>
</tr>
<tr>
<td>Latin America</td>
<td>0%</td>
<td>14%</td>
</tr>
<tr>
<td>UK</td>
<td>13%</td>
<td>27%</td>
</tr>
<tr>
<td>Europe</td>
<td>3%</td>
<td>25%</td>
</tr>
<tr>
<td>Middle East</td>
<td>0%</td>
<td>7%</td>
</tr>
<tr>
<td>Africa</td>
<td>2%</td>
<td>9%</td>
</tr>
<tr>
<td>Asia/Pacific</td>
<td>2%</td>
<td>20%</td>
</tr>
</tbody>
</table>

- **Year-Over-Year Sales Growth Rates** (assume average growth of 4.5%):
  - Worse than average ("Laggards"): 41%
  - Average: 53%
  - Better than average ("Retail Winners"): 6%
Business Challenges

The Customer Dominates

When RSR asked retailers about the business challenges causing them to look at IoT opportunities, we offered three categories of options: growth challenges, cost challenges, and margin challenges. Historically, IoT has been presented as a solution for cost challenges – in preventive maintenance scenarios, for example. However, retailers firmly reject the challenges related to cost or margin in favor of the challenges related to growth – specifically, responding to consumer challenges that might hinder growth (Figure 4).

Figure 4: Revenue Beats Savings

At the top of the list are very classic business challenges faced by retailers at least since the Great Recession: differentiating from the competition, and consumer price sensitivity. We found that the kinds of challenges retailers typically struggle with during omni-channel transformation fell low on the list, including understanding what consumers want in a customer experience, and consumer dissatisfaction caused by a lack of integration across selling channels. Also very low on the list were supply chain disruptions – a common theme used in some IoT use cases. For retailers, IoT is about satisfying customers, not about moving product.

By performance, respondents are united on the idea that IoT represents the best opportunity to create differentiation from competitors. After that, we find some significant differences (Figure 5).
Figure 5: Knowing Customers vs. Fearing Customers

Winning retailers are more challenged by the demand for speed and agility in their operations than their peers. They also express more concern over management impatience with growing levels of inventory, and the increasing gap between their corporate IT capabilities, and that of their customers.

Their peers, on the other hand, are more focused on consumer price sensitivity, their lack of cross-channel integration, and uncertainty about how consumers might want to engage. The focus on consumer price sensitivity has the potential to hold back lagging retailers’ investments in IoT, especially if they fear costs will have to be passed on to consumers. However, their focus on consumers has a significantly different flavor than the consumer focus RSR typically finds among Retail Winners.
Winners have been investing in understanding consumer behavior since the initial rise of omni-channel. They feel the imperative to understand what consumers want (thus their concern about falling behind in the consumer-retailer technology arms race). Others have not made these investments, historically choosing to focus on the operational side of omni-channel at the expense of customer understanding. Their focus on customer now reflects how little they know, rather than a more extreme focus on the customer in the first place.

Other differences worth noting:

• The largest retailers drive the challenge of differentiating from the competition – 71% of respondents vs. 46% for the next most frequently cited answer. The good news is that these largest retailers are the most certain about how consumers want to engage – only 11% report that as a challenge vs. 21% overall
• Tier 2 retailers – $1-5B – report board pressure to cut operational costs as their biggest challenge (55% vs. 29% overall)
• Fashion retailers are the least worried about differentiating from the competition – only 36% said this was a top-three challenge vs. 51% overall. However, fashion retailers were most likely to say that they were uncertain about how consumers wanted to engage with them – 32% cited this as a challenge vs. 21% overall

**Will IoT Pay?**

That retailers see challenges that IoT can solve is an important first step in assessing IoT’s viability in retail. It’s somewhat startling to find retailers’ consumer-focused interest in IoT rather than on inventory or maintenance, but it’s not totally unexpected. Retailers – especially Retail Winners – have been very focused on the customer in the last decade across all aspects of their business.

But is there enough value in IoT to fund retailers' projects? The answer is yes (Figure 6).

*Figure 6: Unrealistic ROI Expectations?*

<table>
<thead>
<tr>
<th>ROI Requirements for IoT Investments</th>
<th>8%</th>
<th>27%</th>
<th>13%</th>
<th>21%</th>
<th>14%</th>
<th>7%</th>
<th>7%</th>
<th>3%</th>
</tr>
</thead>
<tbody>
<tr>
<td>It's not about ROI, it's about capital outlay</td>
<td>An ROI of 0%-2.9%</td>
<td>An ROI of 3%-4.9%</td>
<td>An ROI of 5%-7.4%</td>
<td>An ROI of 7.5%-9.9%</td>
<td>An ROI of 10%-15%</td>
<td>An ROI greater than 15%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Source: RSR Research, August 2015*
Fully 45% of respondents say they need a return on investment (ROI) of less than 7.5% to proceed with IoT projects, and another 27% say they don’t need ROI at all – they see these investments as necessary for maintaining competitive advantage. Only 8% of respondents say they are too cash-constrained to even consider ROI.

While 27% say they don't need an ROI as long as it keeps them competitive, we believe that's a bit of an unrealistic view. Not even the smallest retailers invest in IT projects for the sole purpose of keeping their doors open. In this case, those 27% of respondents are made up primarily of the largest retailers – 46% of those with more than $5B in revenue report they feel this way. While those respondents still most likely have to come up with an ROI for their IoT projects regardless, it is interesting to note that the largest retailers see IoT as enough of a game-changer that they believe if they don't invest, they could be left behind.

Where will those investments focus? Let's turn to the Opportunities section to find out.
Opportunities

IoT Is About Omni-Channel After All

In the Business Challenges section, survey respondents report that challenges typically associated with omni-channel transformation are not as high a priority as more traditional growth challenges. However, as you’ll see below, retailers rate omni-channel opportunities for using IoT higher than others – particularly using IoT to maintain inventory accuracy in stores (the historical strength of RFID), using IoT to bridge the physical/digital divide with consumers, and maintaining system-wide inventory visibility (Figure 7).

On one level, this would seem to be a contradiction. However, other RSR research, including our omni-channel benchmarks, reveal that business growth challenges and omni-channel opportunities are actually closely related. Omni-channel has simply matured to the point where retailers see opportunities like in-store inventory accuracy – crucial to surfacing in-store inventory for online or save-the-sale selling – as opportunities central to their overall growth.

Figure 7: Customer Engagement and Fulfillment

<table>
<thead>
<tr>
<th>Top 3 Opportunities For IoT</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintaining inventory accuracy in stores</td>
<td>49%</td>
</tr>
<tr>
<td>Closer engagement with consumers through their internet-connected devices (watches, phones, appliances, etc.)</td>
<td>43%</td>
</tr>
<tr>
<td>Maintaining system-wide inventory visibility</td>
<td>40%</td>
</tr>
<tr>
<td>New services offered to consumers through monitoring their internet-connected devices (predictive maintenance of a connected dishwasher, for example)</td>
<td>40%</td>
</tr>
<tr>
<td>Gain a deeper understanding of how our internal processes are actually performed</td>
<td>31%</td>
</tr>
<tr>
<td>Increasing the inventory available for cross-channel fulfillment</td>
<td>31%</td>
</tr>
<tr>
<td>Monitoring and predictive maintenance of equipment and property (for example, HVAC systems, refrigeration units, delivery trucks, etc.)</td>
<td>28%</td>
</tr>
<tr>
<td>Gaining more granular and real-time insight into the state of our business</td>
<td>20%</td>
</tr>
<tr>
<td>Automating responses to real-time events or issues that arise in our business</td>
<td>17%</td>
</tr>
</tbody>
</table>

Source: RSR Research, August 2015
The opportunity around in-store inventory accuracy is driven primarily by the largest ($5B+) and the smallest (<$250M) retailers. But it is Tier 2 retailers ($1-$5B) who are most interested in system-wide inventory visibility. This reflects a bit of a nuance in being able to provide cross-channel fulfillment. Both Tier 1 and Tier 2 retailers believe this is an opportunity at a higher rate than peers (36% and 45%, respectively). But Tier 1 retailers translate this into store inventory visibility, while Tier 2 retailers want to see across the whole inventory network.

The largest and smallest retailers are also most aligned around closer engagement to consumers via their internet-connected mobile devices. This is very consistent with their view that IoT offers the most opportunity around customer engagement. Not surprisingly, hard goods retailers (including consumer electronics retailers) were most enthusiastic about this opportunity (58%). However, Retail Winners take this one step further – they were by far the most interested in offering new services to consumers by monitoring their smart devices (54% vs. 31% of peers). Incremental preventive maintenance and extended warranty revenue come immediately to mind.

**The Real-Time Opportunity**

One of the most startling outcomes from this research is survey respondents’ professed interest in both connecting with consumers via their personal internet-enabled devices like smartphones, watches, or appliances (#2 on the opportunities list in Figure 7), as well as offering new services to consumers based on consumer-driven data from those IoT-based devices (#4 on the list).

To enable these kinds of services, retailers need a whole new data structure for their business – one that must deal with even larger amounts of data than retailers already struggle with, along with all of the issues associated with getting insight from this data.

Retailers appear to be staying consistent in their focus on IoT for customer engagement – when it comes to their expected ability to respond to IoT data, survey respondents are looking for the real-time responsiveness that would enable reacting to consumer data, much more so than long-term trending data that would help retailers improve their internal operations (Figure 8).

**Figure 8: The Need For Speed**

![Expected Speed of Response to IoT Data](image)

<table>
<thead>
<tr>
<th>Expected Speed of Response to IoT Data</th>
<th>High Value</th>
<th>Some Value</th>
<th>Little to No Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real-time alerts to changing conditions</td>
<td>47%</td>
<td>49%</td>
<td>4%</td>
</tr>
<tr>
<td>Process improvement over time, as the root causes of process issues are identified and resolved</td>
<td>46%</td>
<td>48%</td>
<td>6%</td>
</tr>
<tr>
<td>Predicting events before they occur and recommending preventive actions</td>
<td>43%</td>
<td>47%</td>
<td>10%</td>
</tr>
<tr>
<td>Predicting events before they occur and automating preventive actions</td>
<td>43%</td>
<td>49%</td>
<td>8%</td>
</tr>
<tr>
<td>Summary-level visualizations of the real-time status of different operations</td>
<td>34%</td>
<td>58%</td>
<td>7%</td>
</tr>
</tbody>
</table>

*Source: RSR Research, August 2015*
But as much as overall respondents recognize the need for near-real-time responsiveness to IoT data events, Retail Winners are even more emphatic (Figure 9).

**Figure 9: Even Faster**

<table>
<thead>
<tr>
<th>Expected Speed of Response to IoT Data &quot;High Value&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real-time alerts to changing conditions</td>
</tr>
<tr>
<td>Winners</td>
</tr>
<tr>
<td>Predicting events before they occur and recommending preventive actions</td>
</tr>
<tr>
<td>62%</td>
</tr>
<tr>
<td>Process improvement over time, as the root causes of process issues are identified and resolved</td>
</tr>
<tr>
<td>58%</td>
</tr>
<tr>
<td>Predicting events before they occur and automating preventive actions</td>
</tr>
<tr>
<td>52%</td>
</tr>
<tr>
<td>Summary-level visualizations of the real-time status of different operations</td>
</tr>
<tr>
<td>40%</td>
</tr>
</tbody>
</table>

Source: RSR Research, August 2015

This desire for real-time will either run into the wall of the limitations of their existing infrastructure, or retailers will be forced to make major changes in technology capabilities to make this level of responsiveness a reality. We'll explore those capabilities later, in the Technology Enablers section.

**Directing IoT Investments**

Consistent with the opportunities identified above, the top three departments retailers believe can benefit from IoT investments are customer service and support, inventory management, and those groups supporting customer engagement in their own homes. Maintenance and repair and transportation and logistics fell to the bottom of the list (Figure 10, below).

It is interesting to note that the retailers favoring customer engagement in their home are not the retailers you might expect. Rather than those selling consumer electronics (classified as hard goods for the purposes of this study), who would theoretically engage through supporting the internet-connected devices they sell, or fast-moving consumer goods retailers, who might engage in support of food replenishment, it is fashion and general merchandise retailers who see the most value in using IoT to engage consumers in their homes.

This seems a little odd, given most of the in-home opportunities that are presented as use-cases for data streams from IoT – health and fitness, food consumption, services related to maintaining consumer electronics have all had more play in the public discussion around IoT opportunities than anything related to fashion or home accessories, for example. It will be interesting to see over time exactly how these retailers expect to engage, and the specific customer lifestyle problems they expect to solve.
The interest in inventory management is driven by Retail Winners – 52% reported this opportunity vs. only 40% of peers. Winners were more likely to see opportunity across the board, and were edged out by their peers only in two areas: customer service and support, and marketing communications.

Fashion retailers’ interest makes much more sense in the context of inventory management – 54% of fashion retailers rate inventory management as an organizational area that could benefit from IoT, vs. 45% overall. In their pursuit of ship-from-store, these retailers are increasingly turning to RFID, for example, to ensure in-store inventory accuracy and to be able to more reliably promise in-store inventory against online orders.

**IoT Optimism**

In this first benchmark on IoT, we expected retailers to be far less optimistic about the opportunities presented by the Internet of Things than they are. And we expected them to be more focused on internal operations – things that can be easily measured from an ROI perspective – than on things that enable customer engagement or are positioned to deliver revenue growth.

Retailers see a lot of opportunity for IoT – but are they realistic about the challenges they will have to overcome in order to make it a reality? That is what the rest of this report will explore.
Organizational Inhibitors

A Whole New World

Despite their optimism, retailers face significant internal challenges before they’ll be able to leverage any of the opportunities they perceive from the Internet of Things. Indeed, it’s hard to take advantage of a new technology when 53% of retailers say their business leadership doesn’t even understand what it is (Figure 11).

Figure 11: Hill To Climb

<table>
<thead>
<tr>
<th>Top 3 IoT Organizational Inhibitors</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business leadership doesn't understand the benefits of Internet of Things</td>
<td>53%</td>
</tr>
<tr>
<td>Overall Capital Requirements – we never even get to the subject of ROI</td>
<td>49%</td>
</tr>
<tr>
<td>We have not identified a business case to support specific use-cases for the Internet of Things</td>
<td>47%</td>
</tr>
<tr>
<td>The technology supporting the Internet of Things is not mature enough for our business to invest</td>
<td>47%</td>
</tr>
<tr>
<td>Our existing infrastructure is not capable of supporting Internet of Things</td>
<td>45%</td>
</tr>
<tr>
<td>We don’t have the skills to manage the analytics and predictive modeling required to take advantage of IoT data</td>
<td>32%</td>
</tr>
<tr>
<td>Our IT team does not have the capacity to take on Internet of Things projects</td>
<td>28%</td>
</tr>
</tbody>
</table>

In fact, our retail respondents seem genuinely confronted by the prospect of their internal roadblocks; not only do their leaders not understand IoT’s benefits, but nearly one out of two predict infrastructure issues, maturity issues, capital issues, and an unidentified business case for forward progress.

However, as is often the case, the best performers see their challenges differently. Winners have moved more past questions of their skills to manage analytics (only 24%, not pictured, compared to others’ 38%), as well as their IT team’s capacity for new projects. Instead, our Retail Winner respondents tell us that, far and away, their greatest challenge will be getting the funding required to take on new projects. For them, IoT is not an issue of if, but when. They’ll worry about their team’s capacity and their ensuing skill level once the money begins to flow.
**Harnessing The Power Of Data**

In a continuation of this theme, Winners also face a different set of implementation challenges. In Figure 12, below, we can see that getting to data – regardless of what state it’s in – presents a problem to all retailers. But note the primary difference: Winners see their biggest tech and process barriers in the future as the ability to generate a powerful offering from the data they’ll be collecting from various sources.

By contrast, their peers can’t get their heads around what it will mean when data is coming in from so many sources at one time. This may seem subtle, but it indicates that non-winning retailers likely already have a tough time collecting data and making it actionable. The deluge that will result from the Internet of Things will not make life any easier on them.

*Figure 12: Data, Data, Everywhere*

<table>
<thead>
<tr>
<th>What do you see as the top technology or process barriers to IoT projects?</th>
<th>Winners</th>
<th>All Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combining disparate data sources together</td>
<td>48%</td>
<td>29%</td>
</tr>
<tr>
<td>Determining the best response to specific data events or exceptions</td>
<td>46%</td>
<td>32%</td>
</tr>
<tr>
<td>Dealing with so much data from so many different sources in real time</td>
<td>42%</td>
<td>57%</td>
</tr>
<tr>
<td>Prioritizing which projects to do first</td>
<td>30%</td>
<td>49%</td>
</tr>
</tbody>
</table>

Source: RSR Research, August 2015

Winners are also less challenged to prioritize which projects they want to tackle first. While roughly one in three Winners view the “triage” process as a challenge, that number is nearly one in two for all other retailers. This is not an uncommon occurrence; in much of the research RSR conducts, we find Winners routinely display a calmer nature while prioritizing new projects. Part of this comes from their early awareness of emerging technologies: paying more attention to trade publications, attending more industry events, and the like.

However, it is also a function of Winning behavior: don’t try to boil the ocean – start with small, achievable goals, put a dedicated exploratory team together with realistic targets, and get to work. The process may seem trivial at first, but this is how progress is made. Viewing a new technology as “too big” to tackle or panicking about where to begin is a sure-fire way to become a late (and likely less-effective) attendee to the party.
Interestingly enough, by vertical, retailers selling Fast-moving Consumer Goods (FMCG) are inordinately challenged to combine their disparate data sources together. While fashion, general merchandise and hard goods retailers are far more challenged to combine IoT data with things like predictive analytics, 50% of FMCG retailers cite combining their disparate data sources together as a top-three implementation challenge (not pictured). Theirs will be a long and painful road before they can glean actionable information from IoT sources. The complexity of their supply chains, coupled with the number of SKUs and often-times perishability of those goods makes these retailers ideal candidates to leverage benefits from IoT devices and technologies; just think of the possibilities!

However, as we’ve said for many years now, it will be a long time before next-generation tracking technologies are inexpensive enough to warrant following a can of peas, even if the law of physics would allow it.

**Worth The Struggle**

In an interesting case of poison as cure, our retailers are clear: it’s definitely worth figuring out the unique internal challenges that IoT functionality poses. Why? Because as much of a challenge as these new systems pose today, in the long run, *IoT holds tremendous opportunity to help with the operational challenges retailers already have within their current systems.*

**Figure 13: The Poison As Cure?**

<table>
<thead>
<tr>
<th>Top 3 Operational Challenges IoT Can Solve</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inventory accuracy</td>
<td>48%</td>
</tr>
<tr>
<td>Visibility into customers' physical shopping behaviors</td>
<td>48%</td>
</tr>
<tr>
<td>Speed of fulfillment to meet consumer demand</td>
<td>44%</td>
</tr>
<tr>
<td>Connecting consumers' online and offline activities</td>
<td>41%</td>
</tr>
<tr>
<td>Visibility into customers' digital shopping behaviors</td>
<td>39%</td>
</tr>
<tr>
<td>Inventory availability for omni-channel demand</td>
<td>34%</td>
</tr>
<tr>
<td>Inventory visibility</td>
<td>29%</td>
</tr>
<tr>
<td>Equipment outages and repair</td>
<td>16%</td>
</tr>
</tbody>
</table>

*Source: RSR Research, August 2015*

When viewed by performance or size, some interesting differences emerge (not pictured):

- Retail Winners are banking on IoT’s ability to help them sort out their inventory accuracy issues (54%, vs others’ 44%). This is vital because retailers consistently tell us
throughout our annual research reports – regardless of the topic – that having a precise picture of their inventory is the linchpin to help cure so much of what ails them today. Will IoT systems help get them there faster? It goes without saying that if they do, the rewards will be tremendous. As channels continue to proliferate and consumers continue to lose empathy for a how retailer fulfills their needs, the retailer who can rely on an accurate inventory will be able to fulfill those demands in countless innovative ways. And that will lead to legitimate brand loyalty.

• In a similar vein, Winners are also more optimistic for what the speed of fulfillment to meet consumer demand will do for that brand loyalty. Fifty percent of Winners (vs. 40% of all others) cite this as an operational challenge that stands to benefit from IoT advances. It’s not a huge difference, but again it shows us how Winners keep a consistently sharper eye on what matters most. Their success is not an accident.

• In yet another classic example of performance variance, when faced with a new technology set, average and lagging retailers are more likely to look outwardly at their customers, rather than at their own internal processes: nearly half cite the chance to get a better look at customers’ digital shopping behaviors, while only a little more than 30% of Winners rank this as a hurdle IoT will help them get over. Winners continue to think within the mindset of: “What can we be doing better?” It’s part of what defines them.

• And lastly, the largest retailers (5B+) are most interested in speed of fulfillment to meet customer demand (57% vs. smallest retailers’ 38%). This makes perfect sense; mega retailers view IoT as a possibility to regain the nimbleness they once had when their enterprises were smaller and far less complex. For small retailers, the message is clear: use every advantage you currently have to meet consumer demand while you can. And hopefully, when that service model enables you to grow, the tools will exist to help you maintain that agility.

Now let’s see the ways technology can help.
Technology Enablers

A Bright Future

We mentioned early in this report that Retail Winners are more aggressive about the opportunities they see for IoT applications to their businesses. That trend continues as it relates to the IoT technologies retailers believe will be of most value to them moving forward. Even as we are admittedly in the very early days of IoT in retail, Winners systemically expect to reap greater benefit than their average and underperforming peers. Are they overly optimistic? It is too early to tell, but one thing is clear: based on Figure 14, they believe IoT technologies are going to be a game changer to their day-to-day operations.

Figure 14: Winners Press On

"High Value" IoT Technologies

<table>
<thead>
<tr>
<th>Technology Enabler</th>
<th>Winners %</th>
<th>All Others %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beacons for in-store customer communications</td>
<td>70%</td>
<td>44%</td>
</tr>
<tr>
<td>RFID for supply chain inventory tracking</td>
<td>58%</td>
<td>38%</td>
</tr>
<tr>
<td>Visual analytics for making sense out of IoT data</td>
<td>56%</td>
<td>36%</td>
</tr>
<tr>
<td>Loss prevention sensors</td>
<td>56%</td>
<td>40%</td>
</tr>
<tr>
<td>Predictive analytics</td>
<td>54%</td>
<td>40%</td>
</tr>
<tr>
<td>Security sensors</td>
<td>54%</td>
<td>35%</td>
</tr>
<tr>
<td>RFID for item-level inventory</td>
<td>54%</td>
<td>32%</td>
</tr>
<tr>
<td>Big data solutions for storing &amp; analyzing IoT-generated data</td>
<td>52%</td>
<td>32%</td>
</tr>
<tr>
<td>Sensors for tracking the status of equipment</td>
<td>52%</td>
<td>26%</td>
</tr>
<tr>
<td>Sensors for tracking the status of inventory for sale (for example, temperature, force, etc.)</td>
<td>50%</td>
<td>39%</td>
</tr>
<tr>
<td>Sensors for tracking customer footpath through stores</td>
<td>50%</td>
<td>26%</td>
</tr>
<tr>
<td>Beacons for store perimeter marketing</td>
<td>50%</td>
<td>28%</td>
</tr>
<tr>
<td>Event-based alerting &amp; exception management</td>
<td>48%</td>
<td>26%</td>
</tr>
<tr>
<td>IoT device &amp; network monitoring</td>
<td>46%</td>
<td>28%</td>
</tr>
<tr>
<td>Cameras and video analytics for customer experience purposes</td>
<td>42%</td>
<td>33%</td>
</tr>
<tr>
<td>Network-controlled lighting</td>
<td>40%</td>
<td>29%</td>
</tr>
<tr>
<td>Cameras and video analytics for operational purposes</td>
<td>40%</td>
<td>35%</td>
</tr>
</tbody>
</table>

Source: RSR Research, August 2015
In fact, Winners believe virtually every component of their enterprise stands to gain from next-gen IoT technologies. The above chart classifies as what we call “compelling evidence” that Winners are more tapped into an understanding of technology (and its potential) that is suited for success across the enterprise. Quite simply, they get it.

When we examine this same data by size or product sold, we find:

- **Larger retailers** are inordinately focused on cameras and video analytics for operational purposes, as well as visual analytics to make sense of IoT data. They are more than eager to start leveraging a lot more from their sizable digital video surveillance investments than just loss prevention and forensic efforts.

- Conversely, **small retailers** are only attracted to beacons for in-store customer communications. Why? Because beacons are currently one of the few low-cost IoT technologies available. Indeed, one of the key takeaways from this, our inaugural report on the Internet of Things is that, at least for the foreseeable future, **IoT will be territory dominated by the big guys**. It is yet one more reason for small retailers to do all they can while their service and inventory model is still differentiated in a meaningful way from that of their larger competitors.

- **Fashion retailers** have the largest appetite for RFID technologies for both supply chain inventory tracking (54%), but also - and most understandably - they are the only segment driving RFID for item-level inventory purposes (61% vs. GMA retailers’ 34% and hard goods retailers’ 26%). This makes complete sense. Their FMCG brethren, by comparison, are all about the value of sensors for tracking customer footpath throughout the store. These both serve as cases where the resulting data merely confirms something we’ve all suspected for years.

**A Look Ahead**

However, as it relates to use and budget, our inaugural audience gives us insight into areas that no one could have predicted (Figure 15, below). Namely, that budgets for IoT technologies are already well ahead of where anyone would have suspected.
A Long Road Ahead

Still, when we look at this data in a different way – comparing the value of IoT technologies to their current use, we see the true story unfold. The Internet of Things has a long road to travel for the retail industry in the coming years (Figure 16, below).
The chasm between what is valued – and what is being successfully used – is vast. We need not harp on this point too much, as the Internet of Things is in its absolute infancy. Consider once more that over half of the retailers who responded to this survey told us their executive leadership doesn’t even understand what the term means. But at the rate of change sweeping through our industry, we fully expect that gap – and those in the chart above – to narrow by the time we conduct this research again next year.
In our inaugural report on the Internet of Things we learned that retailers are far more optimistic about the opportunities from IoT-based projects than we expected, and that their interest lies more with customer engagement and insights that drive growth than with operational improvements that save costs. We learned that inventory management in stores – an RFID play – is an early winner, and not just with fashion retailers. And we learned that even though retailers see a long road ahead to actually gaining the benefits of IoT projects, they are looking for benefits related to some of the most challenging – and exciting – aspects of IoT: real-time sensing and responding to changes, customer interaction, and customer service.

To navigate this new world in which retailers find themselves, we have several recommendations, and a few warnings to watch out for along the way.

This Is Not A New Channel
In the early days of eCommerce and mobile, retailers built new organizations and created channel conflicts that are still being resolved today. So even though retailers are looking to IoT projects to interact with consumers and understand them better, it will be in no way beneficial to the retailer or the customer to treat, for example, the consumer’s refrigerator as a channel akin to the consumer’s mobile phone. IoT needs to be an integrated part of the omni-channel business model.

Educate Anyone Who Is Interested Internally
While the fundamental technologies involved in IoT projects have been around for a long time, the potential for those technologies is only now unfolding. And the potential relies heavily on technology infrastructure, including hardware (sensors), network, and data storage and analytics.

Retailers should invest in education sessions that bring in business leaders from across the enterprise, so that they can start thinking about how this collection of infrastructure can come together to help their own business challenges. But they must also understand the risks and limitations. Retailers, especially poor performing retailers, have a tendency to latch on to “silver bullets” – solutions that they believe can solve problems well beyond what those solutions are actually capable of addressing. This leads to technology disillusionment, which kills projects fast.

And Speaking Of Technology...
IoT is a tech-dependent solution. This is not something that can be purchased as a monthly expense billed to a credit card, even though many of the benefits of IoT may well be delivered in a cloud or “as a service” model. This is exactly the kind of project that requires IT leadership in the form of a program office or some kind of central project coordination. Worst case, it certainly needs strong IT support and involvement, to stay on top of the bandwidth, data storage, and security requirements that will emerge as retailers dig deeper into IoT opportunities.

As a corollary to that recommendation, retailers need to start thinking about their data strategy now. Retailers may not know exactly what kind of data they will need to collect in their long-term IoT strategy, but they surely know right now that they will collect a lot of it. Retailers need to act now to understand the volumes in play, and how and where they may actually keep all of this data, even if they don’t know exactly what kind of data or what they want to do with it.
And corollary #2 focuses on what to do with all that data. Retailers love their reports. But there is no way they can manage data generated by IoT projects in that old-school "show me all the data" kind of way. Even with existing data – supply chain, merchandising, customer, marketing, etc. – retailers could benefit from exception management tools, but culturally have resisted implementing them. It often comes down to trust – trust that exception management is finding everything that is wrong, and is not surfacing alerts that turn out to be nothing.

With IoT, exception management is a must-have. Retailers could ease the transition by training their people to trust exception management tools now – which might actually free up time to invest in innovation projects like IoT itself.

**Get Specific**
Retailers need to get specific fast on how exactly they expect IoT solutions to drive revenue growth. This is needed not from an ROI perspective, but to make sure that their expectations match what the technology can actually deliver. Retailers also need to have the internal resolve to stick with exploring this solution space during a time when there is a lot of uncertainty, especially as regards to how consumer-generated data is collected, shared between participating parties, and ultimately used.

However, one area where there is far less certainty is RFID. RFID appears to be the early winner with retailers' opportunities focused on managing inventory in stores. The cost/risk profile of RFID has changed drastically since its early days and the physical challenges of implementation are better understood. However, it is still possible to implement RFID badly, or to look to RFID to solve inventory problems that are created not by a lack of visibility, but by a lack of process controls.

**Know Your Role**
If you're a large retailer, recognize that IoT is your domain – at least for the time being. These technologies host tremendous opportunities for you to regain what's been missing for years now. However, don't try to boil the ocean. If you move too fast you may find yourself in early RFID (or CPFR) pilot land... expensive and ineffective and wondering why you tried it in the first place. Progress must be incremental and deliberate, to find out what works.

If you're a smaller retailer, understand the implications these technologies may provide your larger competitors. What happens when the largest are as confident in their inventory as you are? What happens when they can deliver a customer service model based in an agility that has previously been reserved by you? Recognize that as price falls, you too will be able to leverage the benefits of many of these technologies. In the meantime, lean based on what you have (that the competition doesn't) as fast as you can.

**Remember The Customer**
Consumer transparency is critical. Consumer-generated IoT data is even more personal and intimate than data generated by using a mobile phone. Retailers most likely won't need to take the lead on developing the standards and controls around sharing or using consumer-generated data, but they need to be thinking about security, ethics, privacy, and transparency – they need to let consumers know what data they collect, what they use, how they use it, and how consumers can opt to have their data expunged. It only takes one larger retailer abusing or exposing consumer data – even unintentionally – to inspire regulation, if not outraged consumer backlash.
Finally, Don’t Panic!

Winners consistently show us that - particularly when it comes to new technology adoption - cooler heads prevail. Make no mistake: competitive advantage will be gained by those who figure out the ways IoT will streamline their business soonest. But with IoT in its absolute infancy, the best course of action is a slow and steady examination of what you’re going to do – before you do it. The pitfall is to do nothing, build anxiety about it, and then be too far behind to catch up.
Appendix A: The BOOT Methodology

The BOOT Methodology is designed to reveal and prioritize the following:

- **Business Challenges** – Retailers of all shapes and sizes face significant external challenges. These issues provide a business context for the subject being discussed and drive decision-making across the enterprise.

- **Opportunities** – Every challenge brings with it a set of opportunities, or ways to change and overcome that challenge. The ways retailers turn business challenges into opportunities often define the difference between Winners and “also-rans.” Within the BOOT, we can also identify opportunities missed – and describe leading edge models we believe drive success.

- **Organizational Inhibitors** – Even as enterprises find opportunities to overcome their external challenges, they may find internal organizational inhibitors that keep them from executing on their vision. Opportunities can be found to overcome these inhibitors as well. Winning Retailers understand their organizational inhibitors and find creative, effective ways to overcome them.

- **Technology Enablers** – If a company can overcome its organizational inhibitors it can use technology as an enabler to take advantage of the opportunities it identifies. Retail Winners are most adept at judiciously and effectively using these enablers, often far earlier than their peers.

A graphical depiction of the BOOT Methodology follows:
Appendix B: About Our Sponsors

AT&T Inc. (NYSE:T) is a premier communications holding company and one of the most honored companies in the world. Its subsidiaries and affiliates – AT&T operating companies – are the providers of AT&T services in the United States and internationally. With a powerful array of network resources that includes the nation’s most reliable 4G LTE network, AT&T is a leading provider of wireless, Wi-Fi, high speed Internet, voice and cloud-based services. AT&T offers a wide range of security services, availability and recovery services that provide integrated business continuity and security solutions to support complex networking environments.

Supporting Sponsor

Software AG helps retailers transition towards a Digital retail business model faster.

The company's big data real-time analytics, integration and business process technologies power retail specific solutions and accelerate innovation in areas such as omni-channel, context & location-based customer engagement and the use of the Internet of Things (IoT). Building on over 40 years of customer-centric innovation within retail, the company is ranked as a “leader” in 14 market categories, fueled by core product families Adabas-Natural, Alfabet, Apama, ARIS, Terracotta and webMethods. Learn more at www.SoftwareAG.com/RETAIL
Appendix C: About RSR Research

Retail Systems Research ("RSR") is the only research company run by retailers for the retail industry. RSR provides insight into business and technology challenges facing the extended retail industry, providing thought leadership and advice on navigating these challenges for specific companies and the industry at large. We do this by:

- **Identifying information** that helps retailers and their trading partners to build more efficient and profitable businesses;

- **Identifying industry issues** that solutions providers must address to be relevant in the extended retail industry;

- **Providing insight and analysis** about a broad spectrum of issues and trends in the Extended Retail Industry.