智能照明- IPS室內定位系統
Smart Lighting- Indoor Positioning System

黃榆婷
亞太區產品經理—室內燈具
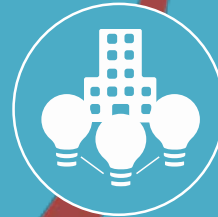
The GE Store.

Aviation
Advanced materials and manufacturing techniques, engineering productivity

Healthcare
Diagnostics technology, first-mover & anchor tenant in growth markets

Transportation
Engine technology and localization

GLOBAL RESEARCH CENTRE

GLOBAL GROWTH ORGANIZATION

SOFTWARE CENTER OF EXCELLENCE

CULTURE & SIMPLIFICATION

Power & Water
Combustion science and services installed base

Oil & Gas
Services technology and is a first-mover in growth regions

Energy
Electrification, controls and power conversion technology

Lighting
Gateway to energy efficiency

The GE journey.

Intelligent platform provider

System solution provider

Lighting component provider

"**Accelerate lighting transformation – build intelligent infrastructure business.**"

Jeff Immelt, CEO, January 2015

Transforming the lighting business

Customer value

Components
Light engine
Luminaires
Application & design expertise

Light Grid™

Smart devices
Lighting controls
Services 1.0

Cloud-based system and analytics
Services 2.0

Predix™
The software platform for the Industrial Internet

Products & solutions → **Lighting controls** → **Intelligent analytics**

Customer Experience

"Smart ready" stores with "online-like" intimacy and capability

Challenges in the retail sector

Retail trends and challenges
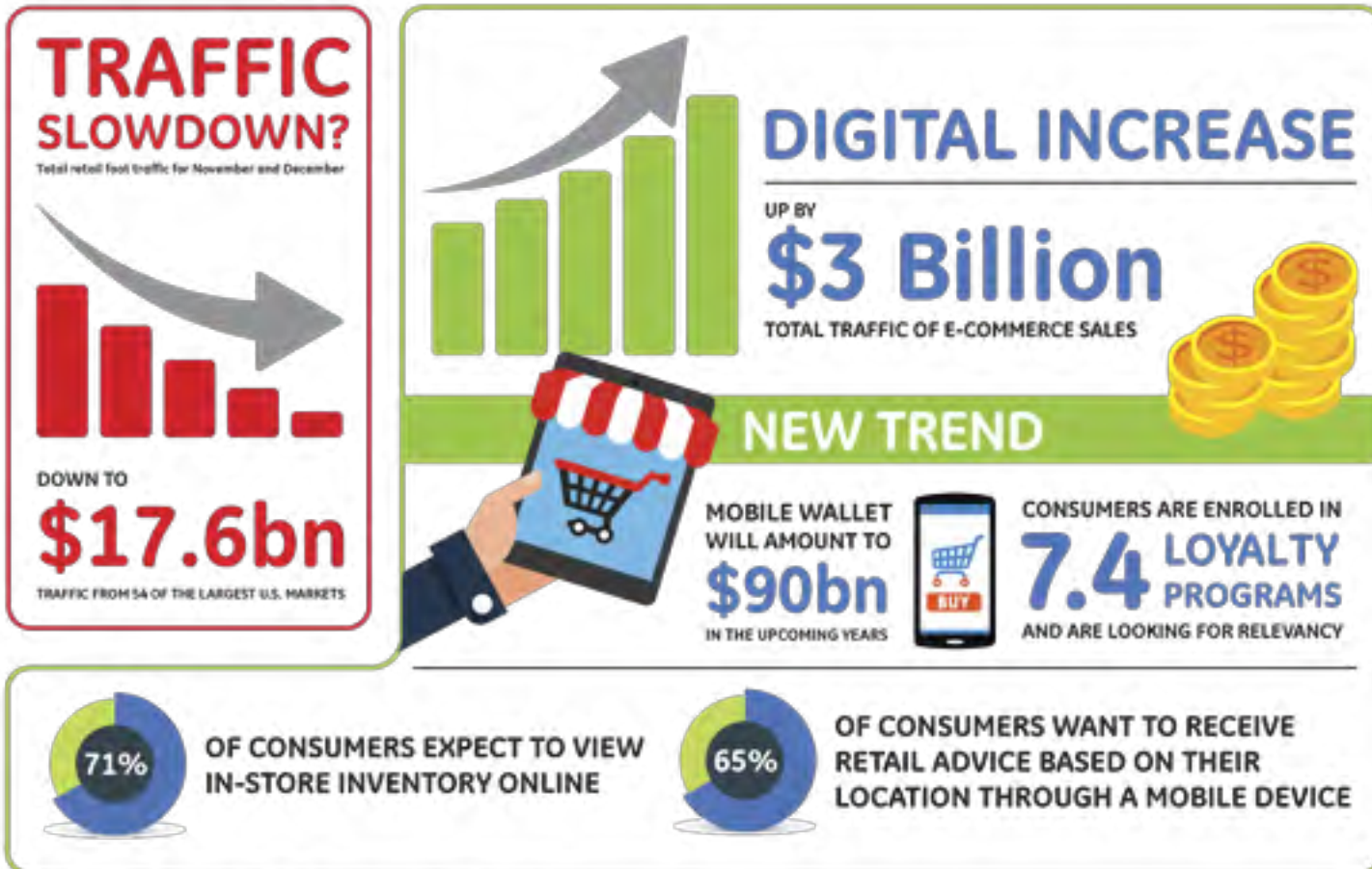
Source: ShopperTrak, CoStar Group, Wall Street Journal, U.S. Census Bureau

Brick-and-mortar retailers face more critical challenges than ever.

Shoppers are demanding a more rewarding in-store experience

The threat from online-only retailers
is real—and growing

Retailers need to know how customers are shopping in-store

Retailers must enhance shoppers' overall experiences to increase conversion from shopping to buying—and to build customer loyalty

Customer behavior

Shopper behavior continues to evolve.

90% of all purchases are still taking place in stores

2 in 3 customers are **NOT** finding the information they need in-store
43% of those customers **leave the store frustrated**

72% of millennials research their options online before going to a store or mall

70% to 89% of customers are using **smartphones** in stores

New opportunity to merge the physical to the digital world...

IN-STORE / PHYSICAL

ONLINE / DIGITAL

PERSONALISATION

59% of consumers surveyed said that They would be more likely to visit a retailer if the offered personalised promotions and deals sent via smartphone.

NAVIGATION

75% noted that retailers could do a better job providing navigation around store. Using location-based services, retailers can guide shoppers around store in search of products/promotions.

EDUCATION

A majority of 66% of shoppers noted that the ability to use a mobile application to search, in real time, for product information would ultimately improve in store shopping experience.

...to enhance the customer experience

Source: RetailWeek White Paper; March, 2015

"If you can't control your data, you can't move fast enough."

—Tom Davis, global lead for e-commerce at Puma

"More data has been generated and collected in the last two years than in the previous 100."

The power of intelligent technology can turn evolving challenges into opportunities.

Internet of Things:
A living network of machines, data, devices and people

Intelligent Infrastructure:
Increasing system intelligence through embedded software

Analytics:
Generating data-driven insights and enhancing asset performance

Big Data:
Transforming massive volumes of information into intelligence

Data can be your advantage

- With intelligent technology, imagine what you could learn—and what you could leverage:

Customer and staff location information

In-store shopper behavior
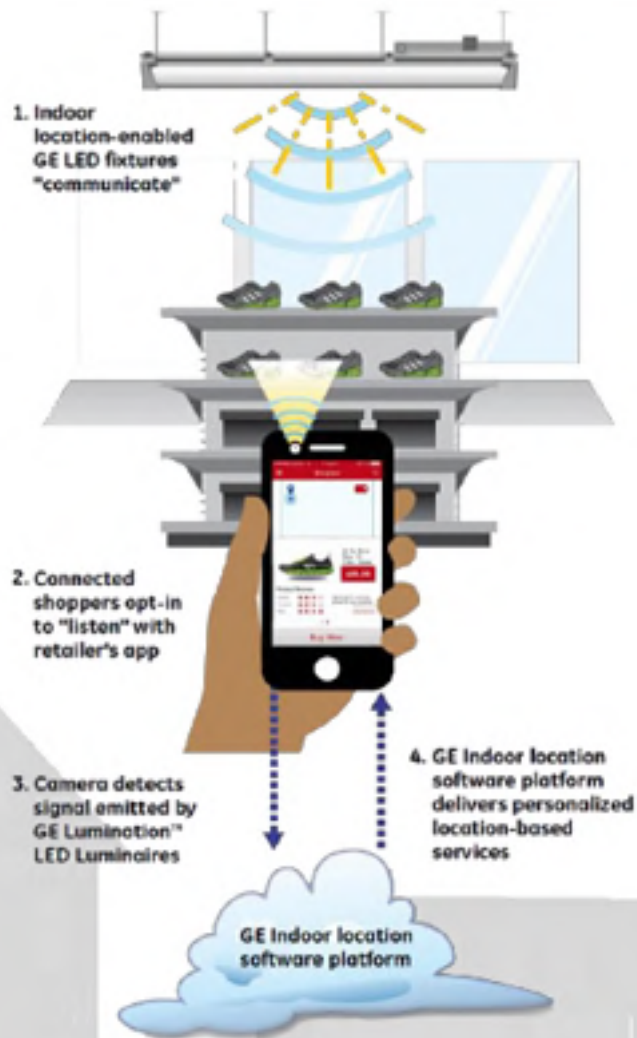
Consumer traffic patterns

Indoor and outdoor climate
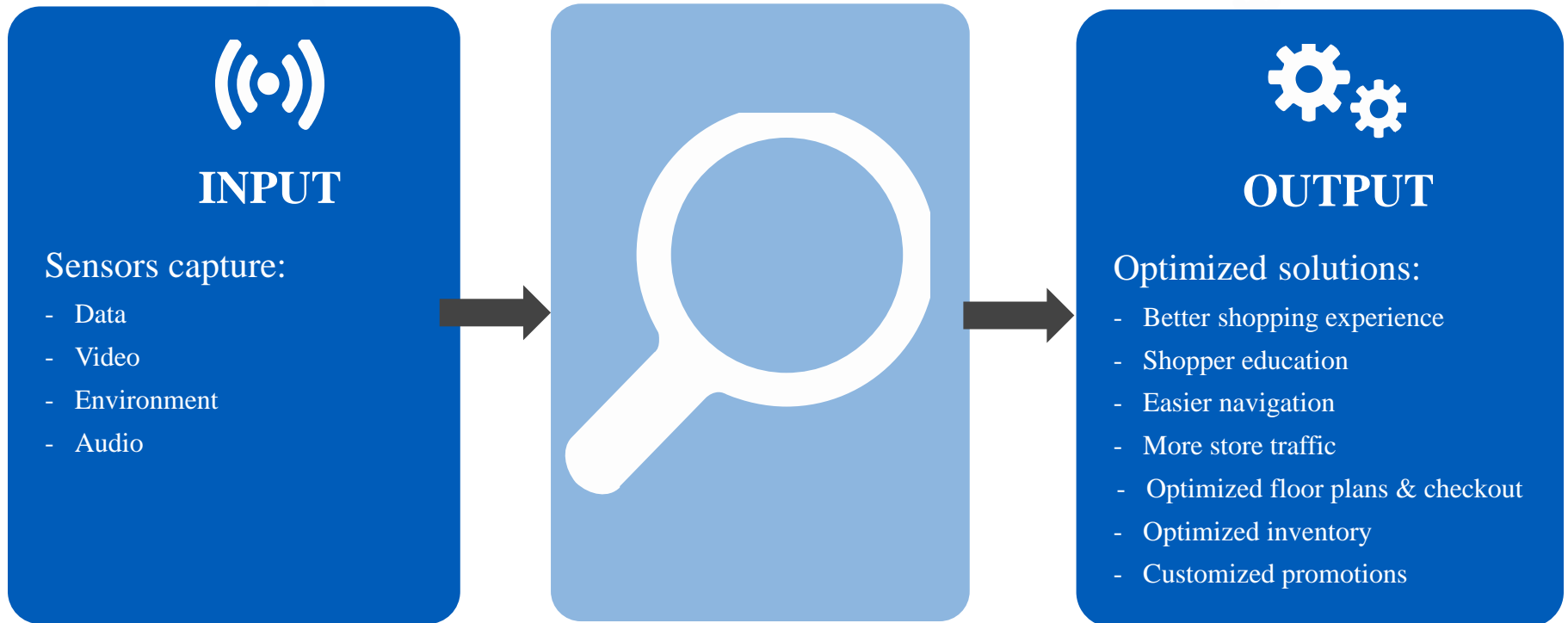
Our Vision
& Indoor Positioning

What is Indoor Positioning Service?

- "GPS" for the indoor

- Enable real-time contextual content

- Light is ubiquitous

- Leverages existing infrastructure

- <1m accuracy

- Smartphone and LED enabled

1. Indoor location-enabled GE LED fixtures "communicate"

2. Connected shoppers opt-in to "listen" with retailer's app

3. Camera detects signal emitted by GE Lumination™ LED Luminaires

4. GE Indoor location software platform delivers personalized location-based services

GE Indoor location software platform

Your store. Your smarter future.

GE can help you activate sensors, collect data and analyze it, delivering insights and solutions and turning your store into an intelligent building—all while maximizing the investments you've already made.

INPUT

Sensors capture:

- Data
- Video
- Environment
- Audio

OUTPUT

Optimized solutions:

- Better shopping experience
- Shopper education
- Easier navigation
- More store traffic
- Optimized floor plans & checkout
- Optimized inventory
- Customized promotions

What's possible when you have an intelligent store?

SINTEF
"Big Data: For better or worse"
Science Daily, May 22, 2013

http://www.sintef.com/home/corporate-news/big-data--for-better-or-worse/
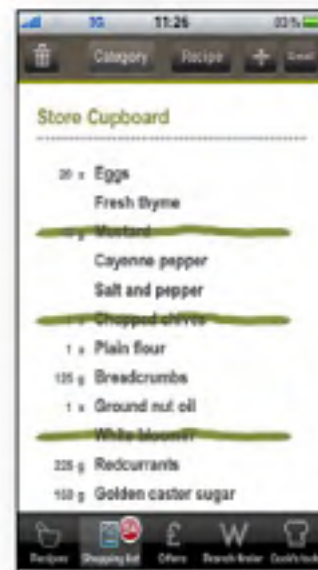
Digital Greeting

- **Welcome**
- **Notify**
- **Engage**
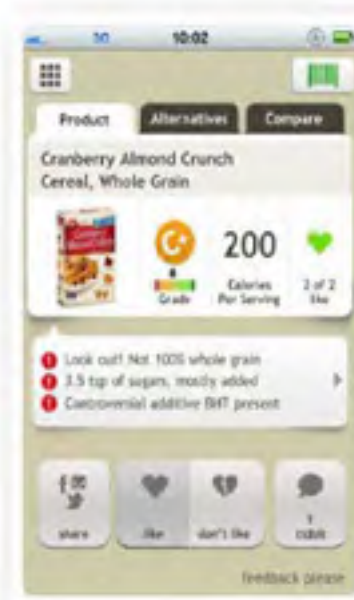- **Assist**
- **Direct**
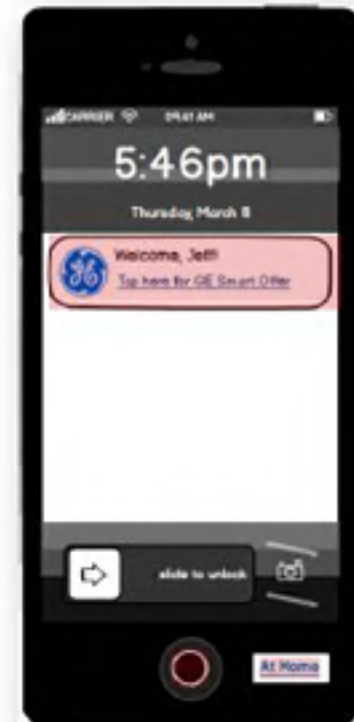
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Indoor Navigation

- Shopping list
- Multi-item path optimizer
- Item locator
- Friend locator
- Emergency egress
- Lavatories

Customer Education

- **Product information**

- **Features and benefits**

- **Story telling**

- **Guided tour**

Coupon Applications

Hyperlocal triggered coupons

Cross Promotion

- Cost of promotion is less
- Win-win situation for both parties
- Cross-promotion marketing is the easiest and often one of the most successful marketing strategies

Do you need buns with those hot dogs?

Confidential

Upselling

- **Locate**
- **Navigate**
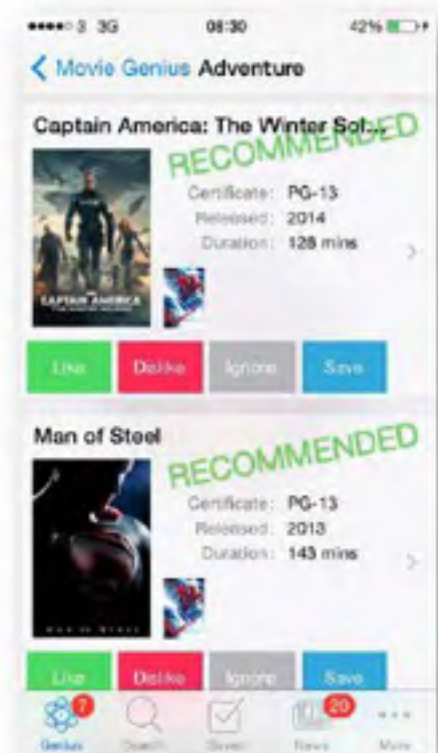- **Educate**

- **Quality**
- **Lifetime**
- **Aesthetics**

Confidential

Recommended Purchase

- Recommendations per location
- People who bought item X frequently bought item Y
- Based on your purchase history
- Blogs
- Social Networks

Product Rating/Ranking

- Aisle/location specific customers rates
- Aisle/location real time customer input

Gamification

- **Digital treasure hunt**

- **Sweepstakes**

- **"Mayor of the aisle"**

GAME MECHANIC	HUMAN DESIRES					
	Reward	Status	Achievement	Self Expression	Competition	Altruism
POINTS	🟢	⚫	⚫		⚫	⚫
LEVELS		🟢	⚫		⚫	
CHALLENGES	⚫	⚫	🟢	⚫	⚫	⚫
VIRTUAL GOODS	⚫	⚫	⚫	🟢	⚫	
LEADERBOARDS		⚫	⚫		🟢	⚫
GIFTING & CHARITY		⚫	⚫		⚫	🟢

🟢 **Game Mechanic Fufills**   ⚫ **Other Areas It Affects**

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Customer Loyalty

Reward levels based on location information

Integrate indoor specific location into loyalty program

Closer parking spots for frequent visiting customers

Premier check out line

Customer Loyalty Factors

Transactional Loyalty	Recency / Frequency Length of Business / Customer Share
Emotional Loyalty	Recommend You / Make You The Standard Pay Premium Price / Perfect Your Product
Satisfaction Level	Product / Service / Relationship / Price Convenience / Brand & Image / Employees
Competition Level	By Industry By Competitiveness

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Endless Aisle

Endless aisle refers to the concept of using in-store digital communications to allow customers to order products which are no longer in stock or not sold in the store. The customers then have the product shipped to their homes.

Endless aisle is a concept which can be used by retail chains which have ecommerce presence.

Endless aisle benefit are:

increasing conversions and sales in retail stores

preventing sales loss

ensuring customer satisfaction and fidelity

expanding offerings / inventory without space constraint

using ecommerce cross-selling and product recommendations

possibly referring sales to partners

removing some products with to low stock rotation

Virtual Shopping Associate

- *One to one sales experience:* Transforming the user experience by making it interactive

- *Loyalty & engagement:* Help customers find things faster, keep them from leaving the store and make them keep coming back

- *Drive sales:* Aid customers in completing a transaction by solving uncertainty and creating trust through personalized recommendations, advice and discovery

- *Insight:* Gain further insight into customer behavior

"You have been standing in the TV aisle for a while.

Can I help you?"

Improving the Stores Performance

- **Store product location optimization**

- **Empty shelf minimization application**

- **Shopping analytics**

- **Safety**

- **Process optimization**
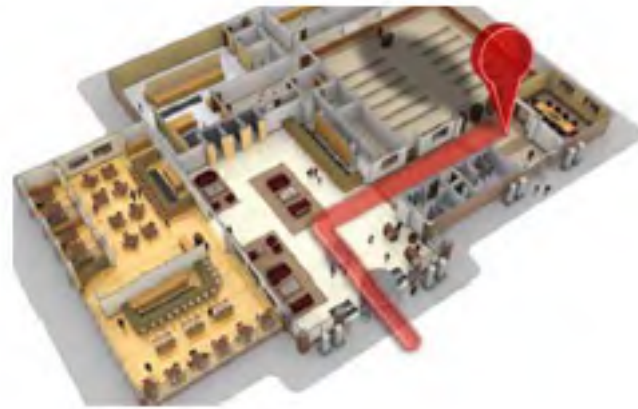
- **Queue reduction**

HEAT MAP A/B TESTING

- Identify heavy traffic areas
- A/B test how product placement affects traffic

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Navigation – Multistore Venue

- **Malls, Airports**
- **Store finder**
- **Gate finder**
- **Event finder**
- **Services finder**

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You can enhance your shoppers' experiences.

Enable your guest-facing apps to:

- Make it easier for shoppers to locate products and navigate stores

- Allow shoppers to make better, more informed decisions at shelf

- Help shoppers get on-demand assistance from an associate

- Keep staff more engaged and informed

- Get shoppers into the fastest checkout lane

- Make buy-online-pick-up-in-store faster and more convenient for shoppers
  and staff members

See tutorial regarding confidentiality disclosures. Delete if not needed.

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You can increase store traffic.

Analyze relevant data to see how to bring guests in and down the right aisles. With help from GE, stores can:

- Tap into endless intelligence, creating a better understanding of guest behavior to optimize store layouts, guest locations and pathways

- Analyze shopper movement (speed and direction) or dwell

- Get relevant, useful information to shoppers

You convert browsers into buyers.

Drive more incremental purchases with effective insights
and intelligence:

- Make it easier to locate products

- Get relevant information to guests when they have queries

- Minimize empty shelves

- Alert staff to support a guest

- Optimize in-store offers

- Provide inventory notices

You can increase operational efficiency.

Aggregate data to reduce redundancies and costs:

- Improve staff utilization and effectiveness

- Handle tickets from buy-online-pick-up-in-store orders

- Train and educate staff to improve guest engagement

- Ensure all shelves are stocked

- Eliminate costs for development and management of additional systems
for data collection

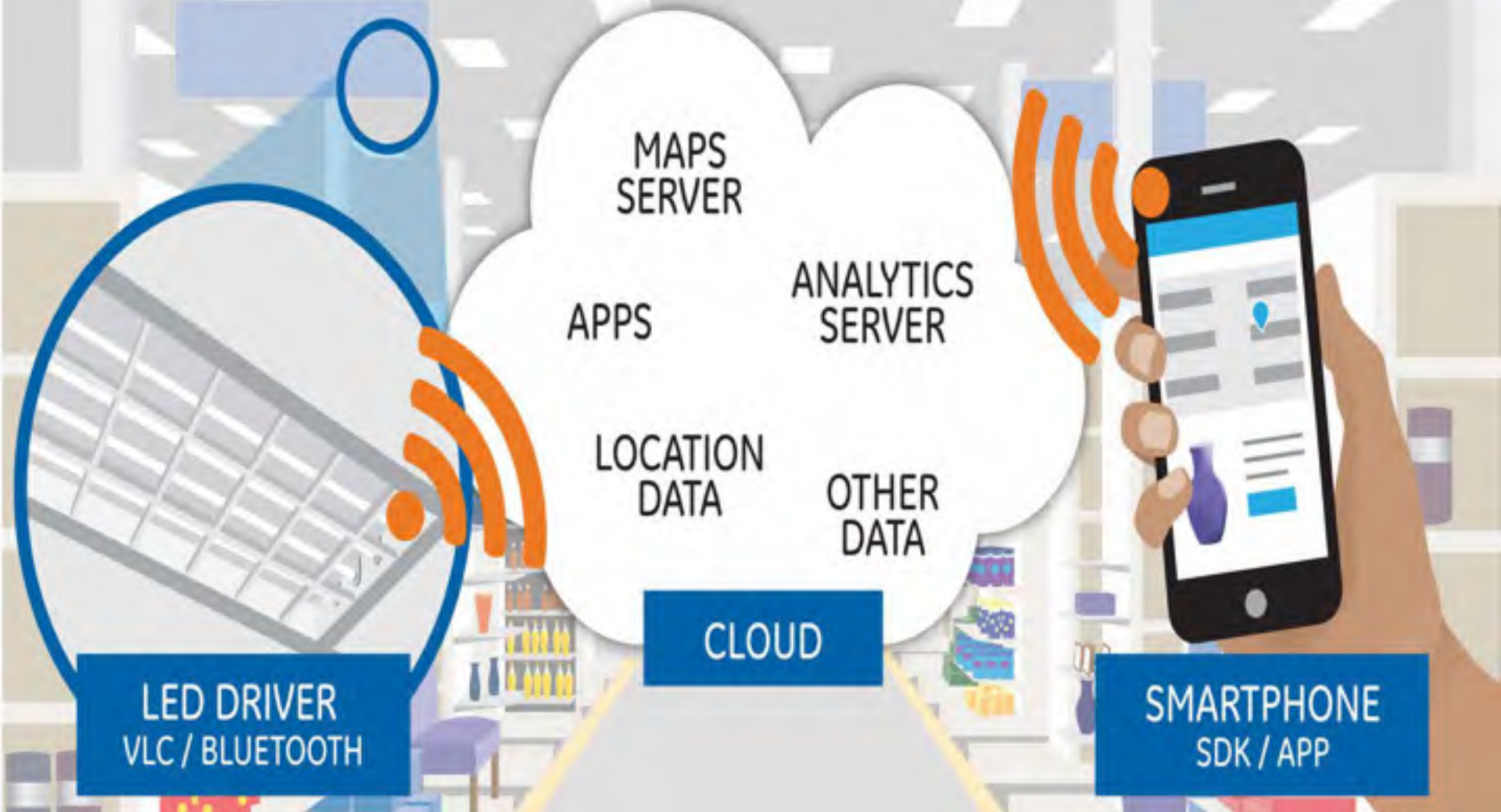See tutorial regarding confidentiality disclosures. Delete if not needed.

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Why lighting?

☑ Lighting systems will always be needed

☑ Lighting is the perfect gateway device to the Internet of Things and to building an Intelligent Environment in-store

☑ LED lighting infrastructure puts sensors in one logical system

☑ Even as other technologies advance and are chosen, lighting will remain a constant

☑ GE can support different sensor technologies and capabilities, which is crucial since LED lights can last through two to three sensor technology cycles

See tutorial regarding confidentiality disclosures. Delete if not needed.

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Today's Technology & Options

Indoor Positioning System

See tutorial regarding confidentiality disclosures. Delete if not needed.

Your lighting fixtures are the ideal solution to leverage data.

They will ALWAYS be necessary & are already in place

— They're — **off the floor,** away from harm

Greater line of light — causes — **less interference**

No additional clutter on the ceiling or walls

No battery maintenance required

LOWER complexity & cost than stand-alone systems

Easiest path to retrofit existing properties

IPS Enabled LED Fixtures

2x2, 2x4 troffers

Linear

Suspended linear

LED Tubes in above fixture styles
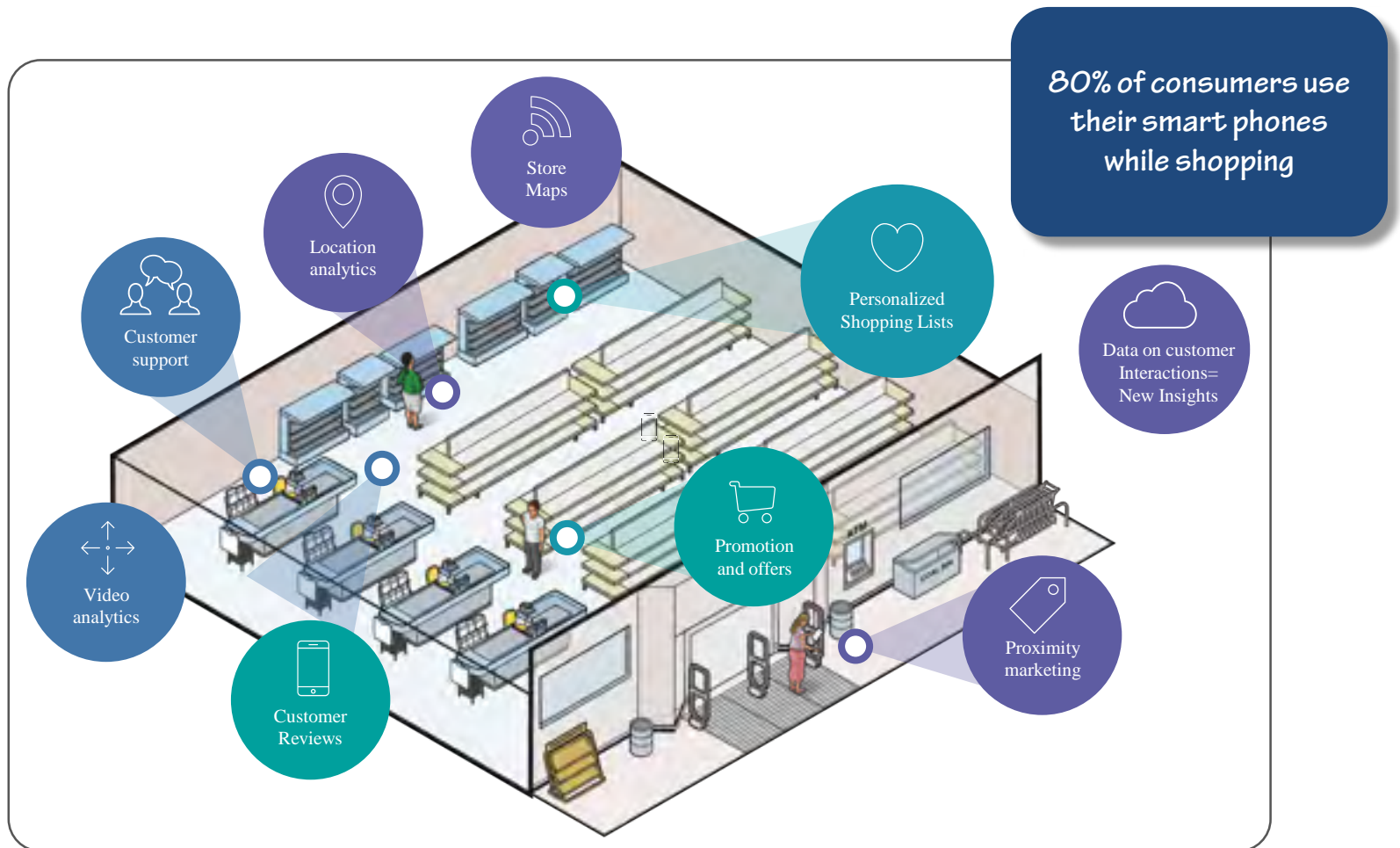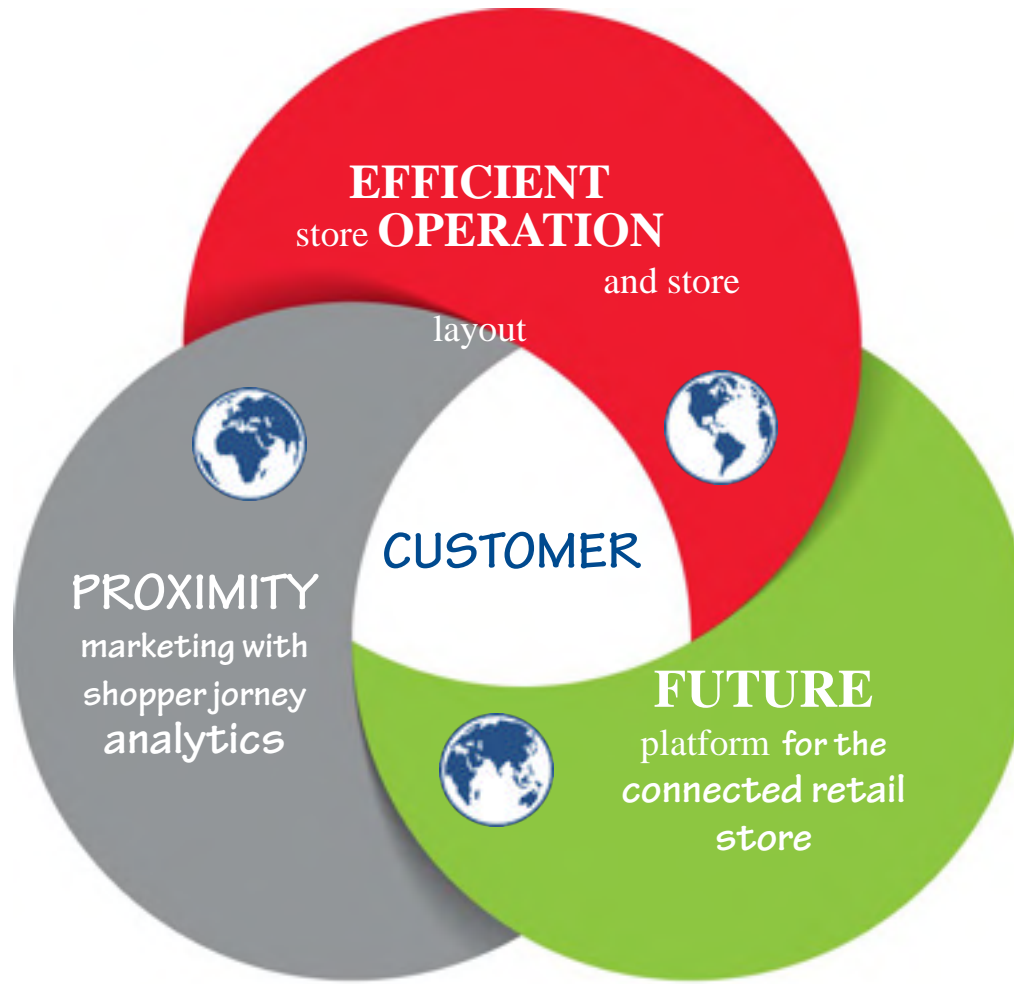
Downlight cans

Track

Customer: Lights + smart phones = informed, efficient, enjoyable

80% of consumers use their smart phones while shopping

Store Maps

Location analytics

Customer support

Personalized Shopping Lists

Data on customer Interactions= New Insights

Video analytics

Promotion and offers

Proximity marketing

Customer Reviews

Retail: Lights + smart phones = insight, influence, sourcing leverage

Real time experiences

EFFICIENT store OPERATION and store layout

PROXIMITY marketing with shopper jorney analytics

CUSTOMER

FUTURE platform for the connected retail store

Analyzing data starts with a platform designed just for this.

- Predix™ is GE's cloud platform that connects lights and data, empowering you to learn about your shoppers.
- By activating sensors in light fixtures, you will be able to tap into shopper data in the most beneficial ways.

The GE Software Center
San Ramon, CA

Igniting the next industrial revolution by connecting minds and machines

- $1B investment over 3 years

- Launched in 2011

- Silicon Valley location

- Aggressive strategy for talent acquisition and growth

GE Software Platforms… shared capabilities

Advanced Research

Developing and deploying scalable predictive solutions to enable Industrial Internet programs

Architecture

Defining new business and delivery models for software and services

Development

Developing applications and solutions around asset optimization and operations optimization

Data Science

Transforming raw data into insights and opportunities, through descriptive, predictive, and prescriptive analytics

Commercial strategy

Optimizing the software portfolio to maximize market success

Cyber Security

Focusing on security management strategies to prevent, detect, and fix risks to GE's data, assets, and intellectual property

Cloud Services

Providing a unified, service-based solution on a protected, fully-automated network

User Experience

Driving revenue and growth by increasing adoption and demand

Why GE?

- Because GE offers a smarter level of hardware and software, backed by a name you can trust.

GE is a trusted advisor, offering robust indoor location services and a turnkey experience that is unparalleled

- Applications, analytics, hardware from one trusted partner

Only GE offers Predix,™ an intelligent platform designed to solve your business problems through data and analytics

As a trusted advisor, GE delivers finance options that align results with your investment

- Reduces technology risk
- Flexible options so you can finance investment in solutions

Credibility – proven ability to deliver LED retrofit programs

The sooner a store implements an intelligent solution, the sooner they can:

GET AHEAD

STAY AHEAD

BE MORE COMPETITIVE