Guidehouse INSIGHTS

White Paper

Connected Lighting in the Retail Market

Providing a Competitive Advantage through Operational Excellence, Enchanced Store Experience, and Sustainability

Published 4Q 2021

Commissioned by Signify

Krystal Maxwell
Research Director

Benjamin Freas
Research Director

Introduction

The retail landscape has evolved in recent years with the growth of online shopping. This growth has allowed grocery and large retailers to extend customer exchanges beyond in-store shopping. This trend was further driven by the coronavirus pandemic: The pandemic led to reduced opening hours, restrictions on the number of people allowed in brick-and-mortar stores, and concern over safety of indoor exposure to the virus.

Although grocery stores have seen fewer disruptions than other retail, due to their essential nature, many have been required to modify their opening hours, leading consumers to experience grocery delivery or pick up rather than shopping in-store. In addition, shoppers have decreased their number of store visits overall, opting instead for multiday or weekly store purchases. Shoppers also spend more money per shopping trip, indulging in more and premium groceries as bars and restaurants have been closed.

The pandemic has also led to an increased amount of spending in a decreased amount of time. According to a study in Europe and the US, spending per minute increased by 49%.[1] Similarly, another study found that European customers reduced shopping by an average of 5% while simultaneously increasing basket size by roughly 16%.[2] These shifts have created many challenges for the retail segment, especially brick-and-mortar retailers that have had to adapt quickly to handle the increase of purchases with an influx of online shopping combined with the need for pickup and delivery options. The importance of an omnichannel retail approach has become more apparent than ever before.

Although this evolution in shopping trends has created challenges for the retail segment, it has also revealed opportunities. Through technology advancements, retailers can address many pain points, provide a more experiential and personalized experience with omnichannel shopping, reach sustainability goals, and achieve operational excellence through energy savings, staff efficiency, and improved store maintenance. Retailers have massively adopted LED lighting and environmentally friendly refrigerators and are increasingly adopting self-checkout solutions and electronic shelf labels. Lighting controls have evolved, enabling new levels of energy savings, ambiance creation, and operational efficiency through advanced scene setting, sensor automation, and remote monitoring and lighting management. Adoption of indoor positioning systems (IPSs), utilizing lighting solutions, has grown in recent years across many verticals, with retail seeing especially strong growth due to the benefits and use cases available within this sector. Although location-based services and mapping via GPS are commonplace in the outdoor environment, this functionality has not always been available indoors. IPSs can provide value to facility owners, managers, and corporations, as well as shoppers and employees within in a retail store.

[1] Pierre-Nicolas Schwab, "9 Concrete Impacts of COVID-19 on the Future of the Food Retail Sector," April 2020, **https://www.intotheminds.com/blog/en/covid-19-impact-food-retail.**

[2] McKinsey & Company, Disruption & Uncertainty – The State of Grocery Retail 2021: Europe, March 2021, **https://www.mckinsey.com/~/media/mckinsey/industries/retail/our%20insights/the%20path%20forward%20for%20european%20grocery%20retailers/disruption-and-uncertainty-the-state-of-grocery-retail-2021-europe-final.pdf.**

Retail Trends

Shifting Customer Expectations

With the increase of online shopping, to draw in customers, grocery retailers need to differentiate their store experience, shifting their store format from transactional to experiential. One key point is to focus on freshness, for example, adding a bakery to the store to provide freshly baked bread to the shoppers, and highlighting the fresh fruits, vegetables, meat, fish, and cheeses so that shoppers can experience them before purchasing. Some grocery retailers take experiential considerations to the next level by adding fresh meal preparation (e.g., a sushi, pizza, or salad station).

The influx of online shopping has provided consumers with a more personalized shopping experience, with store apps providing suggestions based on past purchases and highlighting sales or popular options. This experience has increased the efficiency of shopping and led to shifting customer expectations when shopping in a brick-and-mortar store. An online presence in addition to a traditional brick-and-mortar store has become prioritized to address new customer expectations.

The need for an omnichannel experience is pushing retailers to digitize offerings and incorporate aspects of both the online and in-store shopping experience. With this upward trend of cross-channel use from consumers, companies need to create a personalized end-to-end customer experience by enabling easy transitioning between all channels. Retailers have traditionally operated their online and physical stores separately. However, integration of the operations of these two segments improves a company's ability to provide a seamless transition from an online experience to an in-store experience, enhancing the overall customer experience. Retailers are required to provide a personalized shopping experience to customers to compete and maintain growth in this evolving market.

Operational Challenges

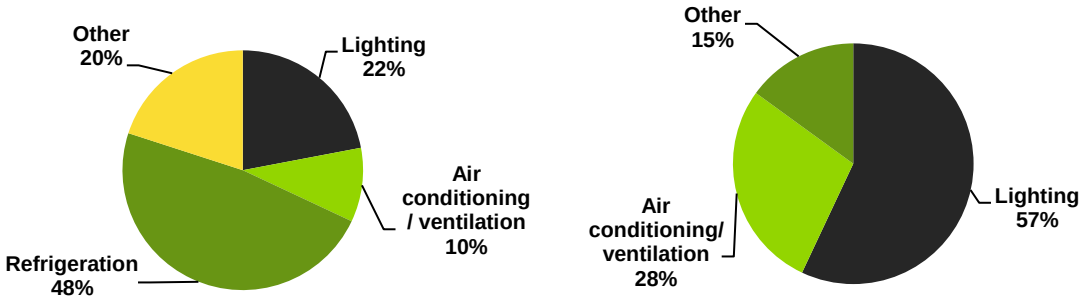
Retailers face a multitude of operational challenges from rising energy bills, increased customer expectation for store experience, and staffing turnover to reduced budgets and a lack of in-store analytics. Beyond these challenges, within the grocery retail market, consolidation puts added pressure on companies. The increased need for digitalization and for grocery providers to offer an enhanced omnichannel retail experience has resulted in larger market players acquiring smaller grocery retailers.

The pandemic has led to volatility in renewable energy generation and high demand for natural gas and coal have led to skyrocketing electricity prices. Several European markets have seen electricity prices quadruple since early 2020.[3] This situation is translating into rising energy bills for consumers and businesses alike. Lighting is a major source of energy consumption for grocery and do-it-yourself (DIY) retail retailers. As a result, they are turning to the latest lighting controls systems to gain detailed insights into their energy consumption and implement measures to reduce that consumption. An example is Rimi, whose parent company, ICA Gruppen, was recognized as the most climate-friendly retail company in Europe.[4] For Rimi, the most important energy saving measures in the company's stores and warehouses are LED lighting and environmentally friendly refrigerators.

[3] Bruno Alves, "Average Monthly Electricity Wholesale Prices in Selected Countries in the European Union (EU) from January 2020 to September 2021, **https://www.statista.com/statistics/1267500/eu-monthly-wholesale-electricity-price-country.**

[4] Rimi, "Financial Times has Named ICA Gruppen the Most Climate-Friendly Retailer in Europe," May 2021, **https://www.rimibaltic.com/financial-times-has-named-ica-gruppen-the-most-climate-friendly-retailer-in-europe.**

Figure 1 Breakdown of Electricity Consumption in Retail Buildings by Category, Food Retail and Non-Food Retail



Food Retail

Basis: 34 food retail chains, more than 27,000 stores, approx. 35 million square meter selling space
Energy Mangement in Retail 2020

Non-Food Retail

Basis: 26 non-food retail chains, more than 11,000 stores, approx. 20 million square meter selling space
Energy Mangement in Retail 2020

(Source: Guidehouse, EHI Retail Institute)

Many retailers experience high staff turnover due to seasonal employee changeover, imperfect schedules, new jobs, and various other reasons. According to a 2018 US Mercer Turnover Survey of 163 US organizations, retail and wholesale have a 60.5% average turnover rate.[5] High turnover is frustrating for employers, as it requires additional training and costs. Salaries for retail employees are often low, with the mean hourly wage of a retail salesperson being $14.87 per hour in 2020 in the US[6] and minimum wage requirements in Europe being as low as €5.40 per hour in Bulgaria, with the average being €27.40 per hour in the European Union. The financial and time cost that go into hiring a new employee is far greater than these hourly wages. It is estimated that replacing an hourly worker can cost as much as $3,500.[7] This high cost coupled with the high employee turnover rate can represent a substantial portion of a company's overall employee budget. Due to staffing shortages over the past two years, there is a growing trend of retailers increasing staff wages to retain their labor force and look more attractive for potential new hires.[8] Labor shortages, increased wages, and the high estimated cost of replacing hourly workers increase the need for operational efficiency. By increasing automation through Internet of Things (IoT) technologies, retailers are able to reduce some manual labor.

In addition to employer frustrations, employee turnover irritation can be experienced by a customer who requests help from a new employee who lacks the experience to adequately assist them. In addition to not always being able to provide satisfactory information to a customer, employees are not always

[5] Theresa Agovino, "To Have and to Hold," February 2019, **https://www.shrm.org/hr-today/news/all-things-work/pages/to-have-and-to-hold.aspx.**

[6] U.S. Bureau of Labor Statistics, Occupational Employment and Wages, Retail Salespersons, May 2020, **https://www.bls.gov/oes/current/oes412031.htm.**

[7] TERRA Staffing Group, "The Real Cost of Employee Turnover in 2021," November 2020, **https://www.terrastaffinggroup.com/resources/blog/cost-of-employee-turnover.**

[8] The Orange County Register, "Amazon, Chipotle, Kroger paying up for workers who suddenly are in control ," August 2021, **https://www.ocregister.com/2021/08/09/corporate-america-is-ponying-up-for-workers-suddenly-in-demand.**

available when needed, and a customer may be required to search for them, which takes more time and can increase a customer's frustration.

Another operational challenge for retailers is a trend toward shrinking budgets for brick-and-mortar locations. These shrinking budgets can limit what retailers are able to improve, which often leads to prioritizing multiple smaller budget projects or implementing less expensive improvements. Risk of market consolidation adds another pressure to address all operational concerns to remain competitive.

In addition, physical store locations generally fall short of online retailers when it comes to analytics. The ease of tracking customer shopping habits from online channels is far easier for most grocery and retail companies than in their brick-and-mortar locations. Without in-store analytics, physical retailers cannot determine easily where people are spending the most time, which can lead to improperly staffing certain areas of the store or missing an opportunity to showcase selected products in these areas.

Despite these challenges, a number of solutions are available to retailers to address this evolving landscape. The potential consequences of inaction for retail stores to combat these challenges include decreased revenue that they lose to more sophisticated competitors or even market consolidation. The benefits of the solutions include improved operational efficiency, including optimized stocking, order pickup, and floorplans, as well as improved customer experience. These solutions can also help a manager oversee heavy traffic customer areas and send more store associates to that area in case help is needed.

Sustainability Goals

Retail companies need to reduce operating costs, both to improve budgets as well as address customer sentiments over corporate environmental concerns. Increasingly, customers are choosing to support businesses that are addressing climate change, which has pushed many companies to set corporate sustainability goals and show customers how they plan to address climate concerns through environmental, social, and governance initiatives. The deployment of energy efficient technologies, such as LED lighting and lighting controls, provides a foundation for reduced energy use as well as the infrastructure for a multitude of non-energy benefits for retailers and their customers.

Figure 2 Sustainability Goal Progression

(Source: Guidehouse)

Rimi's parent company, ICA Gruppen, is an example of a company that successfully hits sustainability goals through targeted actions. Goals include achieving net greenhouse gas (GHG) emissions by 2030,

reducing CO_2 emissions from customer's food baskets by 50% by 2030, and ensuring that the largest suppliers have adopted science-based targets by 2025, among others.[9] The company reduced its operating emissions by 30% between 2014 and 2019, making progress toward its 2030 goal through energy saving measures such as LED lighting.

Connected Lighting Solutions for Retail

The proliferation of LED lighting, which is more controllable than legacy lighting technologies, has set the stage for an increase in adoption of lighting management and controls. However, even with increased adoption of highly controllable LEDs, adoption of lighting management systems and controls has been slower than that of LEDs.

The retail lighting market has seen the growth of lighting controls adoption over the past decade. Lighting control technology has advanced beyond simple on-off or set schedule controls to more advanced controls and software-based lighting management. The ubiquitous nature of a lighting system allows connected lighting solutions to serve as a platform within the retail sector for IoT solutions that can address retail customer pain points. However, even with this advancement, many building owners and facility managers are still interested in the most basic controls to meet building codes. More sophisticated controls present additional perceived barriers, such as cost, implementation complexity, and lack of customer awareness and a full understanding of benefits.

Traditional lighting systems fall into the manual lighting category as depicted in Figure 3. These lighting systems operate on a programed scheduled or manually controlled switches and breakers. The brightness and color temperature of these systems are not adjustable to daylight levels or occupant demands. Sensor lighting is a non-networked lighting system that includes sensors, such as motion or occupancy sensors. Although these systems use sensors, they are not networked, and the luminaires do not have the ability to communicate. Sensors for these lighting control systems enhance energy savings as well as occupant controllability.

The third stage, networked lighting, came with the adoption of dimmable LED luminaires and lighting control systems that provided automated schedules and granular scene setting capabilities that helped retailers to reduce energy consumption and enhance store ambiance. In this stage, there is one-way communication to the luminaires. Grocery retailers frequently connect their lighting control system to their building management system (BMS). BMSs have primarily been used to monitor and manage store refrigeration and HVAC and alarm systems, and the centrally defined schedules trigger scenes in the lighting controls though a simple localized integration.

Figure 3 Evolution of Lighting Controls

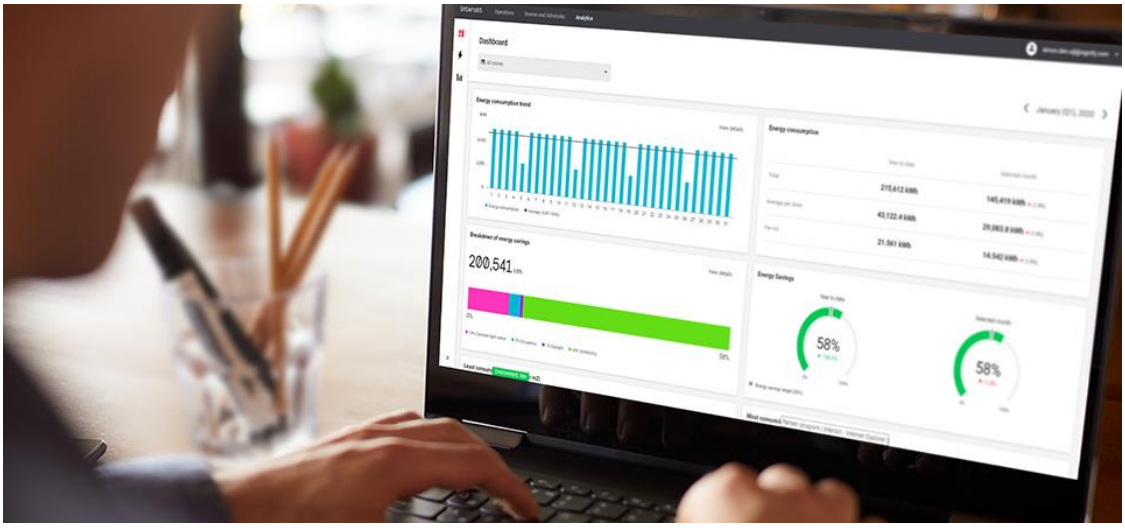
(Source: Guidehouse)

[9] Rimi, "Financial Times has Named ICA Gruppen the Most Climate-Friendly Retailer in Europe," May 2021, **https://www.rimibaltic.com/financial-times-has-named-ica-gruppen-the-most-climate-friendly-retailer-in-europe.**

For the fourth stage in the evolution of lighting controls, connected lighting, Guidehouse Insights uses the U.S. Department of Energy definition, which is an "LED-based lighting system with integrated sensors and controllers that are networked, which can be either wired or wireless, enabling lighting products within the system to communication with each other and transmit data." This stage includes bi-directional communication within the system, and the lighting system has the ability to collect and process data for enhanced insight.

The fourth stage is facilitated by the advent of intelligent LED luminaires that are able to generate data on energy consumption and failures, lighting controls that are able to gather these insights and securely transmit them to a cloud-based solution that can store and process the data with advanced analytics to deliver deep insights and benchmarking on energy consumption, lighting failures, and compliance with centrally defined lighting scenes. These insights can be used at a corporate level to define further energy reduction optimalization, as input for sustainability reporting, and fed back to the store for the store manager to gain insight in-store performance. Such intelligent LED luminaires may also be outfitted with advanced sensors that, for example, enable people counting, and register temperature, humidity and noise levels. Such features could be useful for applications beyond illumination.

Figure 4 Illustrative Advanced Energy Consumption Analytics from Connected Lighting



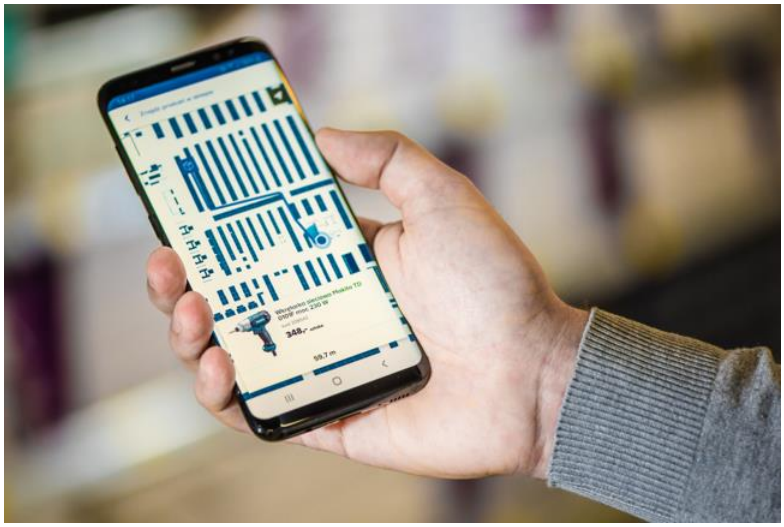
(Source: Signify)

With the advent of LED lighting, lighting companies have found that the capabilities of LED also enable the pursuit of opportunities beyond illumination. For retail, the most notable is the use of LED lighting as an IPS. The two most prominent communication protocols that enable IPS are Visible Lighting Communication (VLC) and Bluetooth Low Energy (BLE). Bluetooth is an open wireless technology developed by Ericsson in 1994 specifically for sending and receiving data over short distances. Often, lighting vendors install luminaires with embedded Bluetooth beacons, which allows for the ability to use these capabilities later without the need for additional hardware.

VLC is the combination of illumination and communications. It is an advanced communications technology using visible light roughly between 375 nm and 780 nm. Data is communicated wirelessly through minor non-visible variations in the light and received by a device with a front-facing camera. VLC technology is typically integrated in digital drivers (i.e., drivers that support the digital addressable lighting interface lighting control protocol), making it easy for a luminaire manufacturer to implement.

The most notable use of VLC is for indoor positioning in the retail segment, as VLC offers the higher positioning accuracy that is required in retail, and LED luminaires are not subject to the mounting height restrictions of BLE beacons. VLC can also work in conjunction with BLE, whereby BLE could be used for in-pocket notifications and VLC for indoor navigation. Indoor positioning using VLC or BLE is obtained by a building owner or manager using LED lighting that is VLC enabled or that incorporates a BLE beacon. A retail customer downloads an app that allows the VLC software to connect to the user's smartphone camera to access their location. In the case that only BLE is used, permission to connect to the user's Bluetooth function to access their location is required. The ability to pinpoint the exact location of a customer and provide them with targeted coupons, product information, reviews, or in-store help by a sales associate offers an improved shopping experience. This experience is comparable to online shopping, where additional product information and discounts are a click away.

Figure 5 Illustrative Retail IPS



(Source: Signify)

Connected Lighting Enabled Market Trends

Connected lighting solutions are uniquely positioned to address the following key trends that are shaping the future of grocery and large retail:

- **Digitalization:** Retailers have already and will continue to increase the adoption of technologies within brick-and-mortar stores, such as self-checkout and electronic shelf labels. Digitalization leads to a simplified shopping experience, enhanced customer loyalty, and increased operational efficiency. The ubiquitous nature of a lighting system enables connected lighting solutions to be the foundation for additional services within the retail environment.
- **Omnichannel Shopping:** The growth of online grocery ordering increased exponentially during the coronavirus pandemic. In one poll, 69% of respondents said they used grocery delivery or pickup for the first time since the start of the pandemic.[10] To adapt to this trend, grocery retailers have started to offer an omnichannel shopping experience to provide customers a consistent experience both online and in a physical store. Ensuring a seamless transition from these various sales channels is critical for retailers. They can accomplish this seamlessness through the

[10] C+R Research, "COVID-19: The Impact on Consumers' Wallets," **https://www.crresearch.com/covid-consumer-prices.**

deployment of a connected lighting system that can integrate with additional solutions, such as store mapping, connected accounts through in-person and online shopping, and inventory tracking.

- **Enhanced Store Experience:** With the transactional experience of online grocery ordering, shoppers' expectations of the experience offered by a brick-and-mortar store have increased. Grocery retailers are adding in-store bakeries, offering freshly baked bread, and fresh meal preparation stations. Connected lighting can enhance the store ambiance, with lighting scenes that match each part of the day and time of the year.
- **Health and Well-Being:** In recent years, there has been a growing trend to focus on health and well-being from multiple aspects. Customers seek fresh foods that meet their dietary requirements, such as organic, vegan, and gluten-free, as well as for the built environment to be healthy for them. Connected lighting solutions are complemented by special light recipes that amplify the freshness of products and allow the optimal correlated color saturation to be achieved for customers.
- **Sustainability:** Retailers are continually looking to reduce their carbon footprint and reduce GHG emissions. To do so, retailers are adopting energy saving technologies, such as LED lighting and lighting controls, purchasing renewable energy solutions, such as solar energy, and reducing waste, such as plastic packaging for fresh produce. Connected lighting solutions allow retailers to cut energy use through the use of LEDs and controls as well as integrate into BMSs.

Connected lighting solutions are uniquely positioned to address these key areas. They provide energy savings and lighting management and control. The use of LED technology compared with legacy lighting technologies are the biggest form of energy savings. LEDs combined with controls can reduce lighting energy consumption by as much as 75%, which is broken down as roughly 40%-50% reduction through the use of LEDs, and roughly 25%-35% reduction with the addition of controls. Control strategies that are implemented with connected lighting systems result in additional energy savings. These strategies include occupancy sensors to adjust lighting when they sense a presence (or lack) of people and daylighting to allow lighting to be adjusted based on the amount of natural light. Luminaire-level lighting controls use 25%-75% less energy than non-controlled fixtures.[11] Energy savings make an ROI for a retrofit of LEDs and lighting controls within the capital budget for companies.

IPS can provide customers an experience more akin to an online experience, which can alleviate some frustrations around finding items easily. Many retailers offer their own mobile app, which allows a customer to create a shopping list and, upon arriving at the retailer's brick-and-mortar store, the customer can then gain access to real-time inventory information and assistance in finding specific products. Additionally, through the app, retailers are able to offer personalized promotions based on past purchases and send location-based reminders of these promotions when a shopper is in-store. Likewise, a grocery retailer could offer coupons based on overall purchase spend, or another metric, to help increase customers' overall spend, either in-store or online.

Beyond providing reduced energy use, an omnichannel experience, and overall enhanced experience to customers, an IPS that is made possible through connected lighting solutions can enable handheld store navigation, which allows employees to instantly locate any item a customer needs assistance with as well

[11] Craig Dilouie, *NEEA Report: Luminaire-Level Lighting Control Costs Decline,* October 2021, **https://lightingcontrolsassociation.org/2021/04/23/luminaire-level-lighting-control-costs-decline.**

as save time for employees fulfilling online orders. Store data that employees can easily access can allow them to search for a product and identify not only where it is located within the store but also if the item is in stock, without having department-specific knowledge.

The increase of online shopping has created a major benefit to retailers: the ability to gather significantly more data and insights into customer buying behavior. Historically, for in-store customers, retailers' loyalty programs provide the cornerstone for shopper purchasing behavior. By combining this program with an IPS, retailers can gain increased analytics beyond sales figures to customer behavior in stores. Gaining improved insights into customers, products, and employees can provide a retailer with a competitive advantage over their peers. Analytics gained from an IPS can include the average time a customer spends in a specific department, a more accurate view of the average time spent in-store, the number of departments visited, and the average time spent in front of an advertised product, among others.

Signify's Interact offering is one example of a connected lighting system that provides a flexible solution that delivers lighting IoT capabilities in a number of professional application areas, include grocery and large retail.[12] Signify's offerings include the connected lighting system, such as the luminaires, sensors, and controls, as well as software. Signify's Interact software application integrates data from a connected lighting system with other smart retail solutions. The company's Interact offering focuses on scene management, energy optimization, lighting management, and indoor navigation. These four core areas address the key retail trends discussed earlier. Signify's indoor navigation and location analytics support personalized shopping and provide staff efficiencies, such as improved workflows and improved store layout and operations. Additionally, Signify's offerings provide multisite management, which allows for effectively managing and monitoring the connected lighting in large groups of stores, whether these are super- or hypermarkets or express stores or a combination of the three.

Regional Trends

The benefits of a connected lighting solution can be realized globally. However, the current interest and number of deployments of connected lighting solutions varies significantly by region. Often with building technologies, Europe has been a leader in deployments, and the same is true for IPS within the retail sector. Europe can often serve as an example of where other regions, such as North America, might be in the future.

Often regionally, the role of lighting can be viewed differently. In Europe, for example, the role of lighting to create ambiance within a store, and the focus on reducing food waste, might be prioritized more than in North America. In North America, often lighting within the retail sector is considered to be more a functional feature rather than a store design element.

Retailers in Europe, and many retailers in North America, have their own employees fulfill online orders that are either picked up in-store or delivered. However, in North America, third-party companies work with retailers to provide shoppers and delivery drivers, so a retailer is not responsible for all of the staff for this service offering. For these companies, such as Uber's Cornershop (initially in South America), Instacart, or Shipt (which was acquired by Target in 2017), shoppers are often unfamiliar with a specific store layout as they may be a shopper for multiple retailers or store locations. Unfamiliarity of where specific products are located can lead to wasted time spent searching for these items. This situation can also occur for seasonal workers that might be hired directly by a retailer to help during exceptionally busy

[12] Interact Retail, **https://www.interact-lighting.com/global/what-is-possible/interact-retail#brochure.**

times, such as holidays. For third-party shoppers and seasonal employees that are not as familiar with a store's layout, indoor navigation within a retail store significantly enhances their effectiveness and speed in fulfilling orders.

In both Europe and North America, the importance of advanced lighting controls and indoor navigation are seen as providing value to retailers. Other regions can look to Europe as an example of possible solutions and to understand the real-world benefits they provide. Specific examples are discussed in the Case Studies section below.

Partnerships

As systems and solutions become more complex, an individual vendor cannot be an expert in all areas required to provide a personalized solution to a client. Strategic partnerships provide strengthened offerings and can set vendors apart in their solutions. Many lighting vendors have shifted offerings in recent years, from a focus on legacy lighting technologies, to LEDs, controls, and finally toward connected and IoT lighting solutions, with the incorporation of software and service offerings. Despite these expanded areas, collaboration with key partnerships can provide increased success for both companies, as well as provide more tailored solutions for clients.

Signify is an example of a lighting market player that has understood the importance of strong partnerships and worked with organizations to enhance offerings to clients through these engagements. One example is Signify's partnership with Zebra Technologies, a global enterprise mobile computing devices company. These devices are commonly used by staff in the logistics, warehousing, postal, and retail environment. For retail, Zebra Technologies also offers a device for shoppers to perform self-scanning and self-checkout, which is widely adopted in Europe. Many of Zebra's mobile computing products are compatible with Signify's VLC indoor positioning technology, allowing customers and staff to benefit from wayfinding and navigation. These devices act in place of a mobile phone; shoppers forego using a smartphone for these features, which could encourage those hesitant to grant an app access to their phone to use these services.

Case Studies

Networked lighting has become widely adopted in grocery and DIY retail. An example includes Albert Heijn, a major grocery retailer in Europe that was looking to improve operational efficiency and enhance customer experience at its newly renovated XL store in Eindhoven, the Netherlands.[13] The store was installed with Signify's Philips LED lighting, both indoors and outdoors, and its Dynalite lighting controls and Interact software to provide an improved in-store experience. The lighting, all dimmable, was used to help create the feel of an outdoor marketplace where local suppliers sell products from individual stalls. Interact software is used to adjust light levels throughout the day in three stages, starting with 100% light intensity in the daytime, dimming to 60% at dusk, and dimming to 30% at restocking and cleaning. Additionally, fresh food light recipes are used to highlight food presentation as well as extend the shelf life of items. Beyond lighting, the renovation included updates with sustainable materials and 1,200 rooftop solar panels. Over the years, Albert Heijn has equipped the majority of its stores with Philips LED lighting, Dynalite controls, and Interact software.

[13] Interact, "Smart supermarket lighting – Albert Heijn XL Eindhoven," **https://www.interact-lighting.com/global/customer-stories/albert-heijn-xl.**

Figure 6 Using LED Lighting to Differentiate a Store and Provide a Welcoming Experience

(Source: Signify)

Although deployments of indoor positioning are not yet widely activated, these solutions are in retail stores globally. Retailers that have deployed these solutions have already realized the benefits and offer a competitive advantage over other market players. Castorama, in Poznan, Poland, is a leading DIY and construction retailer that wanted to enhance the customer experience and take some of the difficulty out of shopping in-store with its 35,000 products.[14] The solution for Castorama was Signify's Interact indoor navigation solution, which allowed customers to access product information and navigate to those products via Castorama's smartphone app. The app guides customers via the quickest route directly to the specific product they are searching for. In addition, the app provides location guidance to staff to improve restocking efficiency and workflows, which has been especially beneficial for new employees. Within the first 5 months, the navigation feature in the app was used more than 10,000 times, highlighting customers' need for this solution.

[14] Interact, "Castorama - A bright future for shopping within reach**," https://www.interact-lighting.com/global/customer-stories/castorama.**

Figure 7 Product Information Via In-Store App

(Source: Signify)

Conclusions and Recommendations

Grocery and large retail have been forced to adapt to the evolving landscape, accelerated by the coronavirus pandemic. Customer expectations have shifted with the influx of online shopping and brick-and-mortar retailers have been required to provide an omnichannel experience while improving a store's operational efficiency. Improving the shopping experience not only provides superior services to customers but also improves operational efficiencies for retailers. Many retailers have already implemented networked lighting, but there are opportunities in upgrading to connected lighting solutions and utilizing the benefits of IPSs. To gain and sustain a competitive advantage, retail market stakeholders should consider the following recommendations:

- **Retailers need to strive for operational excellence.** To effectively compete in the evolving market, retailers need to work smarter in the face of increasing energy bills and labor shortages. By implementing connected lighting solutions, retailers are able to monitor and manage their store lighting remotely, saving maintenance visits and driving down energy consumption.

- **Retailers should prioritize sustainability goals.** For many retailers, reducing their carbon footprint is already top of mind. Prioritizing this goal not only helps retailers reduce their energy spending but also allows them to address customer sentiment over corporate environmental concern. Investing in a connected lighting solution provides one option to prioritize this focus through energy savings from LED lighting and lighting controls while providing the other non-energy benefits discussed here.

- **Retailers must enhance their omnichannel shopping experience.** Even before the coronavirus pandemic, the growth of digitalization was pushing the retail market toward providing an omnichannel shopping experience. Although this trend was not as common among grocery retailers, it had already started and has grown exponentially since the beginning of the pandemic. Retailers were forced to adapt quickly and many now offer some type of omnichannel experience with options for online ordering and delivering or online ordering and pickup at a physical store location. However, providing an omnichannel experience is not be enough to maintain a competitive advantage, and retailers need to work on enhancing this experience.

- **Retailers must gain improved insights into customers, products, and employees**. Online retailers are easily granted access to customers' shopping trends and popular products; gaining these insights for brick-and-mortar retailers is more cumbersome. However, connected lighting solutions can enable these insights for retailers to improve customer loyalty and provide experience more akin to an online shopping experience.

- **Retailers need to understand their options for connected lighting.** Through LED upgrades, some retailers have purchased connected lighting systems with the availability to begin using the software capabilities later by upgrading for those capabilities, such as through connecting the stores to Interact Multisite management from which the entire chain can be managed and monitored. Or by adding in Interact indoor navigation. In this way, retailers have worked to future-proof their brick-and-mortar stores, but as store and facility management turns over, the availability of this functionality might not be clearly understood by new stakeholders. The benefits of connected lighting extend beyond a single store location. Tor retailers to fully realize the benefits of these solutions, they should prioritize expanding to multiple sites. Doing so not only provides the retailer with reduced energy savings, improved operational efficiencies, and expanded insight into their portfolio of stores, but also an enhanced omnichannel experience for their customers.

Table of Contents

Introduction **1**

Retail Trends **2**

Shifting Customer Expectations 2

Operational Challenges 2

Sustainability Goals 4

Connected Lighting Solutions for Retail **5**

Connected Lighting Enabled Market Trends 7

Regional Trends 9

Partnerships 10

Case Studies **10**

Conclusions and Recommendations **12**

Table of Contents **14**

Scope of Study **15**

Sources and Methodology **15**

Scope of Study

Guidehouse Insights has prepared this white paper, commissioned by Signify, to provide insight into connected lighting solutions and IPSs within the grocery and large retail market. It provides an overview of the evolving retail market, challenges faced by brick-and-mortar retailers, shifting customer expectations, examples of real-world deployments and their successes, and recommendations on what retailers can do to tackle the most common challenges.

Sources and Methodology

Guidehouse Insights' industry analysts use a variety of research sources in preparing research reports and white papers. The key component of Guidehouse Insights' analysis is primary research gained from phone and in-person interviews with industry leaders including executives, engineers, and marketing professionals. Analysts are diligent in ensuring that they speak with representatives from every part of the value chain, including but not limited to technology companies, utilities and other service providers, industry associations, government agencies, and the investment community.

Additional analysis includes secondary research conducted by Guidehouse Insights' analysts and its staff of research assistants. Where applicable, all secondary research sources are appropriately cited within this report.

These primary and secondary research sources, combined with the analyst's industry expertise, are synthesized into the qualitative and quantitative analysis presented in Guidehouse Insights' reports. Great care is taken in making sure that all analysis is well-supported by facts, but where the facts are unknown and assumptions must be made, analysts document their assumptions and are prepared to explain their methodology, both within the body of a report and in direct conversations with clients.

Guidehouse Insights is a market research group whose goal is to present an objective, unbiased view of market opportunities within its coverage areas. Guidehouse Insights is not beholden to any special interests and is thus able to offer clear, actionable advice to help clients succeed in the industry, unfettered by technology hype, political agendas, or emotional factors that are inherent in cleantech markets.

Published 4Q 2021