Consumer Reports
Connected Appliances Study: Large Appliances

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INTRODUCTION

Consumer Reports works to create a fair and just marketplace for all. CR empowers and informs consumers, incentivizes corporations to act responsibly, and helps policymakers prioritize the rights and interests of consumers in order to shape a truly consumer-driven marketplace. To achieve its mission, CR is constantly seeking consumer feedback and studying new marketplace enhancements, changes in consumer behaviors and consumer pain points, questions and concerns through quarterly member surveys, qualitative member and non member studies and general population omnibus surveys.

As part of this ongoing effort, in June 2020, Consumer Reports conducted a research study of 28 connected appliance consumers in four product categories (Washer/Dryer, Dishwasher, Oven/Range, Refrigerator) to understand their perceptions, experience, and usage with their connected appliances. The following report summarizes our findings and recommendations for manufacturers.

In each of the four categories, seven consumers were assigned to one connected appliance that they own, and they were also invited to comment on the other connected appliances.
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KEY TAKEAWAYS

✓ **Connected features are seen as an added bonus**, the cherry on top – not seen as “essential” when purchasing an appliance. When consumers are shopping for a new large appliance, its foundation as a good, modern, premium appliance is the baseline to assess and choose. If it doesn’t have the settings, space, or dimensions they’re looking for, the connected features aren’t even considered a benefit.

  ○ These findings are similar to what CR finds in our quarterly members surveys. When choosing a major appliance, the top 3 attributes considered are: price, performance and reliability.

✓ **Connected features sound premium and high tech, but many consumers don’t truly understand these features.** Some consumers do know what connected means and actively want a connected device, others don’t (often the person pushing for connected features is not the one who uses the device the most). They just don’t put any effort into differentiating it. This applies much more to the description of “smart” than to “connected” (the language is problematic - all appliances are connected, to electrical outputs, drains etc.). The terms are used interchangeably though and a sanitizing rinse is seen as "smart" as is the ability to "talk to" your appliance from your phone. For a new appliance, all of the newer, “fancy” features are lumped together in the consumer’s mind. In the study, it was very difficult for consumers to parse out the “connected” features versus:

  ○ New static features (e.g. Washer/Dryer "sanitizing" cycle)
  ○ Newly flexible features (e.g. the ability to change the temperature / humidity in different sections of the fridge)
  ○ Smart / AI features (e.g. Washer/Dryer weighing clothing and changing time)
  ○ Modern Aesthetics (e.g. stainless steel, flat, aligned, handle-free surfaces – it’s all part of the “sci-fi” feel of modern appliances)

✓ **Although consumers appreciate the reminders and capability of having their connected appliance in their hand, the congruence in a smartphone blurs in-home life with outside and work life, which makes it difficult to create mental boundaries.** A few consumers mention potentially preferring a separate device, like a mounted tablet, to help them manage smart appliances and ease the smartphone burden.

I realized that I really rely on apps to make my life easier, but I also tend to get sidetracked with notifications and other issues that pop up in my communication apps. While I am instantly responding to messages, I may even be more efficient with my time if I blocked time for responding to those communications. I believe I will start using my tablet for using connected devices and I will turn off all the notifications from communication apps on that device.

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KEY TAKEAWAYS Cont’d

✓ Consumers perceive that connected appliances will break more often than non-connected. Looking at the data from our CR Member surveys, we found Connected Appliances have had more reliability (1) issues in the past, which probably has fueled that perception. However, recent models with connected features (2018 and 2019) show problem area rates on par with their non-connected peers.

French Door Refrigerator Problem Rates

(1) Reliability as reported by the consumer, and in response to the question: “Has this appliance ever broke or stopped working as well as it should?”. Connected Appliances are defined as appliances having Smart or WiFi-enabled features that can connect to the internet. Smart/WiFi-enabled features (can connect to the internet)
Overall Sample Size (n) = 60,450 consumers
CONNECTED APPLIANCE BUYER PERSONAS

Not all shoppers approach connected appliances the same way, and our research found three core buyer personas: **Proactive Seekers**, **Connected as a Plus**, and **Surprise Connected**.

**Proactive Seekers** want the latest tech in their homes, have other smart appliances, and like the idea of what connectivity means for the given appliance.

- Around half of our participants actively sought a connected appliance on purpose, because of one, or a combination, of the below:
  - They want the latest tech in their homes—for practicality, lifestyle, or perceived resale value
  - They have other smart appliances that they like, and are slowly upgrading
  - They like the idea of what connectivity could mean for this particular appliance (e.g. “I can’t hear my washing machine buzz, so I’d like notifications.”)

**Connected as a Plus** buyers select the appliance based on its other qualities but find connected capabilities to be a plus.

- Many consumers choose or are recommended an appliance (by family, friends, or salespeople), and they are also interested to discover it is connected—an added boost after they already narrow the selection.
- While these consumers buy the connected appliance, this group makes the decision based on the appliance’s other qualities—because of its premium, desired, nonconnected features, such as aesthetic, brand, etc.

**Surprise Connected** buyers do not even know their appliance is connected until after it is in their home.

- Consumers in this category typically don’t buy their appliance in-person—it is selected either by a contractor, or selected and purchased online.
- These consumers also tend to see the lowest value in their connected features, even after use.

Across all personas, consumer tech savviness and previous experience with connected appliances drives the most perceived benefit of these appliances. Also the context and location of the appliance in the home is very important, as well as the presence of other smart appliances or systems.
OPPORTUNITIES FOR MANUFACTURERS

● There is a significant opportunity for manufacturers who are focusing on connected features in their appliances to help educate consumers about the value and reliability of connected features. The weeks after purchase, perhaps even more than the purchase decision, set up the appliance for success or failure – but at this point, consumers have little to no contact with a human who can help them understand and utilize their appliance.

Recommendation: Manufacturers can provide additional customer support to set up these appliances and enable use of connected features in the initial week after purchase.

● The same feature may be more useful or reliable in some appliances versus others. (See examples of basic, moderate and premium features in appendix)

  ○ Basic features which are mostly designed to save time or help with upkeep, tend to be most helpful for appliances that require immediate action from consumers to operate properly (e.g. have to move clothing from washer to dryer to prevent mildew). Otherwise, they’re a nice-to-have.

    "I also wish it would tell me if a pilot light is turned off or there is a gas leak. I agree with my fellow respondent that being able to view the inside of the oven would be a clear win."

  ○ Moderate connectivity features help consumers control or make smart decisions about their appliances from afar. However, for appliances that need in-person contact to kick off the process (e.g. putting food in the oven, adding soap to W/D or dishwasher) these tend to be rarely-used conveniences.

    "I expected to control the dishwasher from far away. The reality is that I don’t really find it that useful. It’s possible but not very practical."

  ○ Premium features come with a premium price tag, and are certainly a dedicated choice –but before buying a premium connected appliance, it’s very difficult for people to “work out” how much value it would actually bring in their homes.

    "I like having the list of foods and their expiration dates so I can quickly glance at it when at the grocery store to see what I need. I am a bad list maker so this helps to remind me."
**Recommendation**: Include or further promote “safety sensors” (e.g. sensor and notification for leaks, if a burner is left on) since consumers appear particularly annoyed if their appliance doesn’t have a feature they think it should.

- **WiFi** tends to be a very common issue for consumers when they are setting up the appliance. Some complain that the manufacturer instructions for setting up the Wifi/connected features are scarce, unhelpful, or missing altogether.
  - There were 2 core issues we noticed - **troubles setting up the Wifi connection**, or **connecting to their smart home or speaker**, and this set the connected experience off on a bad foot.
  - Their poor experience was extrapolated to poor quality / inconvenience and **non-intuitiveness** of the connected features and often, the appliance as a whole.

  "Connecting it was not easy. I had to activate a Wifi signal coming from the appliance and it took many tries."

**Recommendation**: Perhaps a WiFi booster, or external antenna, could solve for common consumer issues with their appliances.

- **Instruction Manuals** are often incomprehensible to consumers, who complain that they don’t solve the problems they are experiencing, and that they have to comb through safety and specifications information (which they see as irrelevant to them) to try to find what they’re looking for. **Common complaints observed**:
  - Manuals contain dozens and dozens of pages of tiny, technical writing which puts consumers off immediately.
  - Manuals are hard to navigate, whether due to length and/or format (online or in-print).
  - Manuals have design or other navigation issues that make it hard to find answers to specific concerns.
  - Manuals display confusing diagrams that don’t reflect how consumers use appliances in real life.

  "I rarely look at appliance manuals because they are too long and tedious to read. First I would go to YouTube to see if anyone has posted a video and if I’m still having problems then I will read the manual."

**Recommendation**: Videos, on the other hand, are much more consumer friendly.
• Apps: Some consumers mention that it felt like the app and connectivity is an afterthought—that the app is often glitchy, gives error messages, or tells them it’s not connected to the appliance. This raises a lot of frustration as it forces them to manually use the appliance anyway.

“This app, like the reviews, is really poorly designed and not user friendly. Really how efficient is an app to remotely control my smart appliance when it’s telling me to connect? I have to be standing at said appliance and manually push a button? That’s not efficient or effective technology.”

“Today the app didn’t work. Honestly it only works about 50% of the time. It’s very very annoying. I follow the steps but I can’t get the app to ‘wake up’ and connect and monitor. If I had to recommend to anyone I would tell them to be wary.”

“I was hoping to use the app but once again the wifi wasn’t connected so I had to push the buttons manually. I called [the manufacturer] and they suggested user error so I guess maybe it’s more me than the app… but I think it was easier to blame it on me not using it correctly rather than admit the app is poor functioning, with many poor user ratings.”

**Recommendation:** Apps are an important piece of the Connected Appliances package and should be treated with similar focus as connected features.
# Product-by-product guide

## DISHWASHERS

### Summary
Connected features are a nice-to-have, especially for consumers who want all smart appliances or tend to pre-load dishes and detergent. However, remote features on a dishwasher aren’t as essential as other appliances; they’re “cool” but widely unused and unnecessary.

### WHAT’S WORKING
- Judged by “non-connected” features first (capacity, efficiency, cleanliness and dryness of dishes, premium look) – which tend to get high marks
- Those few who tend to pre-load dishes and detergent do consistently use and like the remote start feature
- Being able to monitor cycles via the app feels convenient, if not an urgent need

### WHAT’S NOT WORKING
- About half of consumers say it’s not worth it to pay more for a smart dishwasher as they have to load it by hand anyway, and it doesn’t save time (they don’t run multiple cycles)
- Even those who use connected features don’t tend to use them all the time

## RANGES / OVENS

### Summary
Connected features are seen as a real luxury, especially in the ability to pre-heat from anywhere (or by voice) without having to touch with dirty hands; however, most other features go unused or don’t work consistently.

### WHAT’S WORKING
- Judged by “non-connected” features first (premium chef look, size, speed / consistency of cooking, number of burners) – which tend to get high marks
- Remote start allows them to pre-heat on the road (saving waiting time at home) or by voice during food prep (saving the panel from dirty finger marks)
- Only one consumer consistently uses app to set all cook settings – but he loves it

### WHAT’S NOT WORKING
- Most complaints about “glitchy” features or lack of features (e.g. oven cam)
- Frustration if the app “disconnects” from the machine or the remote start is “disabled”
- Panels below range are awkward to use and read, require bending over
### WASHERS / DRYERS

**Summary**
Notifications are key to keep cycles moving, and avoid unnecessary up-and-downstairs trips, but other connected features often go unused.

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<th>WHAT’S WORKING</th>
<th>WHAT’S NOT WORKING</th>
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<tr>
<td>● Judged by “non-connected” features first (capacity, efficiency, range of settings, premium look, automatic weight setting) – which tend to get high marks</td>
<td>● They can’t parse out what are “connected” features vs other new settings and features – it’s all new</td>
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<td>● Notifications for complete cycles allow them to move over laundry in a confident timely fashion: feels like they’re saving time and unnecessary trips to the machine</td>
<td>● They don’t tend to use features or settings they’ve never used before (e.g. delayed start or remote start), without a clear reason</td>
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<td>● Error notifications help them correct issues and keep cycles moving</td>
<td>● They still have to put in laundry and soap manually, so don’t see a motivation to try remote features at first</td>
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<td>● Once other features (e.g. delayed start) are used, they’re appreciated and reused</td>
<td>● Frustration if the app “disconnects” from the machine</td>
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### REFRIGERATORS

**Summary**
Its place at the center of the kitchen, constant use by the whole family, and flexibility in utilization means it has the biggest potential range of connected features and most potential value of connected features.

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<th>WHAT’S WORKING</th>
<th>WHAT’S NOT WORKING</th>
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<td>● Judged by “non-connected” features first (space, design, water / ice) – which tend to get high marks</td>
<td>● Large range in feature capability depending on model – from most “basic” (filter reminders only) to most “premium” features</td>
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<td>● Safety features &amp; reminders appreciated (e.g. if the door not closed, when to change filter)</td>
<td>● Very high potential investment – difficult to judge if it’s “worth it” without trying it</td>
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<td>● Higher-technology features (e.g. smart panels, adding groceries to list automatically) highly utilized and loved…once they become habit, these increase utilization of refrigerator and make it a meeting place</td>
<td>● Some believe they underutilize features compared to expectation (e.g. not keeping up grocery list, not actually changing temp of fridge)</td>
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LOOKING AT A CONNECTED FUTURE

While the possibilities of smarter and more connected appliances is exciting, there is not strong evidence that recent introductions of more connected features in major home appliance categories are solving everyday consumer problems in intuitive, low-friction ways. Moreover, connected features are, in fact, typically changing consumer behavior and not responding to it. For example, premium features are creating new habits for consumers: whether it’s creating shopping lists on the refrigerator, or ordering laundry detergent through the washing machine. These types of features take time to adopt and normalize into a consumers routine. It’s too early to tell how consumers at-large will respond, as right now these features are just reserved to new, premium models. From what we can already observe however, such functionalities are rarely used and consumers have a difficult time understanding their value.

Accordingly, Consumer Reports does not have short-term plans to include connected features in its ratings beyond the data privacy and security tests we’ve begun to add in certain product categories (e.g. robotic vacuums, home security cameras, TVs). But, we are watching this space closely.

As consumers adapt to an increasingly connected world, Consumer Reports is dedicated to educating consumers about the features, benefits, and risks of connected appliances and will continue to evaluate when it's appropriate to incorporate connected feature related tests into our ratings.

To learn how CR Data Intelligence can help your company, contact us at: dataintelligence@cr.consumer.org
APPENDIX

EXAMPLES OF FEATURES

Basic Features

- **Help them identify user error**, as it allows them to immediately right the issue for example, letting consumers know that the washer won’t start when the door is ajar.
- **Tell them when it’s ready** (e.g. push notifications that the washer/dryer or dishwasher cycle is done; notifications that a timer is complete)
- **Keep them aware of what the appliance is doing** (e.g. oven or fridge temperature, cycle status of washer/dryer or dishwasher, if stove burners are on)
- **Alert them about needed maintenance or safety concerns** (e.g. reminders about when the water filter on the fridge needs to be changed)

Moderate Connectivity Features

- **See inside from somewhere else** to make decisions (e.g. being able to scan what’s in the fridge from the grocery store)
- **Adjust settings from the phone** (e.g. select a dishwasher or washer/dryer cycle; adjust oven temperature)
- **Create settings from the phone** (e.g. create and adjust custom settings that can be saved and used later)
- **Start/stop from the phone** (e.g. remote oven, dishwasher, or washer/dryer start)

Premium Connectivity Features

- **Automating needed action** (e.g. set reminders for near-expiring items—if dates manually entered, and automatically put them on a grocery list) One consumer realized during the study that his Washer/Dryer could order detergent but he had not noticed before.
- **Acting as a digital home bulletin board**, combining the features of a tablet with a more traditional bulletin board (e.g. the digital display allows them to play music, view individual calendars, leave each other digital notes and drawings)