RBC Capital Markets

Imagine 2025

The Consumer Edition

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Thinking About the Consumer: 2025 and Beyond

Greek philosopher Heraclitus once wrote, "the only thing that is constant is change". This famous proverb has been timelessly echoed in the halls of public and private organizations. However, we would argue that while change is constant, the rate of change is not. The pace of change is accelerating…quickly. We believe that change can no longer be thought of in strictly linear terms. We are in an era of exponential transformation. Consider this, it took 47 years for electricity to gain mass adoption. It only took 2.5 years for mass adoption of the iPhone.

While the pace of change is more rapid than ever, investors and management teams still do not properly prioritize following and analyzing long-term change forces. Anticipating mega-trends and potential future outcomes often requires lateral perspectives that are either intimidating or time consuming. Furthermore, it often means sacrificing legacy brands and near-term profitability to realize longer-term survival and prosperity. Renowned futurist Brian David Johnson describes the necessary investment timeframe as *ubermorgen*—not tomorrow, but the "day after tomorrow". All too often, we are finding that the "distant future" is not as far away as we think and this future is increasingly impacting stock valuations within a typical investor time horizon—especially when forward-thinking leaders act on their own version of the future (e.g. Amazon acquiring Whole Foods).

Perhaps nowhere has the disruption from technological innovation and advancement that underpins our Imagine framework been felt more than in the Consumer sector. Remember Circuit City? Borders Bookstores? Blockbuster? Best Buy sacrificed $1.3bln in gross profit over a three-year period before evolving its business model so that it could compete with Amazon. In many ways, the consumer vertical was the original lateral battleground for tech disintermediation. We think it is only the beginning.

It is our hope that as you read this report (from cover to cover!), your range of thinking starts to expand to proactively consider how some of the newest technologies, innovations and exogenous macro dynamics of our times will impact how consumers feel, shop and consume in the year 2025. We implore people to look laterally, around corners—a necessity as near-term trend following becomes further commoditized. We also hope to equip our readers with new questions they should be posing to management teams and the boards of consumer/retail companies. Whether it is packaged food, restaurants or apparel, corporate leadership needs to be able to describe the competencies needed for its company and sub-industry to survive and grow in the year 2025. As we consider investment implications from the change forces in this report, investment conclusions will include perspectives on corporate strategy and our views on respective corporate courage to evolve with new paradigms.

As you read this report, please reach out to us with any feedback, thoughts or questions.

We wish you and your family, happy holidays and a healthy and prosperous 2019 and far beyond.

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Executive Summary

The Imagine 2025 Global Consumer Edition: Following on from our June 26 landmark RBC Capital Markets report *Imagine 2025: Themes, Opportunities and "The Law of Accelerating Returns" study*, we look to apply our learnings to the global consumer sector. As a reminder, through our Imagine 2025 process we identified 23 change forces that manifested into six themes we believe will ultimately define the global consumer sector's future through 2025. These themes are The Calibrated and Augmented Self, The Artificial Intelligence Race, In Cloud We Trust, Collective Action, Escalating Uncertainties and The Agility Imperative. To bring these themes to life, we provide a series of company-specific case studies and actionable global investment ideas.

Artificial Intelligence: Artificial Intelligence is a collection of multiple technologies that enable machines to sense, comprehend, learn and act. The dialogue around "AI" has been going algorithmic lately, and we expect the activity to only ramp from here. Applications of AI are very broad, and include autonomous cars, voice-enabled devices, bioengineering, industrial robotics, etc. Economic, social, and political implications could be dramatic. It is obvious to us that the companies that have the best data (and the ability to evolve that data via AI) will be able to deliver better value propositions to the consumer over the coming years. By the year 2025, we envision AI in combination with bio data will give consumer companies the capability to proactively predict and order products before consumers know that they need it. An example of this would be an internal device embedded with AI that detects that a consumer is about to break out with blemishes and proactively orders a bespoke skincare product to address the consumer's need.

The Calibrated and Augmented Self: The Calibrated and Augmented Self is based on the concept that the "average consumer" is vanishing as machine and quantum computing learn and predict behaviors, leading to hyper-personalized products and services. Today's consumer may be about mass personalization. However, tomorrow's consumer will be about "bespoke consumerism". We believe the converging forces of big data, AI, advancements in genomics/science, the rise of 3D-printing among other change forces will flip traditional business models and value chains upside-down. Are apparel companies prepared for VR shopping and the age of 3D printing? Are today's large CPG companies equipped to deal with consumers' 1-on1? Can packaged food companies capitalize on consumers becoming more aware of what they should be eating based on their DNA? These are the questions we believe investors should be asking consumer company management teams and boards. As we imagine the world in 2025 based on our framework, we are excited to be consumers. However, as analysts following consumer companies, our enthusiasm is a bit more tempered.

In Cloud We Trust: We see Cloud as the ultimate enabler—if a consumer business has unique ideas and innovation, the cloud enables organizations to bring those ideas forward quickly and at scale. In addition to spurring growth, the cloud is cheaper than on-premise software storage solutions by as much as 40%+ over a 10-year period (a percentage that is only likely to increase as cloud services quickly become more affordable). The cloud provides instant scale to start ups and also allows organizations of all sizes to share insights and form alliances. We are also mindful of Amazon as a leading cloud provider and the strategic challenges that presents for the consumer industry.

Collective Action: The power to act collectively has never been greater given technology and the viral speed with which social sharing can occur. As a result, long-held beliefs in traditional institutions, social norms, and commerce are being challenged. The idea of "collective action" is by no means a new phenomenon; but advancements in global connectivity have increased the pace at which groups can unite and catalyze change (versus relying on

traditional institutions). Take for example the Civil Rights Movement. The efforts of activists and countless protestors brought about legislation to end segregation, black voter suppression and discriminatory employment/housing practices—but it took 14 years (1954–1968). How would this have differed with today's technology in place? The implications on the consumer/retail sector are already taking shape. The consumer value equation has changed. No longer do products sell based on price/benefit alone, but based on the collective feedback from other consumers. Innovation curves are accelerating, transparency is rising in importance and new business models are emerging. A burgeoning sharing and gig economy will only accelerate from here as a result of collective action.

Escalating Uncertainties: Even as we struggle with a staggering amount of change, we can envision a future where this rate of change goes parabolic, making our present concerns seem quaint, heightening uncertainty, and expanding the list of threats and challenges posed to the world's nations, institutions, and corporations. The sheer scale of change has significant economic, environmental and resource considerations. For consumer companies (especially consumer staples companies) consistency of cash flows, reliable dividends, and stable growth are the most important qualities for investors. However, today (and likely more so tomorrow), the world is directly at odds with the consumer industry's ability to deliver on those promises. Currency volatility, climate change, resource scarcity, geopolitical tensions, and population imbalances are just some of the pressures weighing on every consumer company's ability to deliver sustainable and profitable growth. In tandem with the disruptive technological change, the magnitude of geopolitical instability also seems to be accelerating, often as collateral damage of this technological revolution. Corporations and heads of state alike range from underprepared bystanders to contributors to these exogenous systemic shocks that can have far-ranging impacts. As Director of National Intelligence James Clapper told Congress in 2016, "unpredictable instability is the new normal." We believe those consumer/retail companies that embrace this new reality can create competitive advantages provided they have the foresight and courage to invest.

The Agility Imperative: The Agility Imperative is based on the increasing need for companies to be flexible and able to quickly adapt to societal change forces. An asset base and existing brand equity will no longer be enough to carry companies through changing times, or to sustain dominance and relevance in a category. In fact, it may lead to their extinction. Companies will have to change their structure and cultures to become and remain agile to compete and succeed. We have identified four "agility mandates" to help companies become agile in the face of accelerating change forces. First, make people believe. The brain drain towards the best companies is accelerating, as the global labor force is increasingly open to all. This underscores the need to create compelling and inspiring cultures and incentives. For example, Netflix is refreshingly clear about its mission—to entertain the world—and it pays top dollar to attract only the highest performers. Second, consider a new business model. Best Buy is a great case study that the best future business model may require investment (e.g. a near-term EPS sacrifice). Third, seek allies. Food and restaurant companies are in the convenient meals and snacks business—not the transportation business. But over the next 5-10 years these two sectors may augment eating patterns more than any particular type of food. Delivery aggregators like UberEats, GrubHub and DoorDash all strive to be the dominant delivery platform, but will not get there without the right foodservice allies. Lastly, lighten up. Ownership of physical assets has become less important, and we believe this trend will continue. Airbnb is currently valued at $31 billion, and Marriott, the largest hotel chain in the US, has a $40 billion valuation.

Identifying the leaders through 2025 and Beyond: We believe companies that are best prepared for the change forces and themes of the future we outline in this note are: adidas, Estee Lauder, Kroger, McDonalds, Loblaw Companies, LVMH, Walmart and Yum! Brands.

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Summary Perspective by consumer sub-category

Below we briefly summarize the future for each sub-category and point to relevant page numbers in the report for additional detail.

Exhibit 1: Sub-Sector Manifestations and Implications

Sub-Sector	Sub-Sector Manifestations and Implications	Relevant Page Numbers
Apparel	The apparel sector may be completely revolutionized by 3-D printing and the winners will be those that drive forward the integration of technology into apparel, further differentiating themselves from competitors with new materials. Consumers will demand nothing less than apparel that fits perfectly and is adaptable.	74-76, 101, 121-123, 206-207, 216-220
Apparel Retail	Apparel retail will evolve beyond the mall and online to Clothing as a Service (CaaS) type offerings, including bespoke clothing design services as well as clothing-sharing services. Brick-and-mortar apparel retailers will evolve to be experiential showrooms rather than the inventory displays they are today.	18-22, 34-37, 87-88, 101, 133-134, 206-207, 218-220
Beauty	The beauty sector is positioned to accelerate online sales through advancements in digital engagement (assuming the appropriate investments are made). New start-up brands will challenge incumbents, while the beauty players that further embrace advancements in biology and chemistry will separate from the rest of the pack with bespoke beauty products.	44, 72, 83, 101, 114, 119, 151, 184, 214
Beverage, Alcohol	Beverage alcohol could prove to be a bastion of stability. Consumers may look to consume more alcohol given autonomous driving trends as well as improved healthcare and proactive medicine to limit adverse side effects of alcohol consumption. The wealthy may look to alcohol to celebrate and complement bespoke experiences, the lower class may look to alcohol as an escape.	41, 83, 194-196
Beverage, Non-Alcohol	Non-alcoholic beverages are uniquely positioned to deliver personalized beverages to consumers to meet their performance, lifestyle and health needs. Oddly, advancements in healthcare could also drive an acceleration in demand for more indulgent beverage offerings.	18, 51, 138-146, 148, 194-196
Food Retail	Food retail will evolve to offer consumers bespoke food selections and promotions available anywhere at any time. Agile e-commerce solution, digitalization in store, automated pick and pack, and autonomous same-day delivery will define the business looking forward.	22-26, 87-88, 127, 182, 185, 201-202
Hardlines Retail	Hardline/Broadline retailers will continue to use AI/Big Data to better understand their customer shopping habits/patterns, leverage technology like AR/VR to improve customer satisfaction and close rates and provide same day delivery and expand into "related services" to meet more of their customers' needs. Best Buy stands out as a best in class example of a company partnering and evolving for the future.	18-22, 22-26, 87-88, 106-108, 172, 203-205, 208-212
Household Products	Artificial intelligence, the calibrated and augmented self will converge to provide consumers with bespoke household products that are environmentally friendly and delivered to consumers anytime, anywhere.	41, 69, 71, 101, 114, 138-146, 151, 174-176, 194-196
Food Processors	Increasing delivery and big data capabilities will meet changing consumer health and taste preferences. As definitions of convenience change and the importance of consumer data increases, packaged food companies will need to consolidate in some categories and boldly pursue others.	73, 78, 147, 196-199
Restaurants	The importance of data and delivery will grow, and this could put restaurants with relatively average food and data access at an increasing disadvantage. Amazon and "virtual banner" restaurants on delivery sites will represent increasing threats.	38, 49, 52, 124-125, 174, 181, 187, 199-201
Tobacco	Consumers (including low-income consumers) will receive live feeds of the negative side effects of smoking. In some cases devices may remind smokers of how many months each tobacco product could take off their life. Margin-dilutive investments and likely dilutive M&A will be required to maintain top-line growth.	45, 66, 181, 215

Source: RBC Capital Markets

Why we engaged in this study

We wanted to equip our analysts and clients with a multi-dimensional way of thinking about companies, stocks and valuations.

Equity valuations are based on the present value of future cash flows. Most analysis is focused on the next quarter or next 1-2 years, but *rarely* is time and effort taken to think about the next 7 years when assessing the valuation of a company. This was the impetus for the RBC research team. We wanted to equip our analysts and clients with a multi-dimensional way of thinking about companies, stocks and valuations. The most important assessment for our research team was to understand which companies across our collective coverage had the capabilities to adjust to a rapidly evolving future.

Case Study I—The Power of Futures Research: Time to Face the Music

Record labels could have been leaders in the digital wave of music and concerts, but they passed this opportunity and chose to fight it instead. This led to other and new companies filling the vacuum of consumer demand for digital, portable, and wide selections of music.

The late 1990s and early 2000s were the beginning of the downfall of major record labels. Prior to the Internet Age, major record labels were the most powerful resource for artists to access promotion, production, publishing, and distribution. However, the mass accessibility and adoption of the internet ushered in the era of peer-to-peer (P2P) file-sharing technologies such as Napster, Bit Torrent, and LimeWire. These technologies enabled users to illegally share and download content, most of which was music/mp3 files. Technological advances in hardware also enabled users to 'rip' music from legally purchased CDs to upload onto the internet, or to make and 'burn' their own CDs.

Rather than embracing or adapting to this new wave of technologies, major labels fought back. Within 6 months of its creation, Napster was sued by the Recording Industry Association of America (RIAA); more lawsuits by record labels followed for Napster and its peers. Record labels also began implementing technology to prevent users from 'ripping' songs from legally purchased CDs. This backfired tremendously for Sony BMG in 2005 when its technology installed software on users' computers without their knowledge, and created security vulnerabilities. This all led to a class action lawsuit against Sony.

The music industry's heavy hand against digital file sharing saw a backlash from consumers, and did nothing to stop the digital wave. For the next 15 of 16 years, recorded music sales fell to historical lows and, by 2010, 10 years after the 1999/2000 wave of file sharing, recorded music sales were down 40%, and digital music had overtaken physical as the dominant format of music sales. It was digital music services such as Spotify, Pandora, and Apple Music that accounted for the rise in music sales in 2016.

Labels also missed the incredible marketing power of making music easily accessible, and making music a gateway to other products. Radiohead had their first major number 1 album with *Kid A* in 2000, crediting its success to being leaked on Napster three weeks before its release date. In 2008, Radiohead released their new album *In Rainbows* in a pay-what-you-wish model, the band noted, "in terms of digital income, we've made more money out of this record than out of all the other Radiohead albums put together, forever." Artists in the hip-hop and R&B genre have also found success in this model of free albums, called mixtapes, leading to platinum record sales; these artists include Drake, The Weeknd, Wiz Khalifa, and Kid Cudi.

Today, coupled with a preference for experiences, music itself is a marketing tool for concerts. With less money spent on recorded music, consumers are more willing to spend money on concert tickets, and merchandise. Just as recorded music sales hit all-time lows,

concert attendance was at an all-time-high. From 2010 to 2018, Live Nation Entertainment's stock price has risen over 250%.

The digital music player is a great example of product-as-feature. Record labels' focus on CD sales also ignored the glaring trend in technology of ever-shrinking hardware. In retrospect, this seems inevitable, but labels were reluctant to meet consumers' desires for mass, portable, and seamless music. The iPod was launched in 2001, and each new generation got smaller, slimmer, and sleeker. Today, Apple has discontinued all its iPods, except the iPod Touch that is essentially an iPhone without cellular technology. Standalone music players are all but a relic; music playing technologies and services are all standard, available for free, or "freemium". Even by 2020, almost half of all new cars in North America will not have CD players. The genre of music with the most physical CD sales remains country music, whose fans are a median age of 46.

Case Study II—The Power of Futures Research: Blockbuster vs. Netflix

Music was not the only part of the entertainment industry that failed to adapt to the internet age. The greatest fall came for Blockbuster, and it could come for movie studios next.

That's A Wrap: The Fall of Blockbuster

Blockbuster filed for bankruptcy in 2010, a mere 6 years after its peak, and at the same time, recorded music sales hit record lows. While digital music was making its rise, so too were online retailers like Amazon, followed by Netflix. Although Netflix aspired to online on-demand videos, in the late 1990s and early 2000s, internet speeds and bandwidth were not able to accommodate such a move. The Netflix launch of a subscription DVD by mail service without due dates or late fees, coupled with its convenience versus brick-and-mortar Blockbuster, led to its meteoric rise, and Blockbuster's downfall. Blockbuster rested on its laurels and had to play catchup to Netflix, offering its own DVD by mail service four years after Netflix.

In 2000, Netflix CEO Reed Hastings offered itself for sale to Blockbuster for $50 million, which Blockbuster refused. Of the meeting, former CFO Barry McCarthy said, "they nearly laughed us out of the room… they thought we were a very small niche business." Netflix now has a market cap of over $100 billion. Barry McCarthy joined Spotify as its CFO in 2015.

Product-As-Feature

Even without the rise of Netflix, the downfall of Blockbuster seems inevitable in retrospect when looking at changes in hardware. Technology for physical video went from getting smaller to becoming non-existent in another example of product-as-feature. VHS players were swapped out for DVD players; now, DVD players are being forgone for smart-TVs, and streaming on portable devices. Currently, more than 58% of US households have a smart TV or connected-TV. Similar to music, the standalone hardware is gone, the software is free, and the content is cheap, high quality, and portable.

And The Winner Is…

Video streaming services Netflix, Hulu, and Amazon have all now created their own award-winning content. Amazon Studios' 2016 film *Manchester by the Sea* was nominated for six Academy Awards and won two; Hulu's *The Handmaid's Tale* was nominated for 13 Emmy Awards; and Netflix's original series have been nominated for over 400 awards since 2013, winning Emmys, Academy Awards, Golden Globes, and Grammys.

Understanding "The law of accelerating returns"

All of our six future themes by 2025 are rooted in dramatic and accelerating advancements in technology. Before we discuss each of these themes in more detail, we thought it would be helpful to explain why we have conviction these (at times uncomfortable) themes are in the not too distant future. Ultimately, exponential technology advancement always has been and will continue to be underpinned by five underlying principles: 1) new technology; 2) the network effect; 3) ability to store information; 4) faster pace of mass adoption; and 5) rising affordability.

Exhibit 2: Exponential technological change is rooted in the combination of 5 principles

Source: Augmented

"The only thing that is constant is change"—Heraclitus

While the above quote from the famous Greek philosopher Heraclitus may be true in the proverbial sense, it is not a fair representation of the state of play today. Change is not constant; it is accelerating at a dramatic pace. We believe this accelerating pace of change has been driven partly by faster rates of adoption around new technologies. It took about 46 years before electricity received mass adoption. However, the time for mass adoption of the telephone and radio was only 35 years and 31 years, respectively; the personal computer took about 16 years, and the iPhone took less than 3 years.

Exhibit 3: The accelerating pace of change

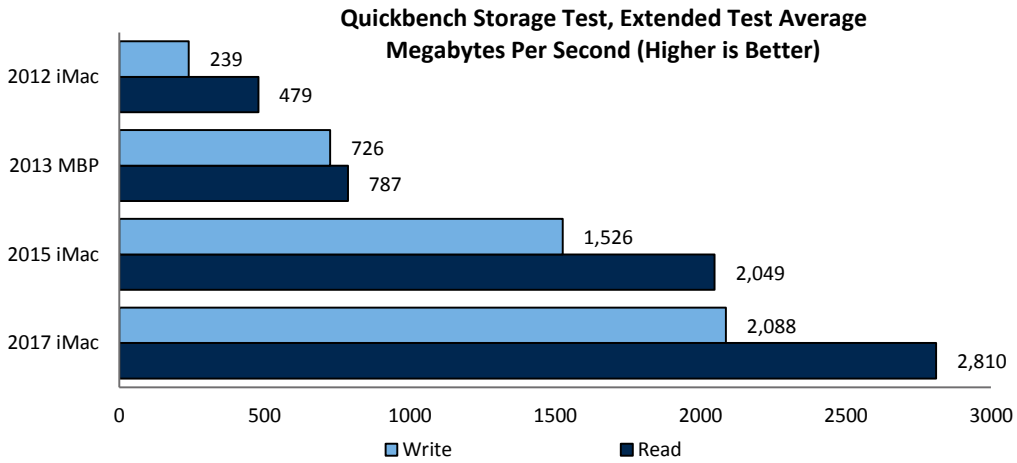
Year Developed	Technology	Years until mass adoption
1872	Electricity	46
1876	Telephone	35
1897	Radio	31
1926	Television	26
1975	PC	16
1983	Mobile Phone	13
1991	The Web	7
2001	iPod	4
2006	Facebook	3
2007	iPhone	2.5

Source: Augmented

Consider the following:

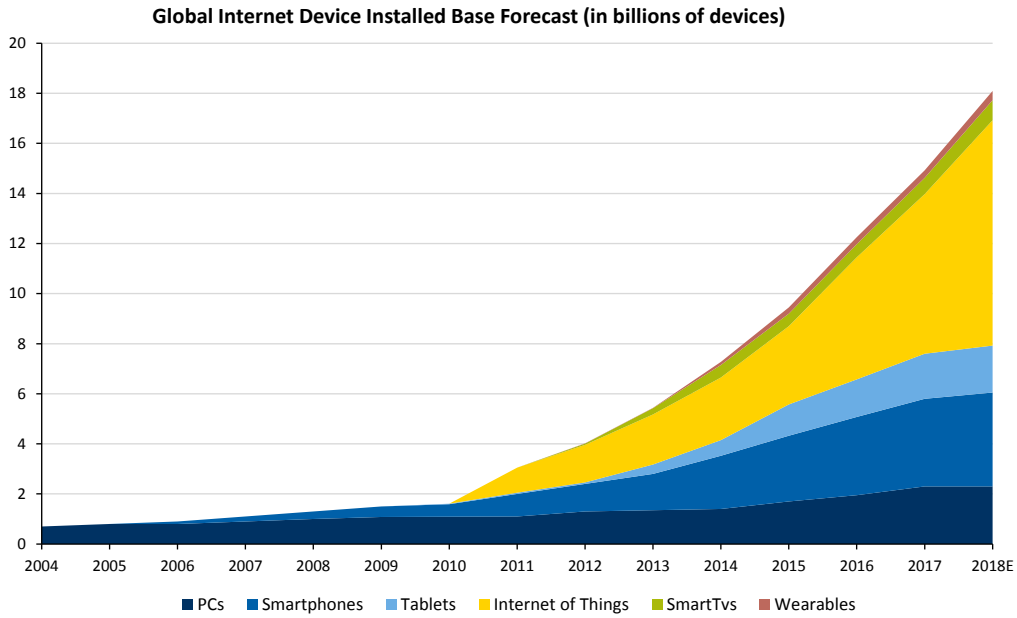
Today's pocket calculators have more computing power than the computers used for the Apollo moon missions. As a reminder, these computers cost $3.5 M and were the size of a car. Today, the iPhone is 32,600 times faster than the best Apollo-era computers, and can perform instructions 120,000,000 times faster. Put differently, the iPhone could be used to guide 120,000,000 Apollo era spacecraft to the moon, all at the same time. Today's supercomputers are able to execute so many instructions per second that scientists do not even measure their speed in instructions per second.

Exhibit 4: Data created globally today is exponentially greater than in prior years



Source: StorageNewsletter

Exhibit 5: Internet accessibility has grown exponentially

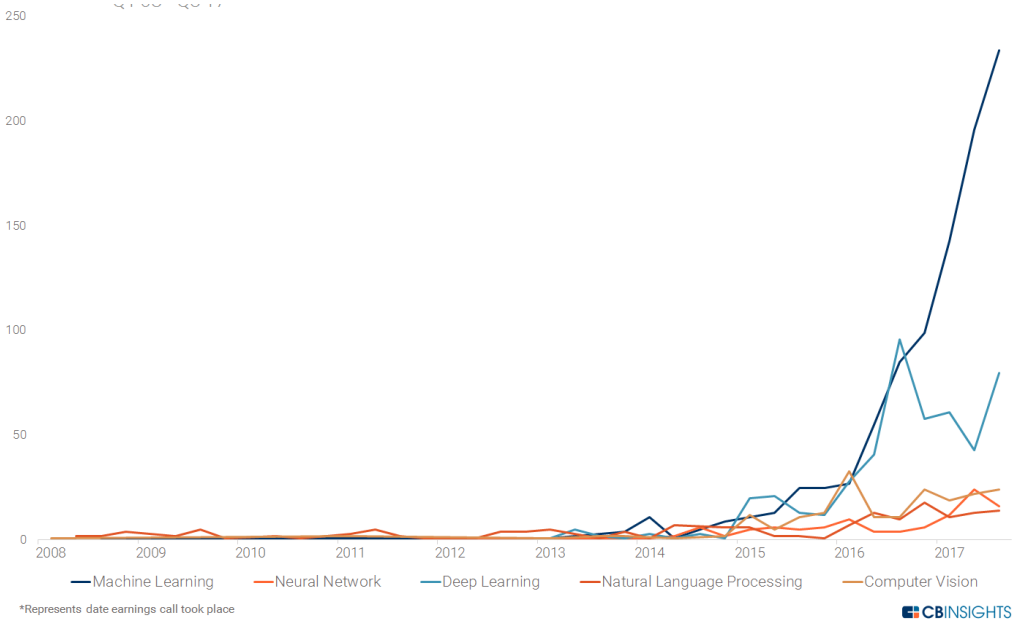


Source: StorageNewsletter

Theme I: The AI (Race)—Table Stakes

We believe starting our detailed discussion about 2025 with the AI (Race) opportunity is appropriate given the importance of data (and the use of that data) to many of the future scenarios and opportunities we see unfolding over the next seven-years. What is AI? Artificial Intelligence is a collection of multiple technologies that enable machines to sense, comprehend, learn and act. The dialogue around "AI" has been going algorithmic lately and we expect the activity to only ramp from here.

Exhibit 6: Mentions of artificial intelligence are on the rise



Source: Bloomberg, CBINSIGHTS

We believe that one of the biggest catalysts for AI has been the rise of "Big Data". To put the amount of data creation into context, consider the following:

- IDC, a market-research firm, predicts that the "digital universe" (the data created and copied every year) will reach 180 zettabytes (180 followed by 21 zeros) in 2025. Pumping it all through a broadband internet connection would take over 450 million years.
- Every day, we create 2.5 quintillion bytes of data. To put that into perspective, 90 percent of the data in the world today has been created since 2016—and with new devices, sensors and technologies emerging, the data growth rate will likely accelerate from here.
- Today we produce the content of all books written in history 80 M times a day.

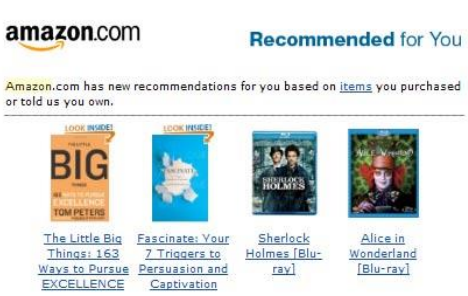
The Impact of AI on the Consumer Space

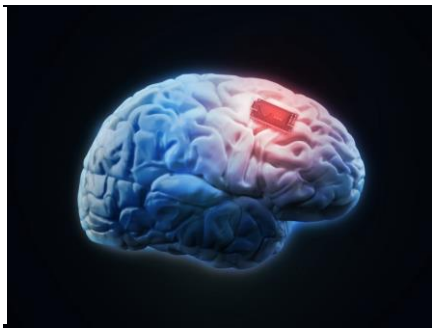
Applications of AI are very broad, and include autonomous cars, voice-enabled devices, bio-engineering, industrial robotics, etc. Economic, social, and political implications could be dramatic. As Vladimir Putin once said, *"The country that leads AI development will be ruler of the world."* While Mr. Putin's statement might seem a bit extreme, it is obvious to us that the companies that have the best data (and the ability to evolve that data via AI) will be able to deliver better value propositions to the consumer over the coming years. By the year 2025, we envision AI in combination with bio data will give consumer companies the capability to proactively predict and order products before a consumer knows that they need it.

***What if** an AI device embedded into a consumer's body is able to detect an upcoming blemish breakout and proactively orders a bespoke skincare product to address the need.*

Exhibit 7: The evolution of consumer-related artificial intelligence

Past	Present	Future
Send personalized emails	Make recommendations based on order and browsing history	Automatically order products based on bio data, understanding a consumer's needs better than the consumer understands themselves





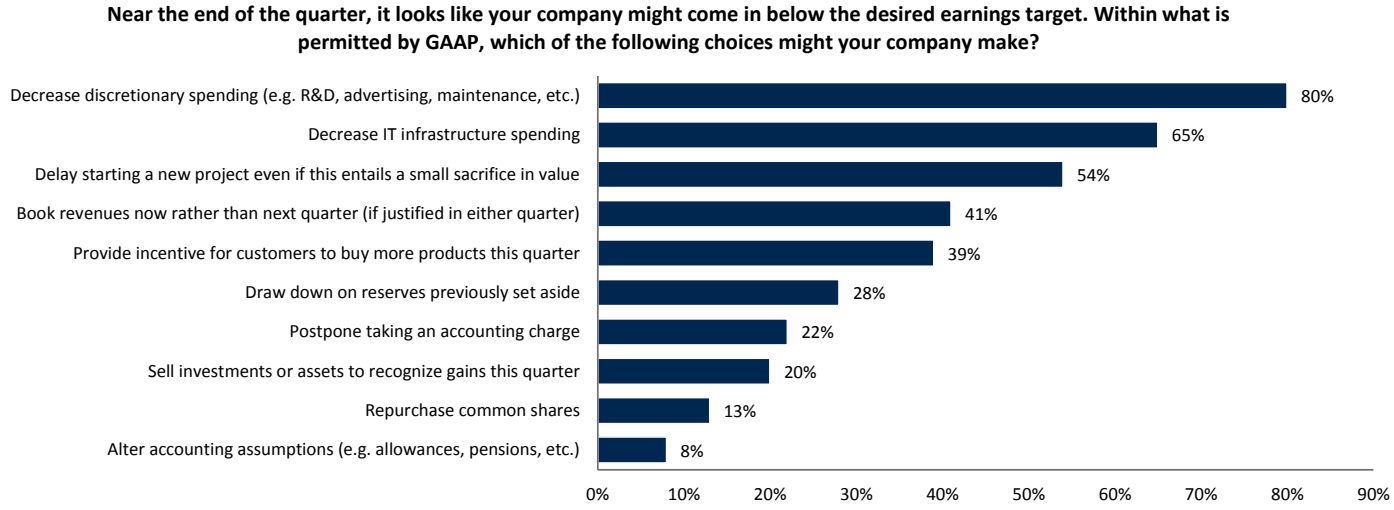
Source: Best Buy

***What if** domestic robots and voice assistants complete most home services tasks—lawn mowing, cleaning, cooking, shopping, appointments, and food ordering? Will the $400B US services industry shrink?*

A Word of Caution: The Hare Wins this Race

The Tortoise and the Hare was one of Greek storyteller Aesop's most popular fables. It discussed an unequal race between a slow-moving tortoise and the faster hare. The hare was so confident he could beat the tortoise in the race that midway through, he took a nap—only to find out that the tortoise beat him to the finish line. What a wonderful story about consistently and perseverance. Unfortunately, for most consumer companies, this age-less fable does not really apply. It should be no surprise to anyone that most consumer companies are way behind in the data game. While we give credit to the consumer sector for being on the cutting edge of the data game decades ago to identify revenue opportunities, we believe the legacy infrastructures (IT/consumer insights, etc.) have now become impediments to truly leading the charge in today's AI(race). In fact, when asked what decisions executives would make when they are about to miss a quarter, 80% of execs in a recent Duke study indicated they would slash discretionary spending, including IT/R&D.

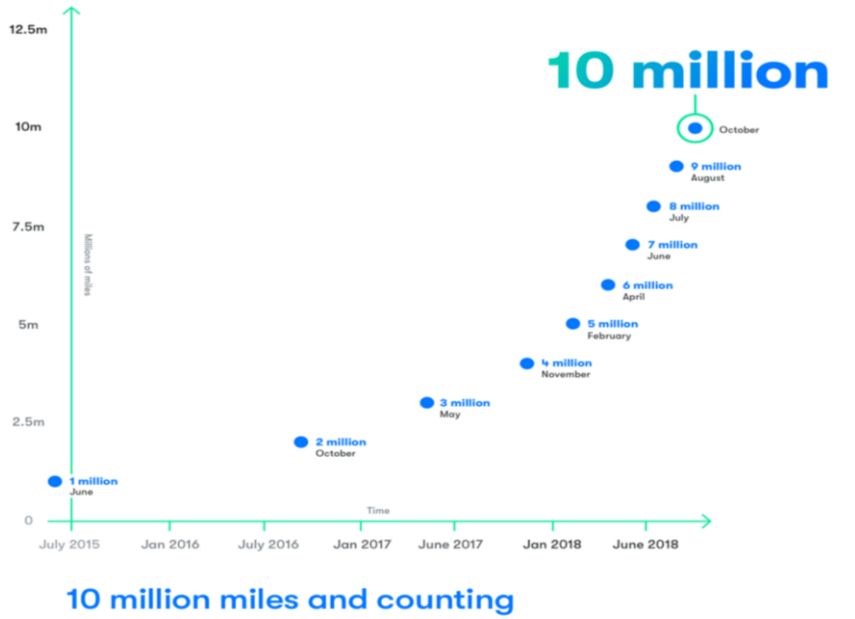
Exhibit 8: Duke University study on CEO decision making



Source: Duke University

The issue with trying to catch up in the data game, which is so critical for the AI(race), is that data compounds on itself. The more data points you have, the better the accuracy, especially when talking about anticipatory analytics—which we believe will be how things will be done in the future. This is why the companies with a big head start in autonomous driving have a distinct competitive advantage. For instance, Waymo-powered vehicles have already driven over 10 M miles autonomously. With each incremental mile driven, more data are accumulated and the autonomous artificial intelligence becomes smarter (thereby creating a superior consumer experience). The pace of increased miles driven has been exponential. Waymo intends to launch autonomous driving capabilities this year, GM in 2019 and Ford by 2021. For additional detail on autonomous driving, particularly as it relates to Waymo, GM and Ford, see RBC Autos Analyst Joe Spak's GM US: Imagine 2025: The Cruise Opportunity.

Exhibit 9: Waymo miles driven



Source: Google, Waymo

Move Fast, Break Things

With our cautionary sentiment regarding consumer companies and the AI(race) out of the way, here is how we think about the key manifestations to the AI(race) for the consumer sector in general.

1) **The Foundation for Bespoke Consumerism:** We believe machine-learning techniques will be widely deployed by 2025 across the consumer sector to improve the personalization of companies' offerings. Content, product promotions, advertising, recommendations are all likely to be more personalized and proactive than they are today. We discuss the evolution from "mass personalization" to "bespoke consumerism" in the Calibrated Augmented Self section of this report.
2) **Shifting the Balance of Power between Vendor and Retailer:** Ramping investments in data/AI by retailers and the significant head start by Amazon and other e-commerce platforms could shift the balance of power between the brand creator and the retailer.
3) **Boosting the Power of Our Voice:** AI-powered Voice Recognition will likely improve dramatically from current levels allowing even better use of Internet apps via voice commands. Search functionality will skew much more heavily towards voice commands than to keypad/phone pad prompts.
4) **VR/AR Go Mainstream:** Virtual Reality and Augmented Reality, empowered by AI, will likely become much more mainstream. This could change the face of advertising and make experiential selling that much more important. We could foresee a world where Friday Night Streaming is replaced by Friday Night VR.
5) **Sensors Everywhere:** We see greater proliferation of smart devices and application of Internet of Things (IoT) into household devices. It is likely that all devices could potentially be Internet-connected and with improvements in machine learning and AI technology, smart devices could become "smarter." Some common applications could include the ability for consumers to track energy consumption of home appliances and increasing home security features with improved cameras and alarms. This could evolve to help automatically order groceries based on what is finished in your smart refrigerator. IoT devices on our person could help us improve our health and suggest OTC vitamins/medicines or certain foods to buy/eat.
6) **Autonomous Vehicles:** We think autonomous vehicles will be arguably one of the biggest applications of AI. Google most recently disclosed Waymo reached the 10 MM milestone of autonomous vehicle driving. How will autonomous driving impact shopping trips? Walmart has already partnered with Waymo to bring customers to store locations.
7) **Productivity and Cost Savings Accelerator:** We believe AI could be a significant accelerator of productivity and cost reductions. Advanced robotics could become a central part of logistics operations for vertically integrated consumer companies. Amazon is a great example. The company already deploys something like 100K Kiva robots, and we would not be surprised to see a very large percentage of Amazon's distribution workforce complemented with these robots by 2025. This dynamic could drastically help improve overheads and mitigate wage inflation. Another big benefit as it relates to corporate back office reform is scalability. Once an AI program has been trained to execute certain processes, it can then be replicated to many different locations and for similar functions within the company. This allows for rapid deployment of new products and services with higher levels of quality control.
8) **Application of Blockchain:** While some view Blockchain as an application of AI, we believe that decentralized networks may in fact disaggregate the data used to feed AI. From this, we see the potential for large consumer companies as needing to rent personal data from users (e.g., pay users in tokens) for its use in AI applications. However, we also envision the potential for Amazon and other Cloud Computing powerhouses to become large nodes on the decentralized network with the ability to rent out unused or latent processing power to others. Therefore, this would likely be a symbiotic relationship.

In the next part of this section, we break each of these themes down into more detail.

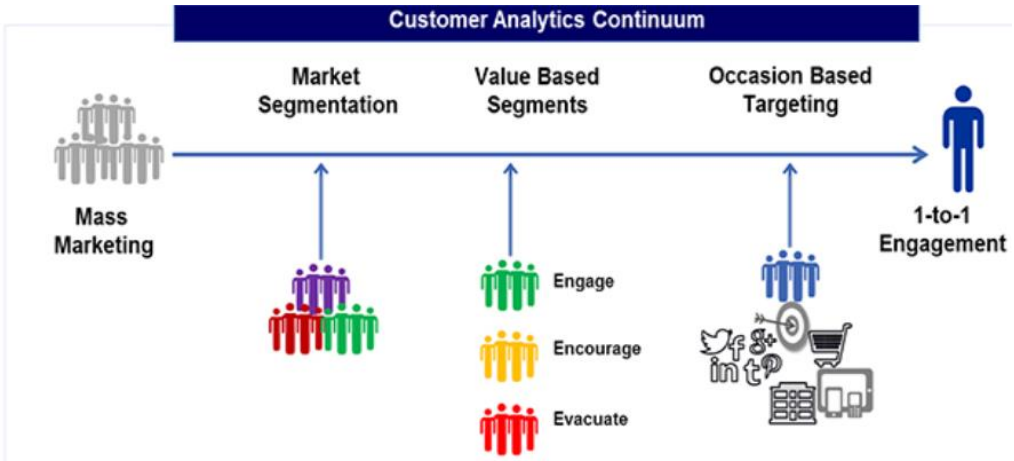
1) The Foundation for Bespoke Consumerism

We believe machine-learning techniques will be widely deployed by 2025 across the consumer sector to improve the personalization of companies' offerings. Content, product promotions, advertising, recommendations are all likely to be more personalized and proactive than they are today. We discuss the evolution from "mass personalization" to "bespoke consumerism" in the Calibrated Augmented Self section of this report.

1-to-1 Marketing Becoming a Reality

Over the past few decades, consumer companies have coveted data to help with finding revenue opportunities (demographic clustering, targeting need states, weighted purchase intent, trial/repeat, etc.). Data has evolved from very generic categories like gender and age to race and career, and now to much more specific data such as your online activity, social media communications and transaction history. While the data is getting more specific, it is often times backward looking and not proactive. In the future, we believe the "internet of things" will provide real-time data feeds that are specific to the person.

Exhibit 10: The evolution from mass marketing to 1-to-1 marketing

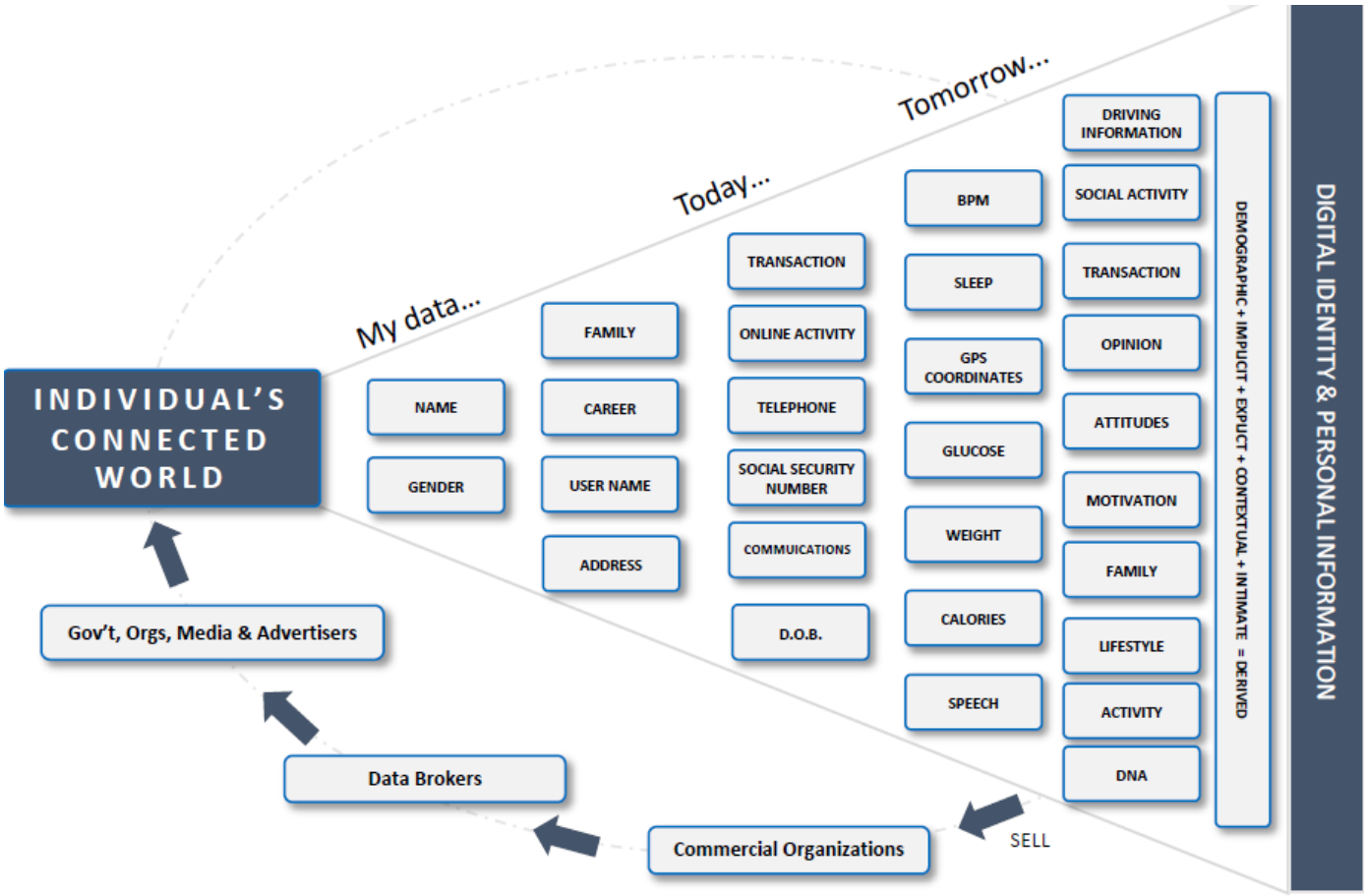


Source: Marketing Management Analytics

Most of us have heard about the news about when an angry father confronted Target why his teenage daughter was receiving coupons for baby products, only to find out that she was pregnant. The story happened in 2012 and nowadays, 1-to-1 marketing has become more sophisticated. Take Spotify, for example, by analyzing the genre, artist, time and other factors, Spotify creates a profile of each user's individualized music taste, and comes up with a "sample" list (Discovery Weekly) with new songs for users to listen to. Another example features Vidyard, which embeds a user's name, email address, workplace and other information in its marketing video to cater to the increasing demand of online video marketing. With more information provided, Vidyard could even address the target customer by name; refer to his/her colleagues and the conversations Vidyard had with them.

***What if** a micro-computer embedded in your body could provide you real-time data on how much you are sleeping, your glucose levels, and changes in stress hormones. Imagine a situation where Alexa proactively suggests a list of groceries to help you bring down your glucose levels.*

Exhibit 11: The evolution of data



Source: Praxis

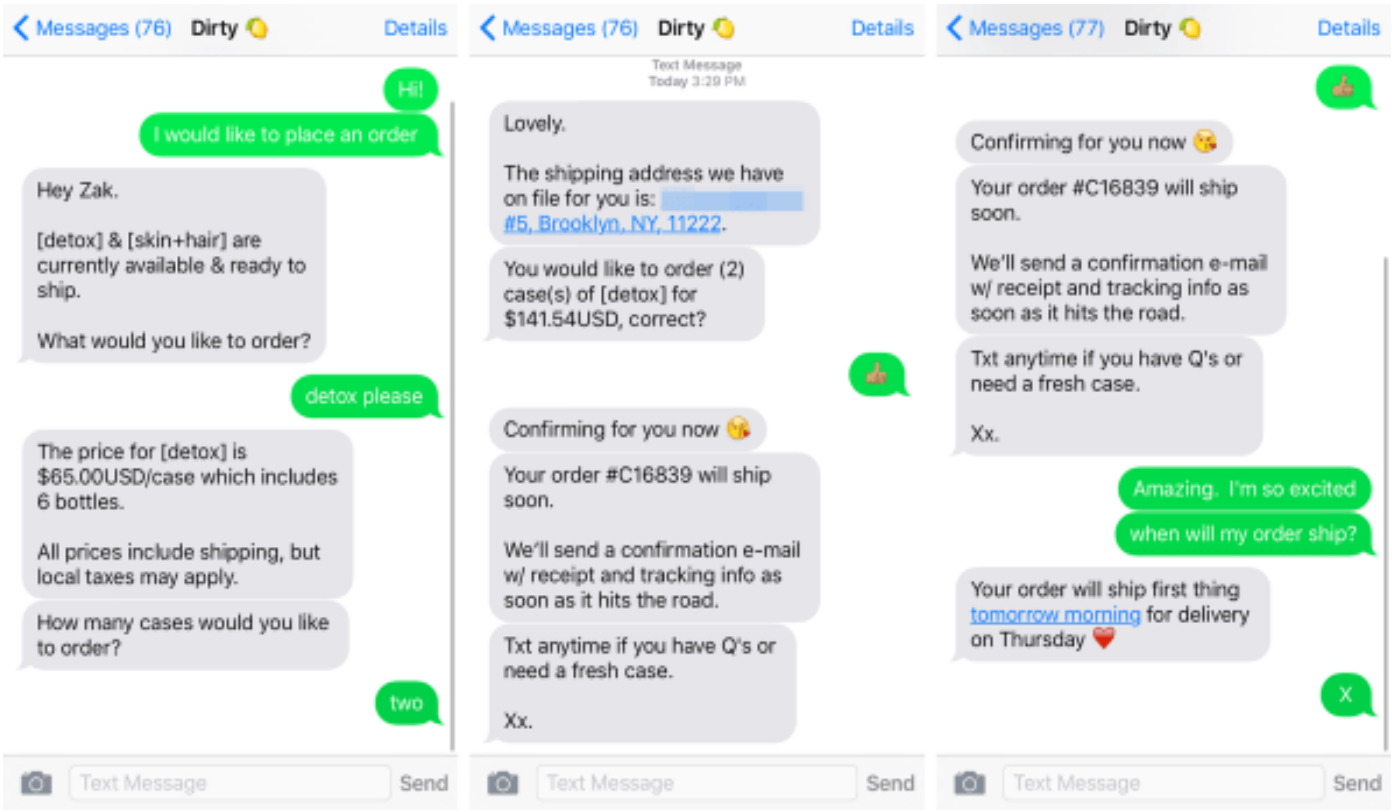
With consumers increasingly glued to their phones, consumer companies are finding new ways to engage with them in a more personalized manner, specifically via text. Consumers are 5x more likely to read and respond to text messages than emails, even when emails take a mass personalized approach by including consumers' names. Silicon Valley start-up Iterable allows companies to engage consumers on a mass scale with hyper-personalized text messages that have been shown to understand a consumer's mood as well as location and product preferences.

More specifically, Iterable enables suppliers and retailers to: 1) automatically determine the best time for customer engagement and conversion gleaned through users' behavioral and event data; 2) identify and designate the specific digital messaging channels users are most likely to engage and convert with; and 3) using real-time interaction data, cap channel-by-channel messaging loads and safely send campaigns without risking channel fatigue. Current Iterable customers include Doordash, Shoprunner, Asics, Zillow, Letote and Imperfect Produce.

***What if** conversations between brands and friends became completely indistinguishable?*

Similar to these aforementioned companies using Iterable, start-up beverage brand Dirty Lemon (which Coca-Cola has been reported by Beverage Business Insights to be seeking a minority equity stake in) has leveraged similar technology to engage customers via text to not only educate on the product but also receive and process personalized orders as well.

Exhibit 12: Startup beverage company Dirty Lemon engages consumers via text message



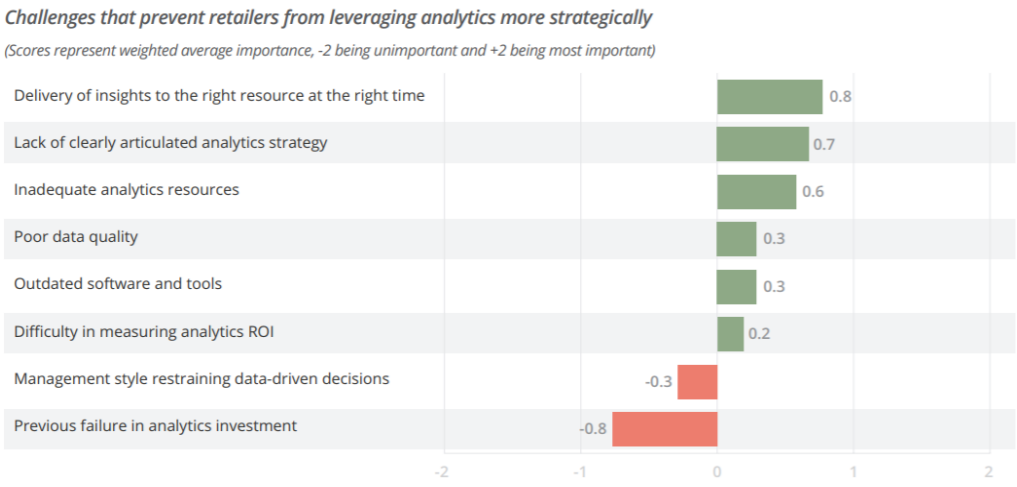
Source: Fast Company

What if *AI and machine-learning techniques become so advanced that data and logic drive every human decision over emotions, and devices help humans decide what they want to do, eat, watch, buy, wear, and even feel? Will it decrease humans' ability to think independently? Will humans become machine-dependent for life? Similar to how we rely on GPS to get us from Point A to Point B.*

2) Shifting Balance of Power between Manufacturer and Retailer

Currently, we believe the branded vendors have a slight advantage when it comes to data and insight relative to their traditional retail partners. We believe this slight edge is mainly a function of historical investments made into consumer insights/analytics capabilities. With margins generally lower than for branded manufacturers, we believe retailers "outsourced" consumer/category insights to the brand vendors. Category captains emerged and became de-facto shelf-space advisors. In addition, we believe retailers have opted to invest in data that focused on merchandising, supply chain, inventories and store operations versus understanding their consumers better or marketing.

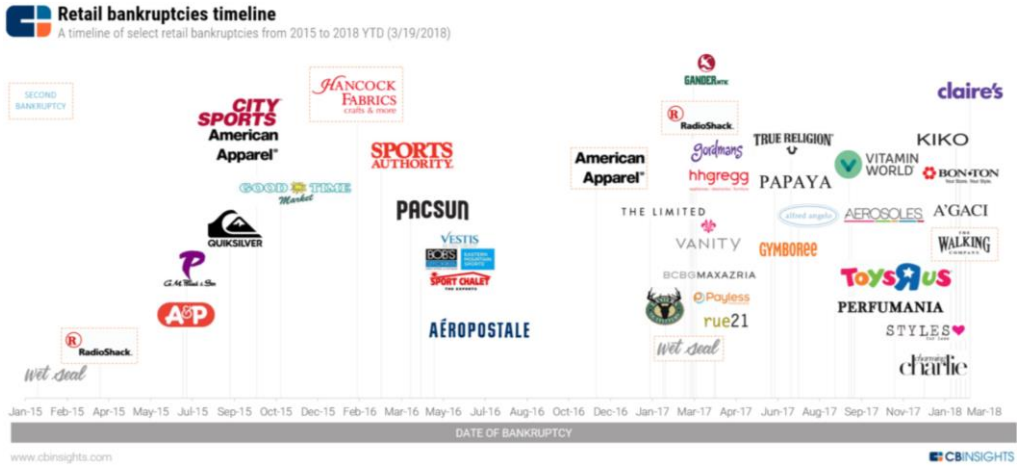
Exhibit 13: Challenges that prevent retailers from leveraging analytics more strategically



Source: SAS

Despite the challenges, more and more retailers have realized the need to invest in big data and remain connected to their consumers in the ever-changing retail landscape, and to avoid going bankrupt. As they saw more peers going down due to the disruption brought in by e-commerce, retailers started to talk more extensively about investing in AI-related strategies. Starting in 2017, the number of retail bankruptcies suddenly increased, and the surviving players (Walmart, Macy's, etc.) have been talking about investing in artificial intelligence, machine learning and other analytics strategies in their earnings calls since 2H17.

Exhibit 14: Retail bankruptcies timeline from 2015 to 2018



Source: cbinsights.com

Exhibit 15: More retailers started to discuss AI investment in earnings calls since 2H17

Source: cbinsights.com

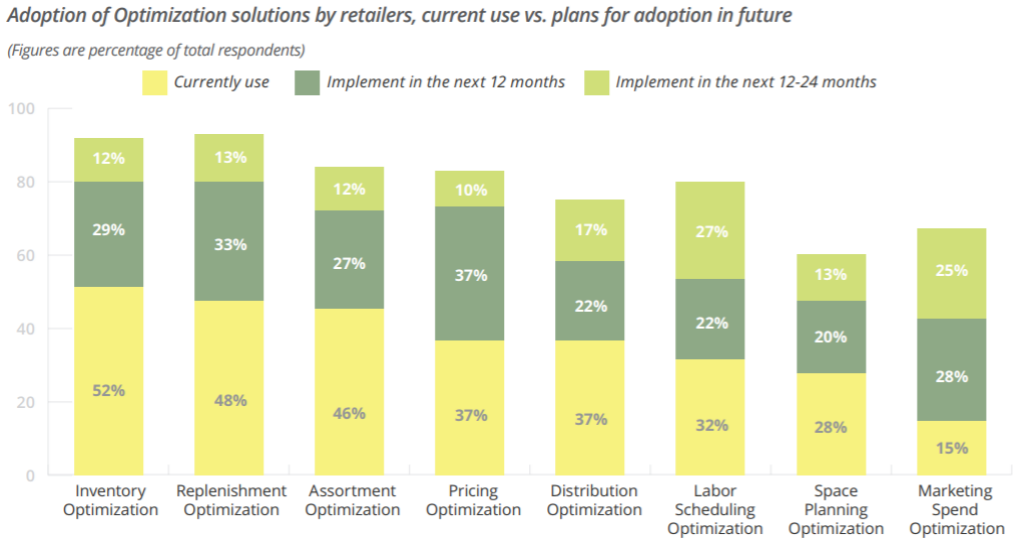
However, we believe the ubiquity of "big data" and the emergence of e-commerce platforms are starting to shift the balance of power between the vendor and the retailer. Are category captains providing retailers with the right advice to maximize sales in the category?

Although retailers' utilization of data analytics is currently more focused on supply chain and operations, if we look at plans for the next 12 months-plus, most retailers are expecting to see more analytics resources allocated to marketing.

Research conducted by smartdatacollective also shows that, despite most retailers planning to focus their Big Data initiatives on improving merchandising (62%), they also understand that improvements in this area are not as easily achievable as improvements in marketing or e-commerce, and see more value in omnichannel marketing enabled by data analytics. As a result, marketing is the top area in which retailers expect to deploy their first Big Data projects, while only 20.4% of retailers expect to deploy their first Big Data projects in merchandising.

What if *online retail personalization gets so accurate that consumers will simply receive weekly or biweekly shipments from Amazon with all of their grocery and consumer-packaged goods needs?*

Exhibit 16: Adoption of Optimization solutions by retailers



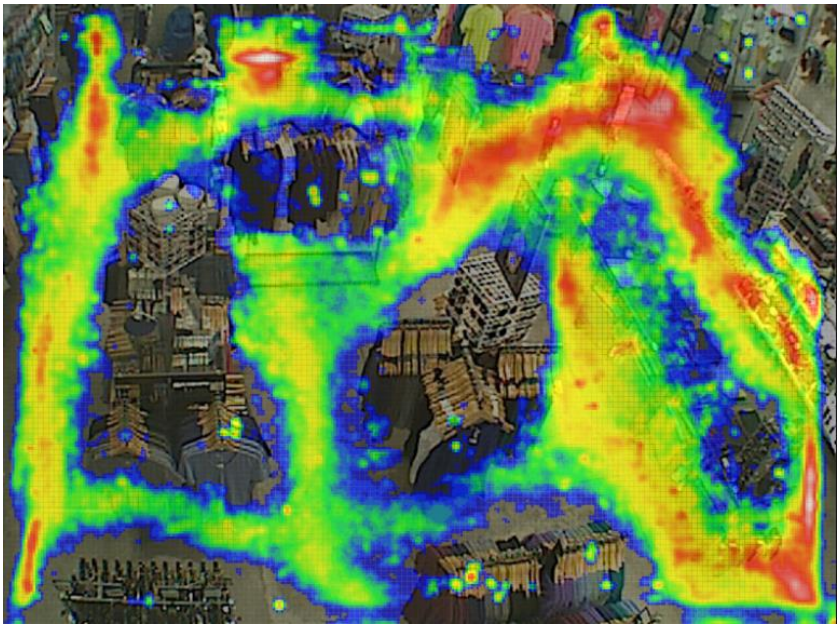
Source: SAS

Exhibit 17: Retailers' goals for using big data

Source: smartdatacollect

Retailers' increasing investments in market analytics not only bring "in-house" the consumer analytics work they previously "outsourced" to manufacturers of brands, but will also take a step further to acquire information that was previously not available to consumer packaged goods (CPG) companies. For example, with the help of big data, retailers can analyze customer traffic flow within the store, thereby improving store layout and shelf space allocation, instead of relying on manufacturer brands to "manage" the shelf. Moreover, retailers can enable instant coupons based on the location of the customer in store and their online shopping and browsing history, which is not an option for CPG players. With more and more information collected at retailer.com, it is inevitable that retailers will eventually hold distinct if not more consumer information than brand leaders within most consumer categories, thus gaining more power in the conversation between the two.

Exhibit 18: In-store shopping analytics



Source: RetailNext

Exhibit 19: Consumer Information Collected via In-store analytics

Advanced retail sensor data will be able to determine unprecedented levels and types of data on customer shopping patterns.

Source: CloudAnalytics

Kroger case study

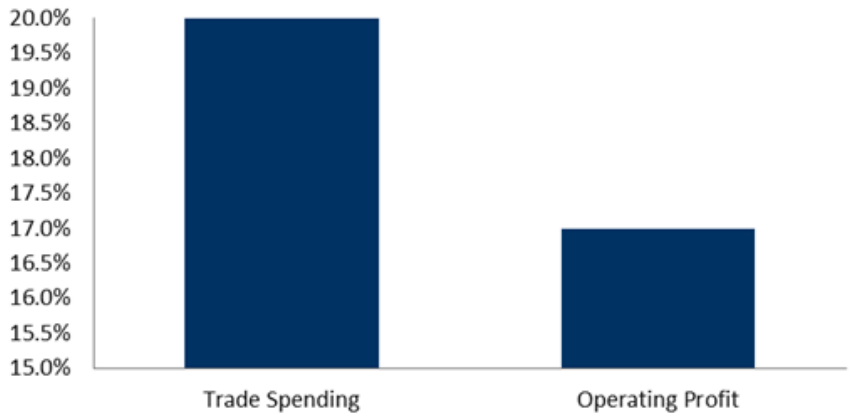
We have already started to see the power shift to retailers. Here, we look at the example of Kroger. Despite being the most frequent shopping activity, food retailing has historically been behind the curve on shopper identification and consumer analytics relative to other industries. Driven by digitalization and urbanization, consumers are increasingly demanding more personalization and convenience in their everyday activities. Here, retailers have an advantage over CPG companies that do not have the consumer transactional insights which can only occur at point-of-sale. To deepen the customer relationships, food retailers need to reshape grocery shopping into a customized rather than commoditized experience. By investing in consumer analytics, food retailers create a personal connection with customers;

more effective marketing (tailor offering/targeted promos) to drive better topline growth; and more negotiation power against suppliers/CPG companies.

Historically, CPG manufacturers have spent significant amounts on trade promotions. Work done by David Palmer, RBC Packaged Food analyst, suggests trade spending as a percentage of revenue (~20%) is greater than the food companies' EBIT margins (~16.5%).

Exhibit 20: Estimated US trade spending versus average US food EBIT margin

Today's levels of in-store trade promotion spending dwarf the average food company's 17% profit margins.



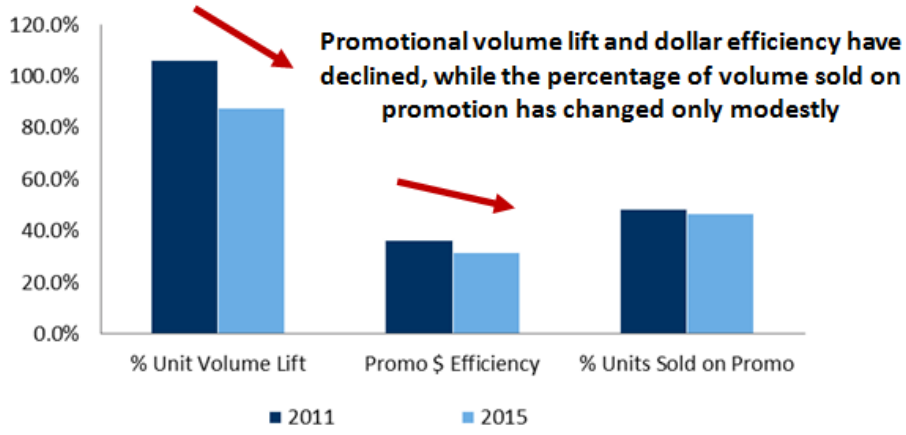
Source: Company reports and RBC Capital Markets

Led by Kraft Heinz, these CPG companies appear to be getting more serious about managing this spend. While there is a common fear that retailers, which capture margin on this activity, will lose a significant portion of their profit, we believe this is misplaced. We think it is more likely CPG companies will try to be more efficient with the spend rather than outright cut it ('prisoner's dilemma' and need physical retailers to stay in business to sell their stuff).

As seen below, promotional activity does not appear to have the efficiency it once did, increasing CPG's need to find the best retailers.

Exhibit 21: Trade promotion effectiveness and efficiency (2011 versus 2015)

From 2011 to 2015, promotional spending effectiveness and efficiency have declined.



Source: Nielsen XAOC+C

Further, CPG companies' biggest concern with promo spend is the retailer's ability to execute and adhere to the plan.

Exhibit 22: Responses to CGT survey question: What are the greatest trade-related challenges when working with retailers?

Three out of four trade promotion practitioners rank predicting and improving promotion effectiveness as their greatest business challenges.

Source: Consumer Goods Technology Trade Promotion Management (TPM) Survey, October 2013

When thinking about the implications of trade spend practices, it is useful to consider them on a relative basis. If the CPG companies are getting smarter and trying to be more efficient with their promotional spending, they would likely want to partner with the most sophisticated retailers. We believe Kroger would be the ideal partner with its robust loyalty program/data analytics and receive more absolute promo dollars. If CPG companies tried to outright cut spending, Kroger would still benefit on a relative basis. Thanks to its strong private-label program, a cut in promo dollars at Kroger would incentivize a shift toward Kroger private label and away from branded CPG. If CPG companies cut spend, they would cut more promo dollars from other retailers (with weaker private label) than they would from Kroger (relative advantage).

Thirteen years ago, starting with the Dunnhumby JV creation, Kroger emerged as a leader in data capture and, more importantly, analytics around the data. Therefore, if you are a big CPG company and you want to do more targeted promotions, Kroger has some of the best-targeted data. Its loyalty card program is very robust and has the ability to tie individual people to individual products at individual times. The company knows exactly who is in its store, why and when.

Kroger also launched a Restock Kroger initiative at its analyst day in October 2017, and part of it is in-store space optimization based on consumer analytics findings from its 84.51 team (Kroger's in-house analytics team). The analytics are store specific based on customers shopping behaviors, so each store is unique. After the launch, Kroger management mentioned that while it does take into consideration profitability, vendor allowances would no longer affect space optimization. Shelf-space allocation is now entirely based on 84.51 insights. This consumer data also becomes a powerful negotiating tool with Kroger's suppliers as well.

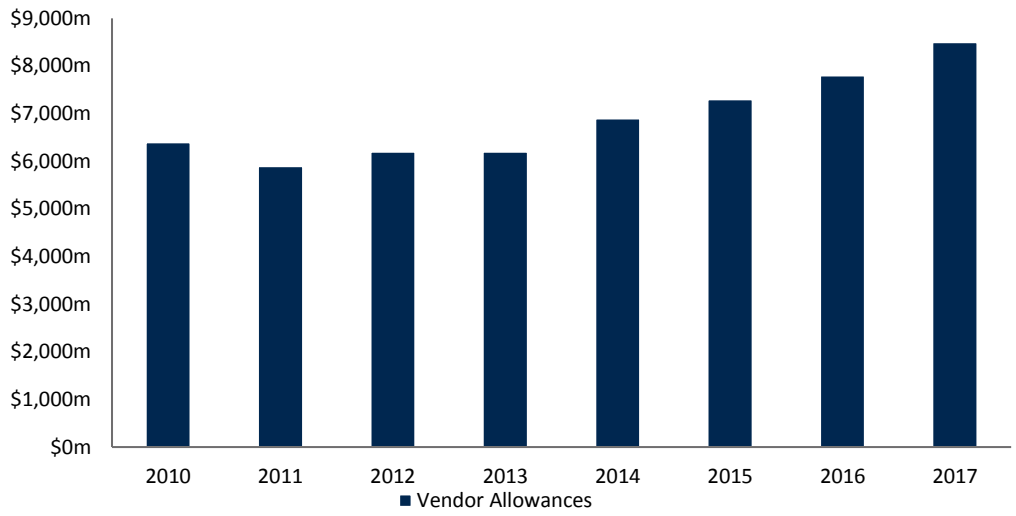
Exhibit 23: Kroger talking in "traditional CPG terms" about relevancy

Source: Kroger

As a result, Kroger's vendor allowances have been increasing steadily over the past five years, suggesting it is a powerful promotion partner, and CPG companies continue to allocate more trade spend dollar to them.

Exhibit 24: Kroger's vendor allowances

Vendor allowances to Kroger have been increasing over the past several years.



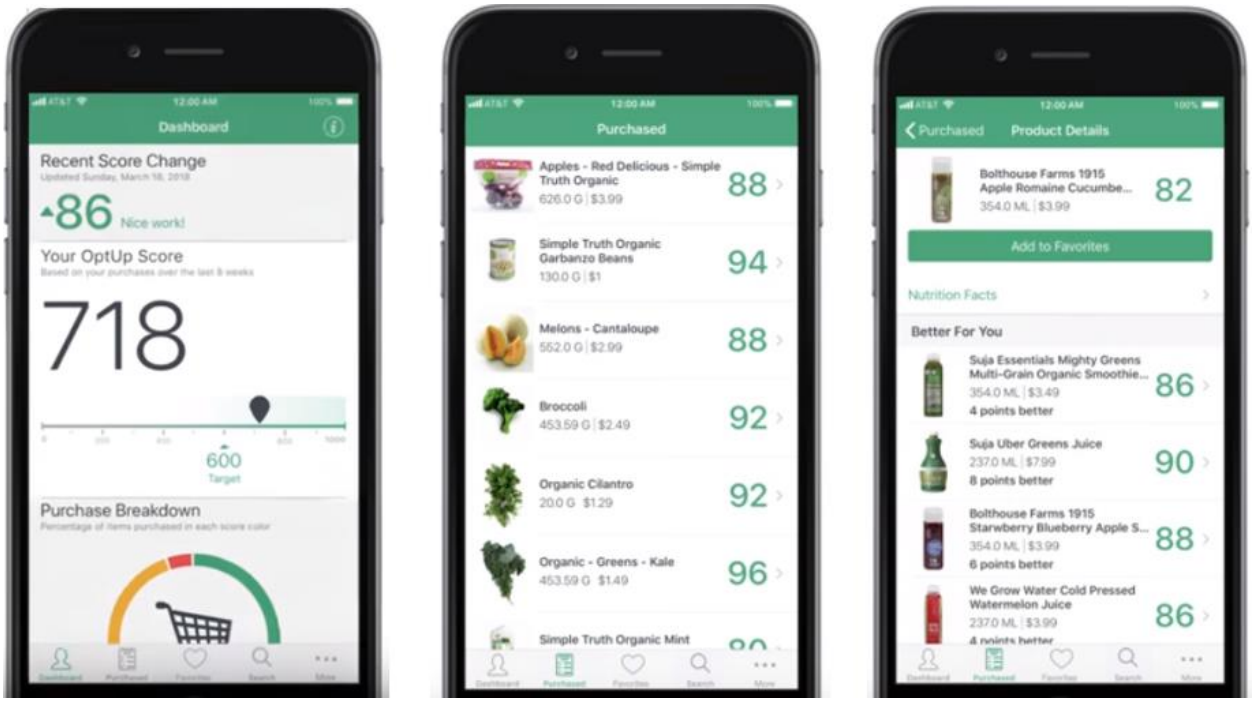
Source: Company reports

A word on Kroger OptUp

Kroger is collaborating with healthcare companies and has recently introduced the OptUp app, bringing personalized wellness to customers. Kroger's team of nutrition experts partnered with healthcare companies to analyze/determine diet-related illness and developed a standardized nutrition-ranking system based on a "nationally recognized nutrient profiling system." OptUp scores grocery items (on a scale of 1-100) based on their nutrition values and categorizes them into high (green), medium (yellow), and low scores (red).

However, the true differentiation is that OptUp is integrated with Kroger's existing customer database of two decades of data. While requiring no proactive user input (receipts automatically collected) for Kroger Plus loyalty members, it helps customers visualize their eating habits and make better food choices by suggesting healthier alternatives. Users can track their "health" scores with real-time updates after each completed purchase.

Exhibit 25: Kroger OptUp app



Source: Kroger and YouTube

Death of the Loyalty Card?

As this mass of disparate data continued to accumulate, we reached a tipping point in early 2016, as retailers began to share their anonymous loyalty card data with huge data aggregators such as Experian and Acxiom. This is important on several levels. First, this is incredibly granular data and a lot of it. Second, it is household address-specific, thereby enabling links to all the other household addressable data. Third, once one retailer shares its data anonymously, others will inevitably follow, creating a mass of >80 million households' worth of data by early 2018.

In fact, data scientists do not need to see 80 million households' worth of data to predict and project behavior accurately. The 40 million households or so currently available are more than enough to predict behavior, down to the level of categories, brands and items, to remarkable levels of statistical confidence. Whatever that level is today (>80%) it will be in the mid-90s in 2019.

The era of data siloed by individual retailer/provider is over

Exhibit 26: Historical Loyalty Cards Have Been Too Fragmented

Source: Oracle

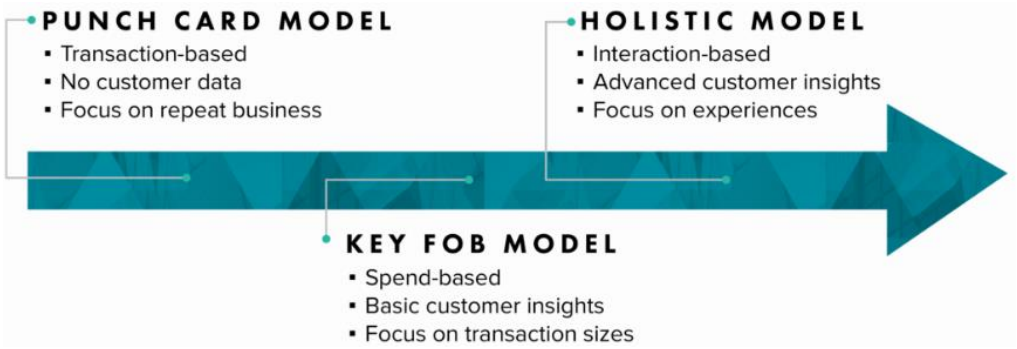
Consumers do not want/need 20 different loyalty card programs. Ecosystems that capture multiple styles of data (purchase history across channels, health/wellness, and location patterns) will have an advantage.

The loyalty program is not a novel idea, customer reward programs were offered by American retailers in the late 18th century. Card-based retailer loyalty programs gained popularity in the 1990s and continue to be a way for retailers to collect customer data today. However, while the program membership base is broad, the engagement level is far lower. According to McKinsey, US households are active in less than half of the loyalty programs to which they belong. Further, McKinsey found that less than 20% of loyalty cardholders believe loyalty programs influence their purchasing decisions. Most of the traditional loyalty programs are based on transactional rewards and provide limited customer insights, and 77% of these types of program fail within two years. The lack of reward relevance and difficulty of use are the culprits for low engagement levels.

With the growth of smartphones and digital apps, most physical cards have now been digitalized and are linked to more personal data (phone number, email, social media account, etc.). The increase in interconnectedness enables companies to take a more holistic approach, create complete customer profiles, which in turn allows them to study their customer base, understand shopping behavior and anticipate needs. Mass marketing is no longer enough, customers today demand personalization and on multiple-user interface platforms. Further, the capability has to expand beyond just a specific aspect of customers' needs (grocery, apparel, personal care, etc.). Folks who can capture multiple styles of data or partner with broadening data providers will win by creating an ecosystem around consumers and becoming an integral part of their lives.

Loyalty programs have to take a more holistic approach to succeed in the future.

Exhibit 27: Evolution of loyalty program models



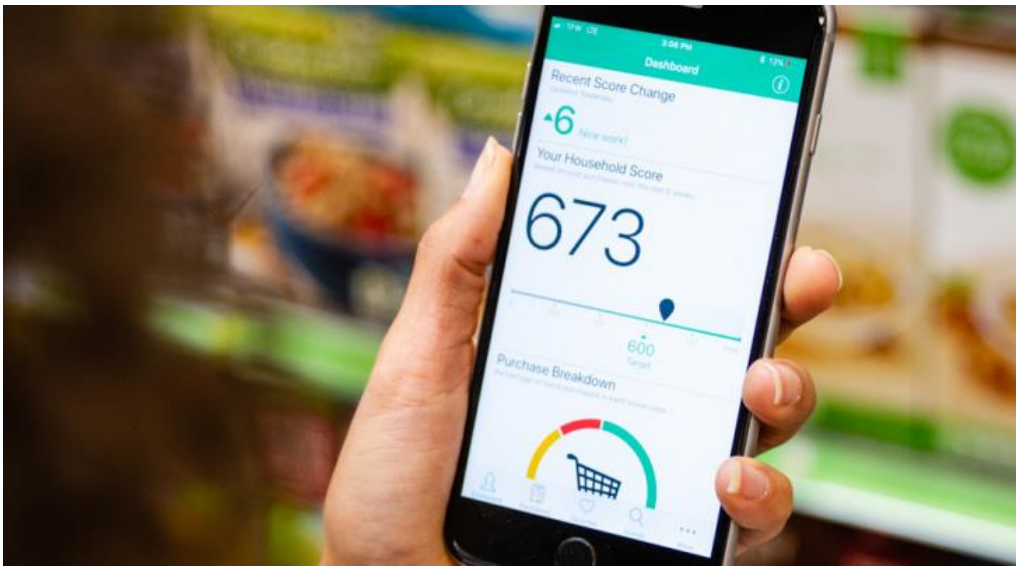
Source: Clarkston Consulting Insights

Amazon has many different styles of purchase data. Retailers have specifically one form of data (in our case grocery purchases). Therefore, it takes partnering with other people to build an ecosystem of data that can compete with Amazon.

While Kroger has more limited data than Apple/Google/Amazon/Facebook, it captures 3bn transactions a year in the largest consumer category (Food is large and high frequency). This extreme specialization in data makes it an ideal partner for rounding out an understanding of how a consumer operates. Kroger, through partnerships with Walgreen's and its OptUp app, is increasing its knowledge of customer health and wellness. This complements its knowledge of customers' dietary habits and allows it to offer personalized, useful loyalty card promotions and perks.

Exhibit 28: Kroger phone app engages customers

Loyalty programs have to take a more holistic approach to succeed in the future.



Source: Kroger.com

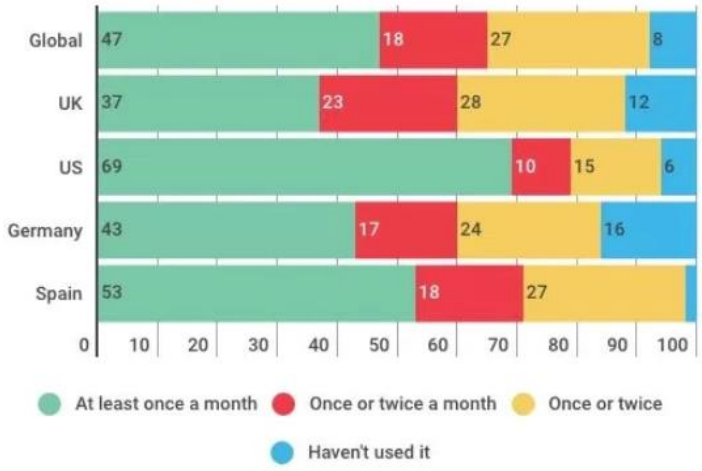
The old, repetitive rewards loyalty program is dead. Companies still need a way to identify and contact customers, but those with the most complete ecosystem of data will be able to communicate with customers in the most effective ways. In this way, early movers/data owners will be at a significant advantage to those who cannot develop a walled garden.

3) The Power of Voice

AI-powered Voice Recognition will likely improve dramatically from current levels allowing even better use of Internet apps via voice commands. Search functionality will skew much more heavily towards voice commands than to keypad/phone pad prompts.

A Mindshare report estimates that 600 million people use voice-activated assistants at least once a week globally, whether that is through Echo and Google Home devices or on smartphones. However, problems still exist with rudimentary tech failing to understand accents and dialects, context and complex sentences. According to the Mindshare report, which asked smartphone owners globally how often they use voice assistants, those using voice once a week typically are young (38% ages 18-34) and male (58%). From a global perspective, 69% of US owners claim to use the service at least once a month compared to 47% globally.

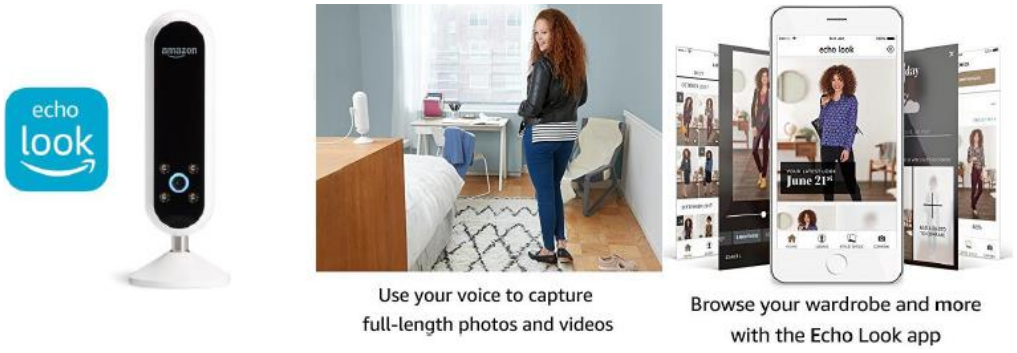
Exhibit 29: Voice Tech Usage (%)



Source: Digiday, Kantar, Sonar

A report in the UK from Accenture found that 60% of people want to use Echo in their shopping experience, and 7% already do so. Amazon continues to add new features to its assistants including taking pictures of you and helping you browse your wardrobe. Coincidentally, Amazon Prime Wardrobe was announced several weeks after echo Look was released.

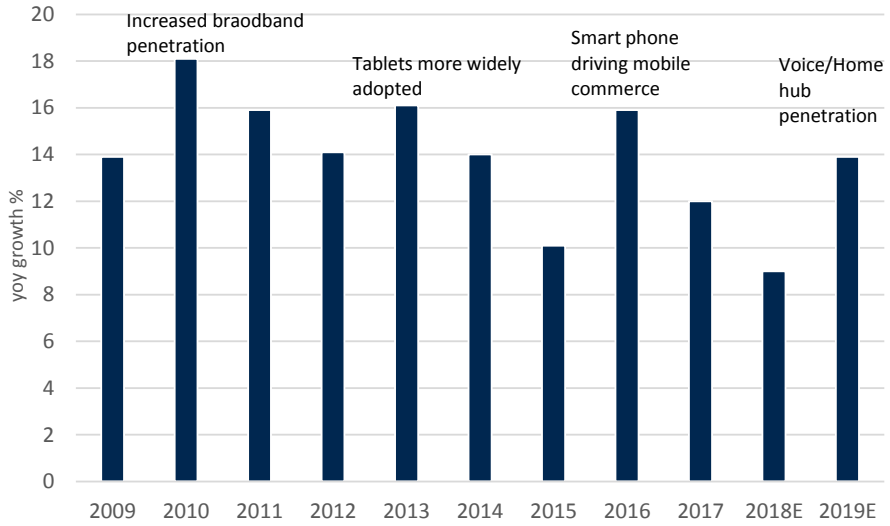
Exhibit 30: Alexa in your closet



Source: Amazon Company website

AI has also helped to create new communication channels, such as voice-enabled assistants like Apple's Siri and Amazon's Alexa. This helps people to buy simple everyday items through voice activation, as the AI involved simply needs to find out the required information, and send reminders that will trigger purchases.

Exhibit 31: Voice to be the next driver of online sales



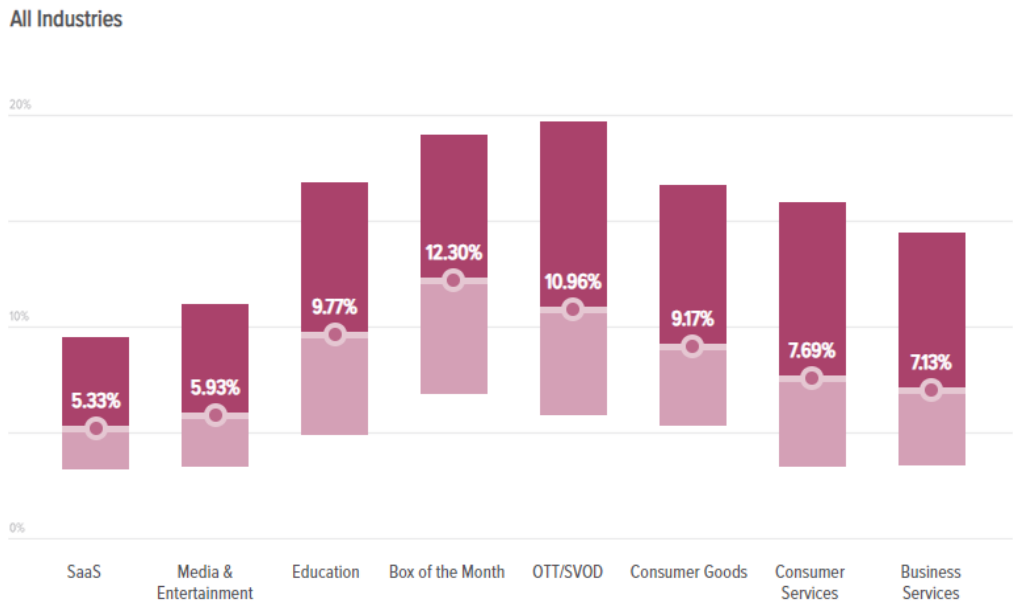
Source: RBC Capital markets, IMG Capgemini

Alexa's potential to disrupt commerce is discussed with a mix of fear and trepidation, but little evidence for this exists to date. There is ample opportunity for growth in e-commerce: Mindshare's report found that finding information on products that users are interested in was the No. 2 most common task voice assistants handled for users.

What could the introduction of Alexa-enabled ordering at Whole Foods mean for grocery shoppers?

It has been 18 months since Amazon acquired Whole Foods, and almost exactly one year after the acquisition, the company introduced voice-enabled ordering from Whole Foods locations in 24 U.S markets through its Echo smart speakers. Customers can now add items to a Whole Foods cart using their Prime Now account, which ensures two-hour, same-day delivery. For example, a customer will now be able to say, "Add steak to my Whole Foods cart" and Alexa will add the item to the customer's order (VentureBeat, 2018). In the case that you tell Alexa to add a generic item (like steak or milk) to your cart, Alexa will choose a type of steak or milk based on order history and purchasing behavior of other customers.

Exhibit 32: Churn rates for consumer goods subscriptions are overall very low and towards the average churn rate when compared across industries



Source: Amazon Company website

This new method of shopping with Alexa comes as the e-commerce giant continues to battle other retailers (and e-tailers) that are also introducing "smart-ordering" or voice-enabled ordering (ex. Google Home partnering with Walmart to offer voice shopping). In our view, the introduction of voice-enabled shopping for consumers will only continue to drive additional sales online and, in particular, in consumer segments more typically thought of as defensible from the threat of e-commerce (i.e. grocery).

Exhibit 33: Amazon Echo and Echo Dot on sale at Whole Foods

Source: VentureBeat, RBC Capital Markets

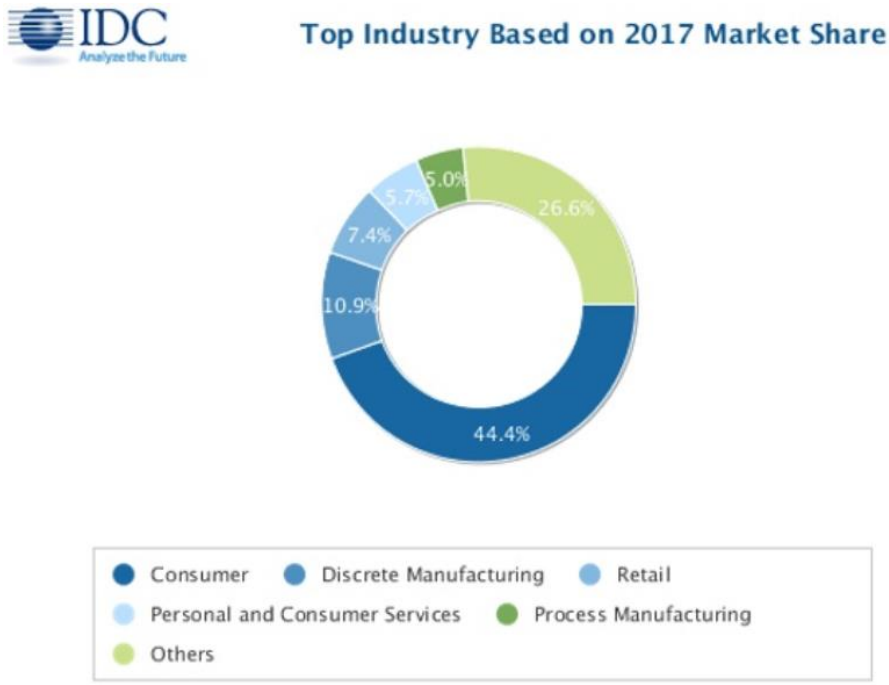
4) VR/AR Go Mainstream

Virtual Reality and Augmented Reality, powered by AI, will likely become much more mainstream over the coming years. This could change the face of advertising and could make experiential selling that much more important. We could foresee a world where Friday Night Streaming is replaced by Friday Night VR.

Consumer and retail have always been at the center of VR/AR application

IDC estimates that Consumer, Discrete Manufacturing, Retail and Personal, and Consumer Services together account for 68% of the VR/AR spending in 2017. According to Affinity VR, by 2025 the VR/AR market is estimated to grow to $674 B, with most of the applications related to consumer-facing activities (Service, Advertisement, Game, etc.). IDC further estimates that retail will be the top one industry for AR/VR spending in 2020, with a five-year CAGR of 239%.

Exhibit 34: Top industries in AR/VR spending



Source: IDC

Exhibit 35: VR/AR Market Segments

Source: Affinity VR

VR/AR application in retail

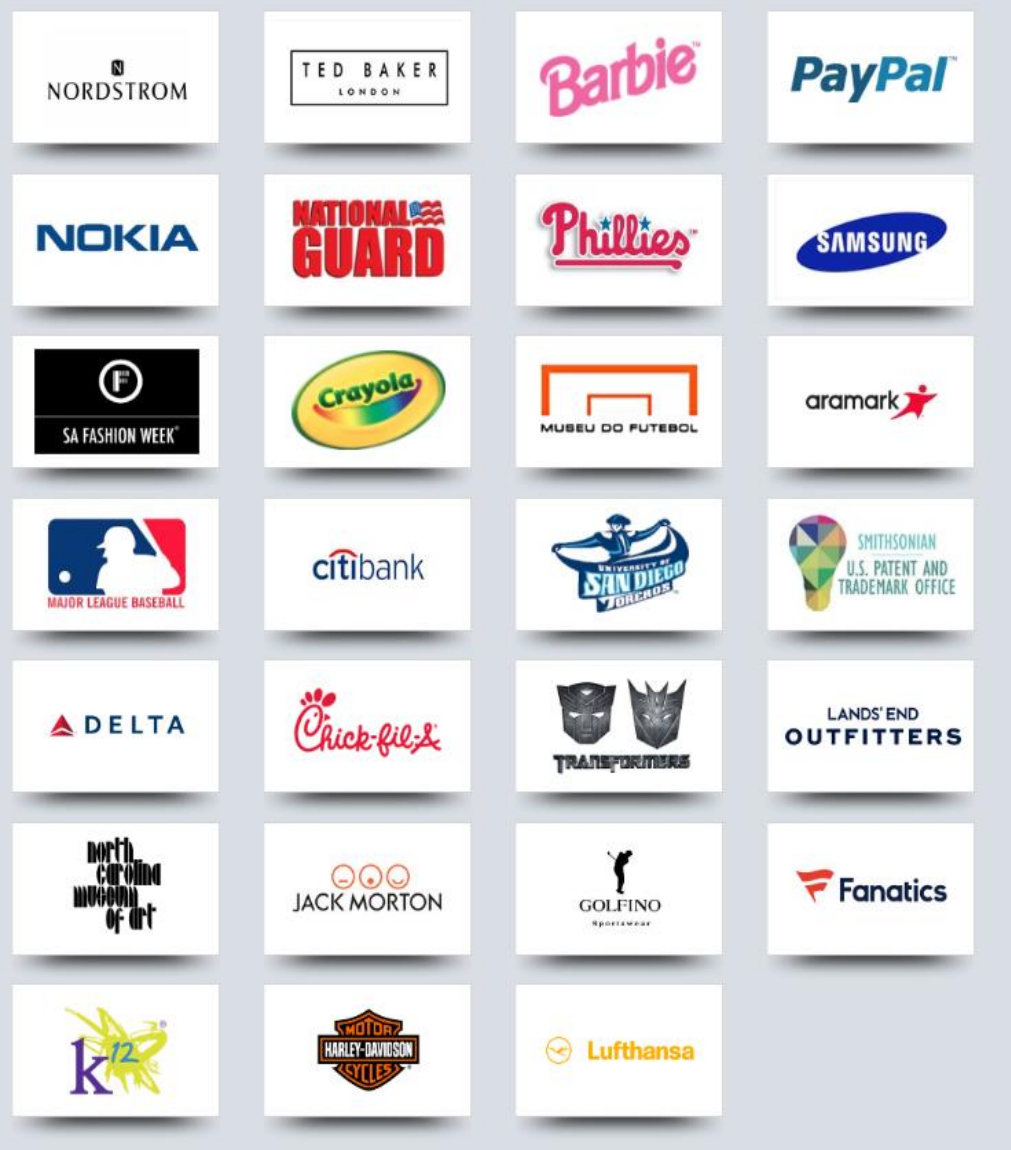
Visual Dressing Room: Using a regular web camera at home, consumers are able to try on clothes virtually at home, and share the look on social networks with their friends and families. Zugara is a start-up developing the under-pinning virtual dressing room technology that is not only available to consumers at home but also in-store and at kiosks, offering a seamless multi-channel experiences. To achieve this, the company leverages a combination of gesture and facial recognition, motion capture, video conferencing and motion capture

technology. In addition to software, to complete the process hardware is also required including a 2-D or 3-D camera such as the Kinect. Brands that are already using the visual dressing room technology to engage with customers include Nordstrom, Ted Baker, Barbie, and Golfino.

Exhibit 36: Nordstrom's visual dressing room

Source: Zugara

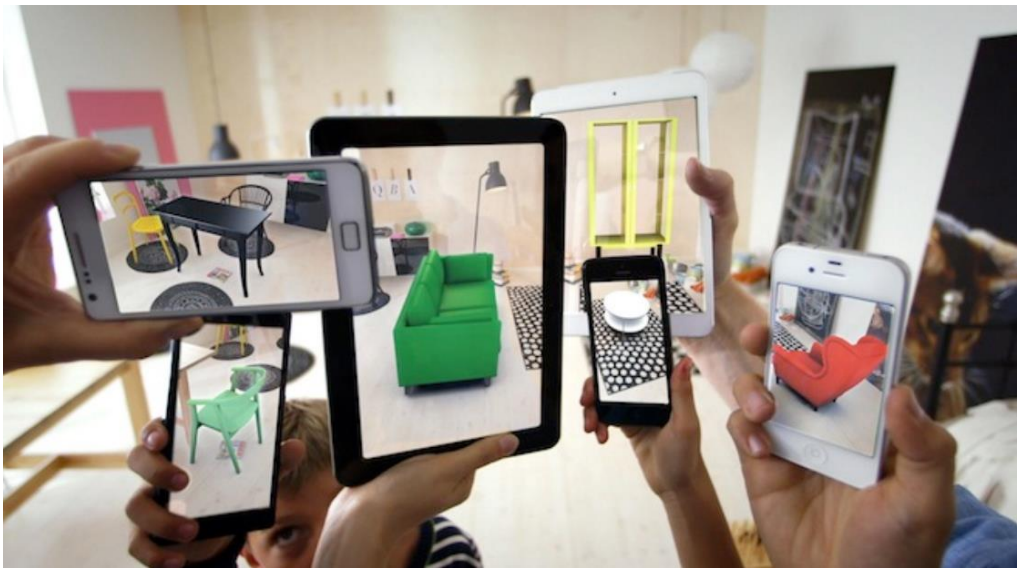
Exhibit 37: Brands and retailers that have used Zugara's virtual dressing room products



Source: Zugara

Virtual furniture displays: Launched in the autumn of 2017, the IKEA Place app lets customers see exactly how more than 2,000 furniture items would look—and fit—in their homes. Pottery Barn's 3D Room View app also allows customers to stage new furniture at home. Other companies like Wayfair, Target and Amazon are also offering AR furniture shopping features on their websites and apps. According to IBISWorld, 15% of the $70 billion US furniture market has moved online in 2017. With the pressures of inventory management and availability of AR technology, we expect to see more online sales of furniture happening seamlessly.

Exhibit 38: Shopping for Ikea furniture via AR



Source: Ikea

Another example is Inditex, which is often thought of as a pioneer in the world of retailing, as it is using augmented reality (AR) to transform its consumers' shopping experience.

Zara AR was developed by a Paris-based creative director Ezra Petronio, of Self-Service magazine, and a French company, Holooh, along with the French National Institute for computer science and applied mathematics. The team that developed the Zara AR app made 12 dynamic sequences, which were captured as holograms in a 170m^2 studio, using 68 cameras.

As part of a pilot project for a limited time only, this made-to-measure AR app was available on mobile devices via the Zara AR app, which can be downloaded through Zara's in-store Wi-Fi network, QR code, via iTunes and Google play or through the link on zara.com or the app store.

Inditex trialed these 12 dynamic AR sequences in 120 Zara-branded stores worldwide. Shoppers were able to enjoy a unique shopping experience that only became available with the addition of augmented reality technology. The AR activation plays out at three different sites, store windows, centrally located podiums, and on top of the home-delivery e-commerce boxes.

When phones are placed at the graphic signage, models Léa Julian and Fran Summers seemingly come to life for 7 to 12 seconds on consumers' mobile screen displays. The holograms are incredibly realistic as the 'models' pose, move around and even speak while dressed in the SS18 Zara Studio Collection.

Exhibit 39: Zara AR app

Source: YouTube Zara AR app by Holooh, RBC Capital markets

Above all, all of the looks showcased can be instantly purchased through a single touch on the Zara AR app "shop the look here", as well as in store. In addition to the shopping feature, a social-media-sharing feature allows customers to take and send photos alongside the holograms, establishing an incredibly real virtual connection, which in turn drives Zara brand engagement and ultimately product purchases.

This is not the first time that Inditex has tried to use advanced technology to deliver personalized products and services. This initiative is part of a wider digital drive, which saw Zara pilot an upgraded multi-channel shopping experience in its London Westfield store in January. See below for Zara Westfield store's self-checkout counters. Increasingly, Zara is using robots in its logistics chains. In our view, 3D imaging and data are also likely to be used more frequently by manufacturers.

Exhibit 40: Zara store photo

Source: Zara store, RBC Capital markets

VR/AR application in restaurants

In 2016, Pokémon Go, a mobile-augmented reality game, quickly became the hottest topic of the year. In less than a week, the game had reached to the top of the IOS and Android app stores. It is estimated that the app was being played about 43 minutes a day, longer than WhatsApp or Instagram. The high engagement has prompted consumer-facing companies to utilize the augmented reality technology behind it. Hungry Jack's, a fast-food franchise of Burger King Corporation in Australia, released a mobile augmented reality game and challenged its customers to "Protect Your Whopper". By combining virtual objects that can be interacted with in the restaurant environment, customers could venture inside the store and the nearby streets, and win a prize with the high scores.

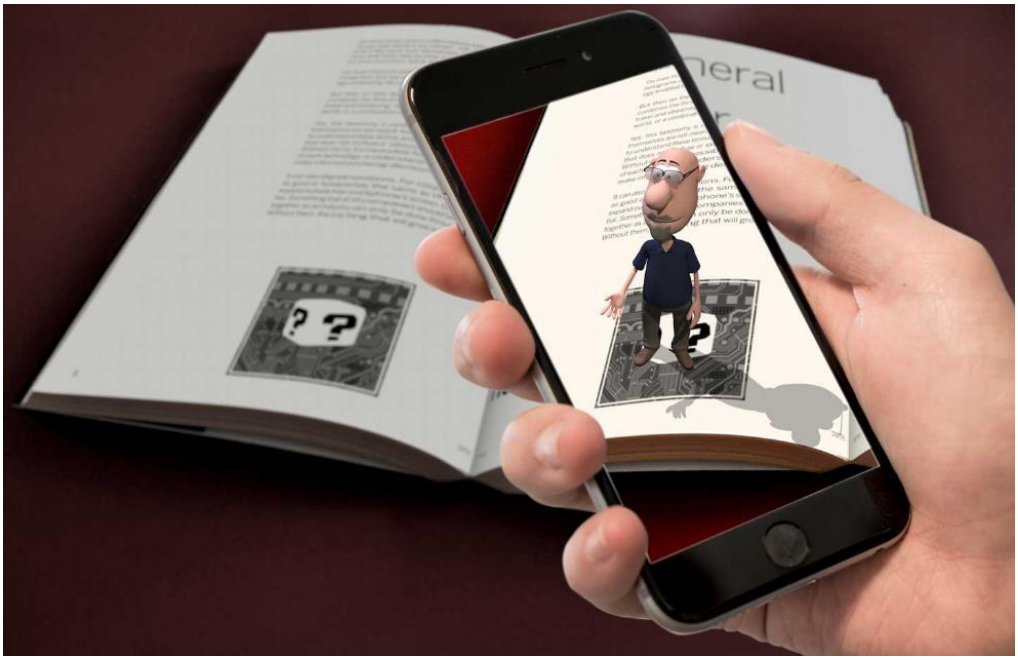
Exhibit 41: Hungry Jack's "Protect Your Whopper" Augmented Reality Game

Source: Zugara

VR/AR application in reading/education

Charlie Fink, who covers VR & AR for Forbes, created a book called "Charlie Fink's Metaverse—An AR Enabled Guide to AR & VR". Selling at $49.99 on Amazon, the book features original character animation through an app called "Fink Metaverse". This is not the first time AR technology was used in books. In fact, many children's books and classrooms are already adopting the technology to educate and engage students, bringing books to live.

Exhibit 42: The book "Charlie Fink's Metaverse—An AR Enabled Guide to AR & VR"



Source: finkmetaverse.com

Exhibit 43: Augmented Reality in education

Source: Emerging EdTech

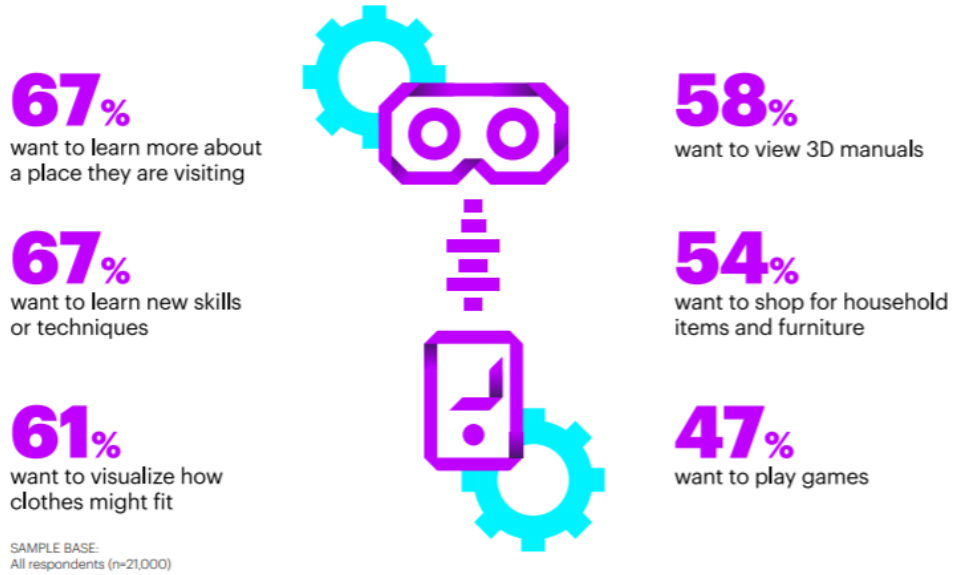
Consumer willingness and technology development will continue to drive the future of VR/AR

The future of VR/AR application does not just stop at trying on things and having fun. According to a consumer survey of 21,000 respondents by Accenture in 2018, the majority of the consumer base is more interested in practical, daily-life VR/AR applications than just playing games. The willingness to replace smartphones with a wearable solution (55% consumers) also laid solid ground for VR/AR functionality. In addition, Deloitte forecasts that the quantity of premium AR devices will swell and lower barriers to entry should increase the supply of apps that feature AR. The adoption of the technology will be driven by a combination of hardware and software upgrades, including the incorporation of AR functionality into operating systems. As AR/VR becomes ubiquitous, it is key for retailers and CPG companies to differentiate their experience in order to better engage customers.

What if *advancements in VR and AR offer a very real, 3D virtual experience for any place in the world? Would the demand for travel grow as users are inspired to visit those places or be curbed because people feel they have already visited them?*

What if *people become more reclusive because virtual reality gives them one less reason to leave their homes, positively impacting food delivery and negatively impacting the on-premise food and entertainment industries?*

Exhibit 44: Consumers are interested in practical, daily-life VR/AR applications

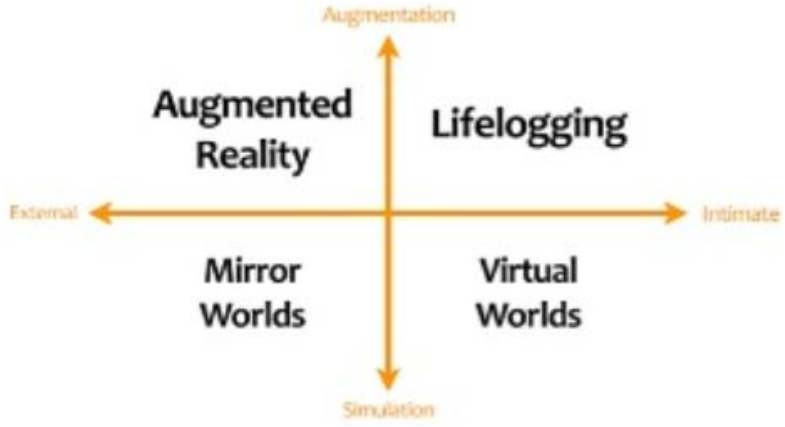


Source: Accenture

The ultimate future—the Metaverse?

According to Wikipedia, the Metaverse is a collective virtual shared space, created by the convergence of virtually enhanced physical reality and physically persistent virtual space, including the sum of all virtual worlds, augmented reality, and the internet. Metaverse was created in Neal Stephenson's 1992 science fiction novel Snow Crash, where humans, as avatars, interact with each other and software agents, in a three-dimensional space that uses the metaphor of the real world. With the fast adoption of VR/AR technology in reality, it may go even beyond mainstream and become the norm for the way we conceive and interact in our everyday lives?

Exhibit 45: The Metaverse Roadmap



Source: KZERO Worldswide

Virtual significant others?

The meta verse is not just something you see in a sci-if movie. It is manifesting itself in real ways today. Japanese company Gatebox has launched a digital girlfriend, a combination of new hardware and AI software to depict a woman that is effective in building an emotional connection with a man. There are more single adult men in Japan than any other country and the digital girlfriend directly addresses the need for companionship. The digital girlfriend greets users and can watch TV alongside of them. Japanese men buy gifts for their digital girlfriends. And looking into the future, it is not hard to foresee a scenario where the AI-powered digital girlfriend makes product recommendations and the human male counterparts purchase those products, less so for the validity of the product recommendation or the product's efficacy, but more so based purely on the emotional connection formed with the digital girlfriend.

Exhibit 46: Gatebox's digital girlfriend in Japan

Source: Gatebox

What if *everything we are surrounded by is made "smart"? Will humans live like "robots" and robots become more humanized? What if robots are made to look and sound like humans—will it become difficult to distinguish between humans and robots? And if it becomes difficult to distinguish between the two, will we have to re-think traditional norms of companionship and commitment?*

Other start-ups driving VR/AR forward include:

1) **NBA League Pass** – We believe virtual reality could revolutionize entertainment from home and the NBA is getting a head start on this with its virtual reality digital league pass offering. NBA fans have the option to subscribe to NBA League Pass or purchase a single game for $6.99, where they will have the option to use their virtual reality headset to watch games live as if they were sitting courtside. This brings an experience that would traditionally costs well over $500 in any city affordably to the homes of NBA fans all over the world. This could also change the way consumer companies advertise around sporting events, limiting the traditional television opportunity and likely evolving to a more targeted approach.
2) **Jaunt VR** – Offers hundreds of 360-degree films, shows, documentaries, tours and concerts on its app, all in virtual reality. As we highlighted in our original Imagine report, travel-related companies might be adversely impacted by developments in virtual reality. We wonder if this emerging technology will also influence travel retail consumption patterns.
3) **Neaurable** – Developed wireless brain-computer interface platform, people can interact with virtual and augmented reality applications with only their brain activity, avoiding lag-prone technologies like eye tracking and voice commands.
4) **Vivid Vision** – Uses virtual reality technology to treat lazy eye. While this example is not entirely consumer related, it demonstrates how widespread virtual reality's influence is.
5) **VirtualSpeech** – Helps users hone their public speaking skills by simulating a presentation on stage in front of an audience that responds to specific content discussed in the user's presentation. The user also has options to determine the specific room setting and level of distraction that takes place during the presentation.

5) Sensors Everywhere

We see greater proliferation of smart devices and application of Internet of Things (IoT) into household devices. It is likely that all devices could potentially be Internet-connected and with improvement in machine learning and AI technology, smart devices could become "smarter." Some common applications could include the ability for consumers to track energy consumption of home appliances and increasing home security features with improved cameras and alarms. This could evolve to help automatically order groceries based on what is depleted in your smart refrigerator. IoT devices on our person could help us improve our health and suggest OTC vitamins/medicines or certain foods to buy/eat.

What if *virtual reality combines with the industrial Internet of Things (IoT), allowing workers to remotely operate equipment, thereby eliminating the chance of an accident physically harming a human being? Do equipment manufacturers stop placing emphasis on machinery safety and place emphasis solely on a machine's capability?*

Sensors redefining the retail experience

Amazon Go takes sensor technology to an unprecedented level through the use of spatial recognition, unique customer tagging (through the customer's app), and overhead cameras, customers can simply grab the products they want and walk out—both increasing convenience and removing a large labor component from physical retail. These labor savings could provide Amazon with a funding source to add labor/investment to the second disruptive force: **delivery/personalization**.

Exhibit 47: Amazon Go—the future cashier-free store

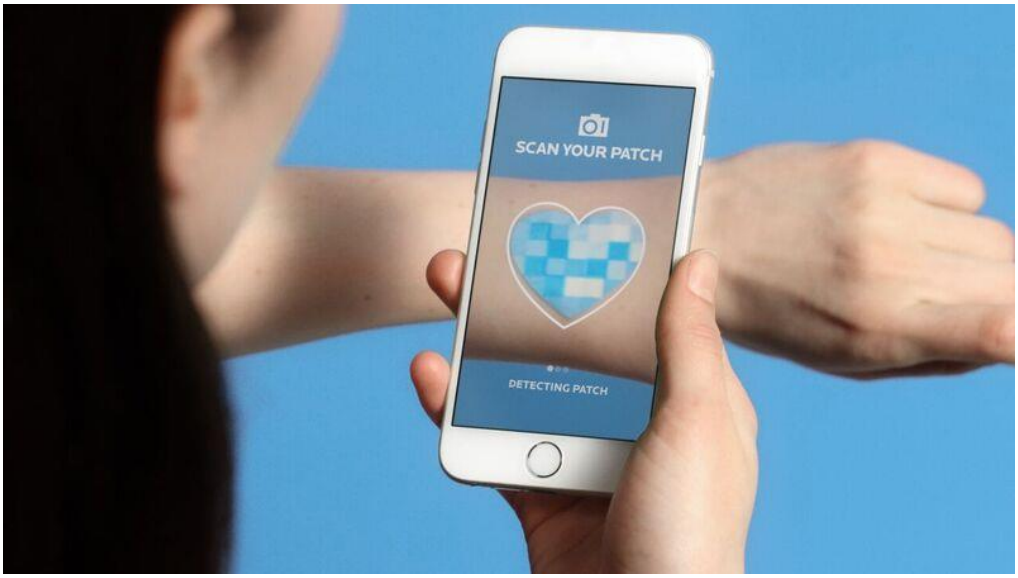
Amazon opened its first Amazon Go store in Seattle in January 2018.

Source: CNN

Bio-Sensors: The Real Game Changer

While sensors around us will continue to proliferate, we believe the real game changer as it relates to consumer companies is the growing trend of sensors on and inside our person. Most of today's products, like an Apple Watch or Fitbit, are descriptive (describing the state of your vitals). Next-generation products, also available today, are prescriptive. An example of this is L'Oréal's La Roche-Posay brand "My UV Patch", a patch that allows users to measure and monitor their sun exposure via an app that tells them whether to stay out of the sun or apply more sunscreen.

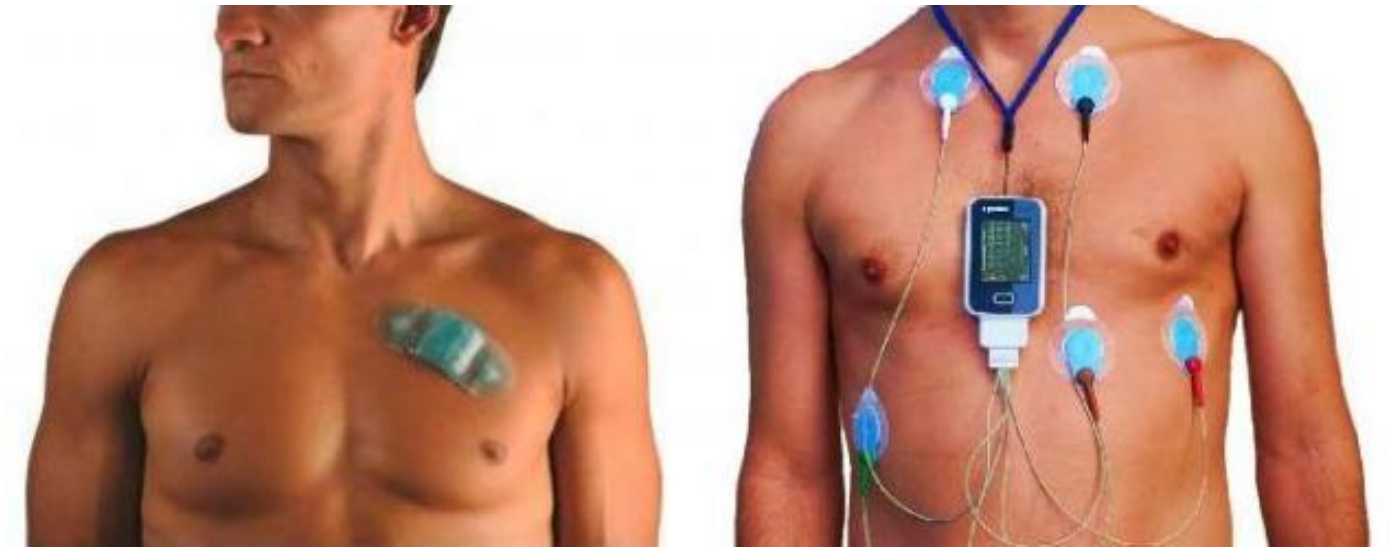
Exhibit 48: L'Oréal's La Roche-Posay "My UV Patch"



Source: NIH, iRhythm Technologies

However, the definition of "descriptive" as we look towards the future is evolving. For instance, iRhythm Technologies (IRTC) is a medical-device company that manufactures heart-monitoring devices to detect cardiac arrhythmias (Zio Service). In addition, Apple recently announced its Apple Heart Study in partnership with Stanford University and BioTelemetry (BEAT). The study is an assessment of whether photoplethysmography (PPG) can accurately identify cardiac arrhythmias. Further, Apple's documentation suggests that the "study is part of the development of a new investigational device and certain Study Data will be used for FDA submission to seek approval of the investigational device," hinting that Apple might seek approval from the FDA to market future wearable devices as a medical device.

Exhibit 49: New heart monitoring (left) vs. traditional heart monitoring



Source: NIH, iRhythm Technologies

Devices will not only evolve as they relate to descriptive capabilities but also become prescriptive.

In the future, devices will not only evolve as they relate to descriptive capabilities but also become prescriptive. One way to think about this is the ability to provide the direct implications of every choice we make and its impact on our lifespan.

What if *consumers could scan and receive a readout on their wrist of the impact that a particular product would have on their life expectancy? Healthy foods like vegetables and clean water would have a positive impact on life expectancy, while other items such as tobacco, alcohol and illicit drugs could have a negative impact. Importantly, lifespan impacts will vary depending on each person's* ***personal*** *state of health. The device would also be able to tell the impact that sleep, exercise and hydration habits are having on lifespan.*

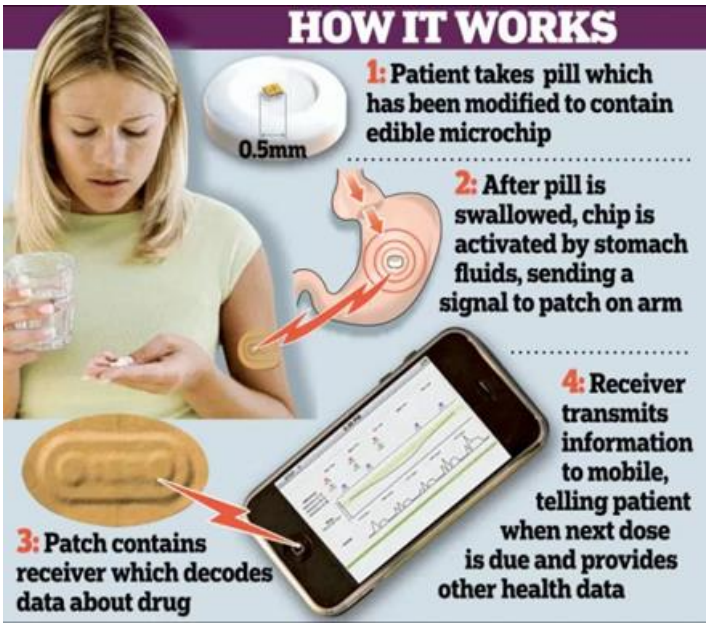
What if *AI and machine-learning techniques become so advanced that data and logic drive every human decision over emotions? Could devices help humans decide what they want to do, eat, watch, buy, wear, and even feel? Will this decrease humans' ability to think independently? Will humans become machine-dependent for life?*

Automatic, personalized healthcare from within?

The miniaturization of technology is structurally altering the face of medicine.

The miniaturization of technology is structurally altering the face of medicine. Performing a one-time self-diagnostic test may be easy and convenient for patients but often compliance with regular medications can be difficult. Solutions for compliance and medication may be on the horizon though. The FDA recently cleared a pill to help individuals understand when they need to take their medication. Otsuka Pharmaceutical Co Ltd.'s Abilify MyCite is the first drug with a digital ingestion tracking system approved in the United States. According to the FDA, the product, which uses digital tracking to record if the medication was taken, has been approved for the treatment of schizophrenia, acute treatment of manic and mixed episodes associated with bipolar disorder, and for use as an add-on treatment for depression in adults. The system sends a message from the pill's sensor to a wearable patch, which then transmits the information to a mobile application, so that patients can track the ingestion of the medication on their smartphone.

Exhibit 50: How Abilify MyCite works



Source: Otsuka Pharmaceutical Company

Another such product could be the creation of the diagnostic tampon. Such a product would capitalize on the menstrual blood and cells shed by the uterine wall each month by women. A quick shipment of the tampon to the diagnostic center could easily, and painlessly, test women for STIs, non-sexual infections, hormone readings, and other health information—all without a trip to the clinic. As this technology develops and refines, researchers would be able to diagnose and identify more conditions that can cause pain, infertility or death, including: endometriosis, uterine fibroids, cervical cancer, and ovarian cancer, which currently has no reliable routine screening and is typically not diagnosed until advanced late stages. Genomic start-up NextGen Jane is currently working on this technology with funding help from next-generation sequencing company Illumina.

What if *we could ingest pills that can release doses of medication based on our bodies' vitals?*

What if *advances in artificial limbs and organs develop a market of consumers proactively looking to replace body parts without injury or issue to enhance performance?*

6) Autonomous Vehicles

There are already enough signals that we expect the technology to advance to make robo-taxis a reality by 2025.

We think autonomous vehicles will be one of the biggest applications of AI. Google most recently disclosed Waymo reached the 10 MM milestone of autonomous vehicle driving. How will autonomous driving impact shopping trips? In many respects, operation of a motor vehicle has been automated for a while (think power steering or cruise control). The world is now in an era when advanced driver-assistance systems (ADAS or active safety) that offer features such as automatic emergency breaking and lane-keep assist are increasing in penetration. But we think of *autonomous driving* more in terms of the SAE definitions of Level 4 (autonomous given certain environments) and Level 5 (autonomous all the time). It is higher compute power and the development of AI through more robust machine learning and deep learning neural networks that enable these higher levels of autonomy. That said, there are already enough signals that we expect the technology to advance to make robo-taxis a reality by 2025.

Exhibit 51: SAE levels of autonomy

Level	Name	Narrative definition	DDT: Sustained lateral and longitudinal vehicle motion control	DDT: OEDR	DDT fallback	ODD
Driver* performs part or all of the *DDT						
0	**No Driving Automation**	The performance by the *driver* of the entire *DDT*, even when enhanced by *active safety systems*.	*Driver*	*Driver*	*Driver*	n/a
1	**Driver Assistance**	The *sustained* and *ODD*-specific execution by a *driving automation system* of either the *lateral* or the *longitudinal vehicle motion control* subtask of the DDT (but not both simultaneously) with the expectation that the *driver* performs the remainder of the *DDT*.	*Driver* and *System*	*Driver*	*Driver*	Limited
2	**Partial Driving Automation**	The *sustained* and *ODD*-specific execution by a *driving automation system* of both the *lateral* and *longitudinal vehicle motion control* subtasks of the *DDT* with the expectation that the *driver* completes the *OEDR* subtask and *supervises* the *driving automation system*.	***System***	*Driver*	*Driver*	Limited
***ADS* ("*System*") performs the entire *DDT* (while engaged)**			*System*	***System***	*Fallback-ready user (becomes the driver during fallback)*	Limited
3	**Conditional Driving Automation**	The *sustained* and *ODD*-specific performance by an *ADS* of the entire DDT with the expectation that the *DDT fallback-ready user* is *receptive* to *ADS*-issued *requests to intervene*, as well as to *DDT performance-relevant system failures* in other *vehicle* systems, and will respond appropriately.				
4	**High Driving Automation**	The *sustained* and *ODD*-specific performance by an *ADS* of the entire *DDT* and *DDT fallback* without any expectation that a *user* will respond to a *request to intervene*.	*System*	*System*	***System***	Limited
5	**Full Driving Automation**	The *sustained* and unconditional (i.e., not *ODD*-specific) performance by an *ADS* of the entire *DDT* and *DDT fallback* without any expectation that a *user* will respond to a *request to intervene*.	*System*	*System*	*System*	**Unlimited**

Source: SAE International J3016

How is AI used for autonomous

The more miles the AI takes in, the more it learns. Thus, miles = knowledge.

Autonomous driving is one of the most high-profile use cases for Narrow AI—that is a specific-use case, in this instance replacing a human driver. While Narrow AI may be simpler than General AI or super-human AI, it is by no means simple. Autonomous driving will rely on machine-learning algorithms and deep neural networks (deep learning) to take all the sensor inputs (cameras, lidar, radar, maps, and other sensors) to drive, make decisions and understand location/perception.

The more miles the AI takes in, the more it learns. Thus, miles = knowledge. These miles come in two forms: on-road and simulated miles. On-road miles are just as they sound—done on the road. All parties testing autonomous vehicles have some sort of on-road testing. The challenge with only using on-road testing is that the number of miles that can be achieved is limited by fleet size. Waymo reported that as of October 2018, it had driven over 10 MM autonomous miles on-road since 2009. The pace has been exponential.

What if *autonomous vehicles give way to new forms of "entertainment"? If autonomous vehicles allow occupants not to pay attention to the road, does media consumption rise? Will the cars of the future not have windows and instead have media screens? Are other advertising outlets negatively impacted?*

Why robo-taxis before an autonomous vehicle in your garage

Because of two main factors, cost and technological progress, we expect autonomous vehicles will first be deployed in a ride-share business model.

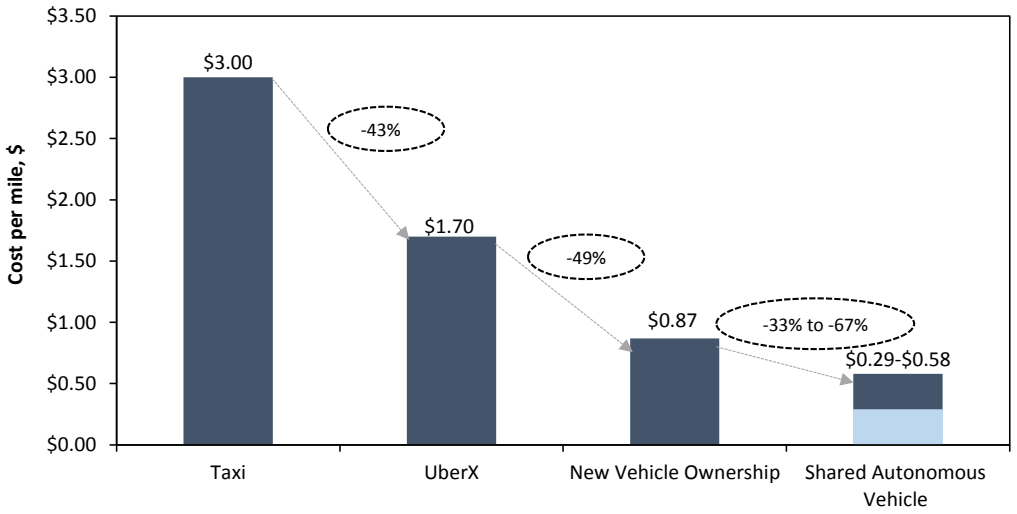
Because of two main factors, cost and technological progress, we expect autonomous vehicles will first be deployed in a ride-share business model. For our *futurist* vision, we will assume the technology progresses and gets there. However, the economic reality of shared and fleets makes robo-taxis economically attractive. A personally owned vehicle may put on 12-15k miles/year and is utilized about 4% of the time. However, in a fleet environment utilization can be much higher and vehicles could put on 70-100k miles per year (current networks like NYC taxis, Uber and Lyft support this). This allows for a much greater defraying of costs—even if an autonomous vehicle were to cost more.

***What if** the Robo-taxi shared autonomous vehicle model becomes widespread and economic for consumers? Will consumers simply stop purchasing their own vehicles?*

Research by RBC Auto Analyst Joe Spak suggests that a shared autonomous vehicle could bring the cost per mile to the consumer down to near $0.50/mile. That amount could be cut in half in a "pooled" ride.

RBC surveyed average taxi rates across over 360 urban US areas; we found the average taxi cost per mile to be about $3. When we looked at UberX rates in US cities where it operates, we found the cost per mile to be closer to $1.70. Across the US, the average cost to own a vehicle comes to about $0.87 (though clearly more in urban areas where parking costs more money and miles driven are generally lower). Research by RBC Autos Analyst Joe Spak suggests that a shared autonomous vehicle could bring the cost per mile to the consumer down to near $0.50/mile. That amount could be cut in half in a "pooled" ride.

Exhibit 52: Cost per mile economics for various mobility solutions



Note: Taxi and UberX analysis assumes an average trip distance of 10 miles traveled. New vehicle ownership analysis assumes 15,000 miles traveled annually. Shared autonomous analysis assumes 70,000 miles traveled annually.
Source: Uber, Taxi Fare Finder, ALG, RBC Capital Markets estimates

On the flipside, what happens to (among other areas) dealerships, auto retail and repair, and public transportation?

There are of course other industries that would be impacted. Insurance premiums may fall but the companies are likely to also experience lower claims. Because of all the data coming off the vehicle, they could use AI to better write or dynamically adjust rates. Autonomous vehicles could represent a growing opportunity for entertainment and advertising as well as the telecom industry. The beverage industry may see growth as impaired driving becomes less of a concern. On the flipside, what happens to (among other areas) dealerships, auto retail and repair, and public transportation?

Changing the game for consumer suppliers, retailers and restaurants

Autonomous driving has the potential to redefine at which brick-and-mortar locations consumers shop (including restaurants), how products are delivered to consumers (including food) and how products are shipped between warehouses and retailers. We specifically point

out that Walmart, Waymo and Ford have all collaborated in an effort to autonomously drive consumers in Ford vehicles to Walmart stores and back home. Often times the consumers are picking up previously ordered products for a quick turnaround. In other cases, consumers are welcome to take their time shopping through the store.

Exhibit 53: Walmart and Waymo have partnered to drive consumers to Walmart stores

Note: Walmart and Waymo

This model of picking consumers up and taking them to a retail location is not limited to brick-and-mortar retailers but also includes restaurants. We suspect that in the future restaurants will be willing to pay for Uber/Lyft rides, if they do not have autonomous vehicles of their own, to drive restaurant traffic. This becomes especially safe as it relates to alcohol and limiting potential drunk driving incidents. Product delivery to home is also being redefined, with Dominos and Ford collaborating on autonomous delivery, further limiting wage inflation and employee unreliability for the restaurant industry. Perhaps the biggest opportunity for retailers and suppliers is autonomous semi-freight truck driving. Walmart has already ordered 45 Tesla Semis as of this past September, although it will be some time before these trucks are able to be produced in mass.

What if *AI-enabled autonomous driving turns your vehicle from a depreciating asset to an income-earning one—being put into a shared fleet or used for last-mile delivery when not in personal use? What if the vehicle could mine for crypto currencies or other future crypto assets with its computing capacity when not in use, generating additional income for owners and operators?*

Exhibit 54: Dominos and Ford have partnered on autonomous delivery vehicles

Note: Walmart and Waymo

Exhibit 55: Tesla Semi electric truck

Note: Tesla

C-Stores on the loose?

In Shanghai, a prototype of a new 24-hour convenience store has no staff, no registers, and the whole thing is on wheels, designed to eventually drive itself to a warehouse to restock, or to a customer to make a delivery. The startup behind it believes that it is the model for the grocery store of the future, and because it is both mobile and far cheaper to build and operate than a typical store, it could also help bring better access to groceries to deserts and rural areas. To use the store, called Moby, you download an app and use your phone to open the door. A hologram-like AI greets you, and, as you shop, you scan what you want to buy or place it in a smart basket that tracks your purchases. Then you walk out the door; instead of waiting in line, the store automatically charges your card when you leave.

Exhibit 56: Moby—the 24-hour mobile convenience store

Note: Tesla

7) Product(AI)vity

We believe AI could be a significant accelerator of productivity and cost reductions. Advanced robotics could become a central part of logistics operations for vertically integrated consumer companies. Amazon is a great example. The company already deploys something like 100K Kiva robots, and we would not be surprised to see a very large percentage of Amazon's distribution workforce complemented with these robots by 2025. This dynamic could drastically help improve overheads and mitigate wage inflation. AI could also help in the areas of the back and middle office. The inclusion of AI programs has several benefits, such as being able to work 24/7 without days off or a raise. However, the biggest benefit by far, in our view, is scalability. Once an AI program has been trained to execute certain processes, it can then be replicated to many different locations and for similar functions within the business. This allows for rapid deployment of new products and services with higher levels of quality control.

However, as consumer companies overhaul their middle and back-office processes with AI programs, we see two main challenges that may slow this change. First is the disconnectedness of data from legacy systems. Companies that have made acquisitions over the years and have not taken the time to digitally integrate acquired companies' data will have a more difficult time with this. To fully reap the benefits of AI, consumer companies need to "bite the bullet" and overhaul their systems, if they have not already, to allow for data transfer among the different silos. The second challenge we see is the mountain of un-digitized (paper) and unstructured data. Structured data is data that can be placed neatly in a table, such as an Excel table, to manipulate and draw conclusions from it. Unstructured data is data from emails, phone calls, social media, etc. AI could provide insights into these types of data, but it has to be collected in a proper format first.

***What if** coffee and energy drink volumes declined due to lower consumer demand for caffeine because AI replaced driving, manufacturing, construction and menial office labor?*

AI as a retail labor substitute?

From an operational perspective, AI is in the early stages of helping to automate manual and low-value-added processes in order to improve efficiencies and save costs. For example, many chatbots on company websites (e.g. adidas.com 'live help chat') are robots in the early stages of the conversation that have the ability to respond to frequently asked questions and point customers towards further information, or to progress the conversation to a real person when required. It is inevitable that companies will have to build their internal capabilities if they wish to leverage the benefits that AI and Big Data can bring in terms of operational efficiencies (costs) as well as customer targeting (revenues). The challenge they face is expanding IT budgets (opex and capex) and determining to what extent technology and ancillary capabilities should be developed in-house vs. outsourced.

Kroger Case Study

Kroger has implemented an electronic temperature-monitoring tool in all of its stores to keep track of all its frozen and refrigerated cases throughout the day. This cut down the labor required to perform this task manually and saved over $25m for the company in-store. Further, the sensors alert the engineering teams to cases that consistently have higher or lower than ideal temperatures, prompting them to address/eliminate potential system issues. The ultimate benefit is enhancing the quality of food being offered in stores.

Automation in the workplace

Labor costs have been one of the biggest drags on restaurant margins recently, but what if restaurants do not need as much labor in the future? Technology has already been slowly creeping into restaurants and augmenting workers' abilities, which has increased efficiency and throughput. For example, McDonald's and Wendy's have installed self-order kiosks in some restaurants, decreasing the need for cashiers and allowing the kitchen laborers to operate at a higher utilization rate.

Exhibit 57: First, it was automating the burger ordering…

Source: Wall Street Journal; Yelp

The ordering process is not the only automated process people should look for in the future. At Creator, a San Francisco burger shop, the $6 burgers are made by an automated process without the help of any humans. The machine can produce 120 burgers per hour and reportedly costs under $1 million, according to the restaurant's founder. The restaurant, opened in June 2018, introduces a new possibility of labor and scale efficiencies in restaurant kitchens.

What if *the fast-food industry evolved to a machine preparing burgers in a low-rent building with no storefront, and a conveyor belt that places the burger in the back of a waiting car, and an autonomous vehicle delivers it to your doorstep. As farfetched as that sounds, the future is getting ever closer. Companies will need to invest in advanced technologies to reap the efficiencies of automation, potentially benefiting large players in the space that have the necessary capital.*

Exhibit 58: …then it was automating the burger making

Source: Creator

Start-up Zume Pizza is already making significant progress on restaurant automation. The San Francisco based company was founded on two core concepts: robotic automation and en route cooking. More specifically, robots assist in pressing pizza dough in a perfect circle in just nine seconds as well as dispensing and spreading the perfect amount of sauce on the dough – creating the perfect pizza. The other unique element to Zume's business is en route cooking, effectively making it a "restaurant on wheels". By creating trucks outfitted with ovens, Zume begins cooking ordered pizza deliveries en route to delivery location. Each Zume pizza truck has 56 pizza ovens, which are individually connected to the order system and the truck's GPS. A robot will put the pizza into the designated oven exactly four minutes before the truck reaches the customer's house. A worker will pull out the pizza when it is finished and place it into the cutter, where a robot will cut the pizza. The pizza is boxed and delivered to the customer's door, all within a few minutes of finishing baking. Interestingly, this business model is not limited to pizza and could eventually be applied to preparing and delivering food of all types.

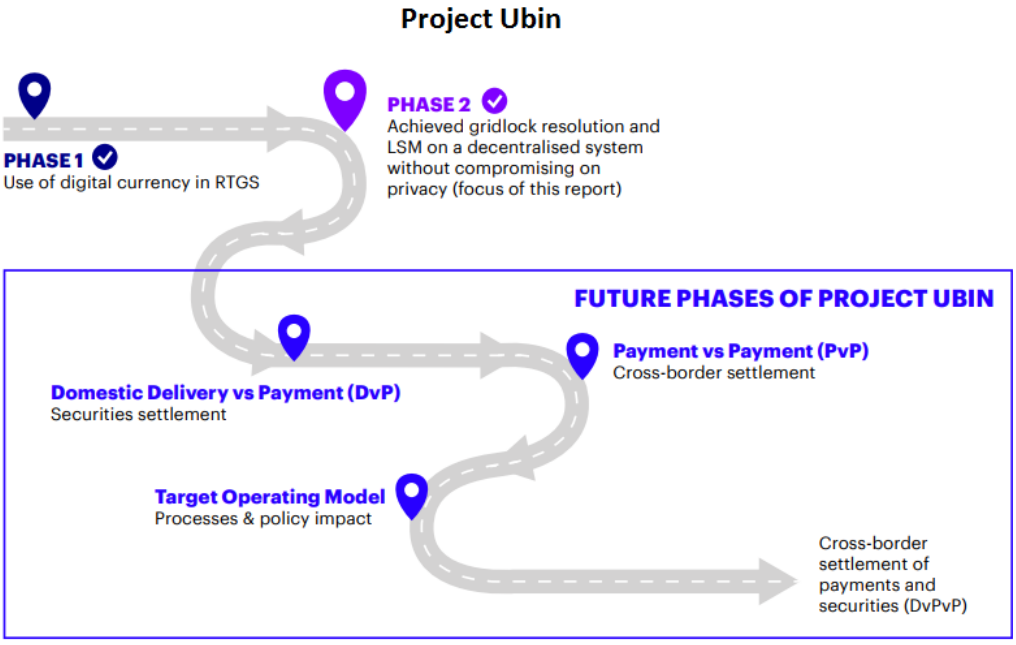
***What if** fast casual dining food was no longer prepared in brick and mortar kitchens but on trucks while en route to delivery location, ensuring freshly prepared food every time?*

8) Layer 2 Blockchain a game changer for consumer companies

While some view Blockchain as an application of AI, we believe that decentralized networks may in fact disaggregate the data used to feed AI. From this, we see the potential for large consumer companies as needing to rent personal data from users (e.g., pay users in tokens) for its use in AI applications. Later on, as layer 2 Blockchain develops, we wonder if consumer companies will not only use Blockchain for business with end consumers but also for facilitating cross-border transactions (which ultimately may be able to limit currency risk). More specifically, phase 2 Blockchain developments should enable:

1) Real-time gross settlement (RTGS) functionalities, such as gridlock resolution and a liquidity-saving mechanism, work on a decentralized system;
2) Blockchain-based designs can effectively preserve privacy in such transactions;
3) A Blockchain-based system could also help mitigate interbank payment risks by increasing system resiliency through the removal of a single point of failure and providing cryptographic security, immutability, and real-time processing; and
4) A Blockchain-based RTGS system would reduce the costs and resources of day-to-day operations and eliminate the risk of the central bank becoming a single-point-of-failure in a systemic disturbance.

Exhibit 59: Accenture's Project Ubin



Source: Accenture

The Risks from AI

AI development must also make sure it is for the betterment of humanity as opposed to a select group of humans.

With intelligence comes power. Just as the atomic race and the space race dictated global power in prior periods, so too can the AI race. What is interesting about AI versus prior intelligence races is that completion in those prior races was essentially between different states. Pedro Domingos, a professor at the University of Washington, author of the book *The Master Algorithm,* and machine-learning expert, recently conducted an interview with *Der Spiegel* in which he stated: "Artificial intelligence is a very powerful technology, and there is an arms race going on. Fast forward 20 years into the future and one of the players could have won the race. China is more likely to win than Russia is, although Russia has a lot going on. So, we could end up in a world that China may not formally control, but they effectively do because they rule the cyber world." However, the AI race also seems to include more private enterprise, particularly in the United States with the likes of Google, Microsoft, Facebook and Amazon. This raises the question: Does power increasingly shift away from governments and towards corporations? Did someone say Skynet…? Yes, governments can regulate, but some governments are more authoritarian than libertarian, and regulation could be difficult if the technology is not understood. Further, there are clear ethical considerations. Nick Bostrom, author of the book *Superintelligence: Paths, Dangers, Strategies,* discusses how there may be few problems Super AI cannot solve. This includes

ending suffering from disease, poverty, and environmental disasters. But, AI development must also make sure it is for the betterment of humanity as opposed to a select group of humans. He gives the sample of "superintelligence whose top goal is the manufacturing of paperclips, with the consequence that it starts transforming first all of earth and then increasing portions of space into paperclip manufacturing facilities."

***What if** the combined forces of AI, Big Data and machine learning eliminate all but the most entrepreneurial, highly skilled and creative jobs in the economy? Will there be a need for a living wage?*

Even in a world where machines do not rule over humans, AI can be used for benefit or detriment. Technologist Aviv Ovadya has warned about the "Infocalypse"—that the Internet and information ecosystem can reward misleading information or "fake news". AI could amplify this issue leading to AI-assisted misinformation campaigns. Twitter bots could seem tame compared to AI-driven reality distortion that could make it, as Ovadya was quoted saying, "appear as if anything has happened, regardless of whether or not it did." Teams at Stanford University and the University of Washington have built programs, using AI, that manipulate audio and video to make it appear as if world leaders said things they never did. Software currently under development can use AI to generate hyper-realistic photos and audio. Ian Goodfellow, a staff research scientist at Google Brain, stated at a conference in November 2017 that deep-learning systems can be used to create fake images and learn to make them more believable, making it easier to fool people, and warned that AI could set the way we consume news back 100 years.

China is using an AI-driven facial recognition system in 16 Chinese cities and provinces to help police crack down on criminals and improve security. Reports indicated the system is fast enough to scan China's population in 1 second and has an accuracy rate of 99.8% even with the individual in motion. Such technology holds promise for counter-terrorism and security as well as tracking missing persons. However, it is easy to see how this power in the wrong hands can impede human rights. Somewhat ominously, this system is called "Skynet."

Fake News proliferation?

Octi.tv is an augmented reality startup that received $7.5 million in Series A funding in early July. Octi.tv has developed unique video software that can recognize when a human is in-camera and specifically modify that human's image and actions. For example, it can completely erase all humans from a video or "cut-out" a human and his/her actions from a video and insert him/her into another one. The app is already available for download. In the immediate term, this seems like valuable technology for Snapchat or Facebook (Instagram stories) to acquire, in order to further the modifications their videos can offer. In the long-run, if the technology is truly unique and Octi.tv protects it well, the AR implications may be even larger with the likes of Google Glass or machine-recognition.

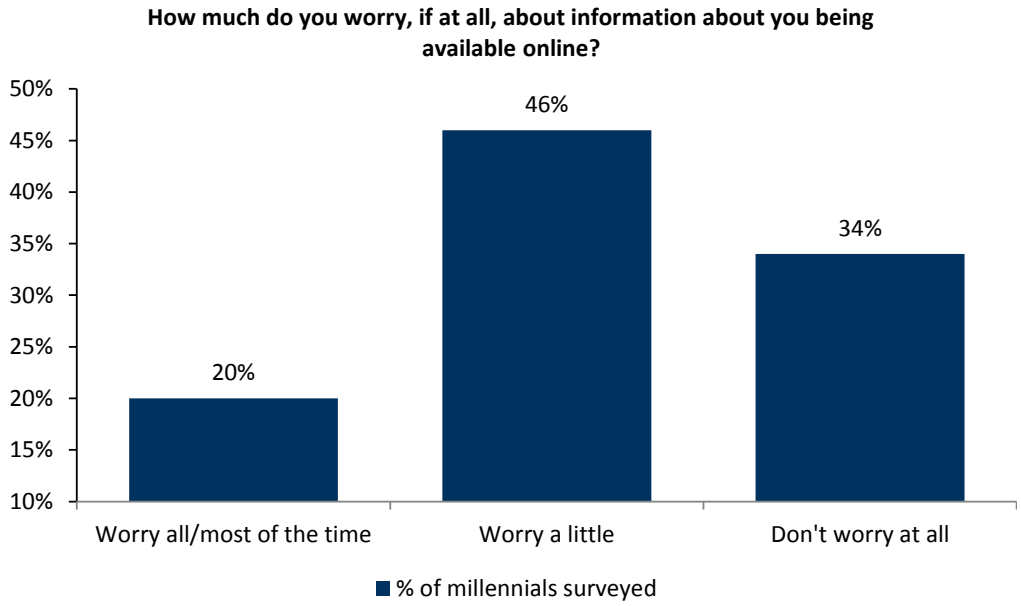
***What if** advertising and media content produced by third parties can no longer be trusted due to advancements in audio/visual manipulation technology? Will commentary direct from government officials and influencers only be trusted if it comes from their direct social media platforms?*

Privacy—Do we need digital bodyguards?

With the constant sharing of information, privacy is at the center of debate as technology advances. Originally, consumers expressed concerns around the privacy of financial information with online banking as well as access by all to pictures and personal information on social media accounts. Today, privacy concerns have limited the adoption of Amazon

Alexa/Echo, and Google Home devices (could someone be listening in and recording private conversations?). In the future, personal medical information, among other types of information, will be readily available to companies, the government and, if unsecured, hackers. Unsurprisingly, millennials have expressed little concern about their personal information being available online. In a study by the American Press Institute, 80% of millennials surveyed responded that either they worry "a little" or not at all about their information being available online; only 20% said they worried all or most of the time.

Exhibit 60: Concern over personal information availability online



Source: National Press Institute

In a USA Today article on the topic, a 21-year-old interview participant commented *"there is no longer such a thing as privacy and it's a little scary but honestly inevitable. I'm not sure if it's reasonable to be worried anymore because it's already out there."*

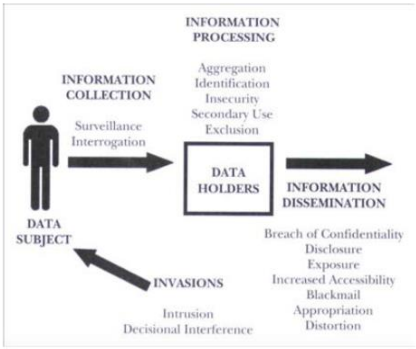
However, companies that are unable to safeguard consumer information, such as Equifax and Target, expose themselves to elevated levels of reputation and brand risk. Companies must also increase transparency on how consumer data is used, alleviating the concerns of 47% of consumers who, according to Pew Research, are not confident in their understanding on what will be done with personal data.

Exhibit 61: Privacy concerns

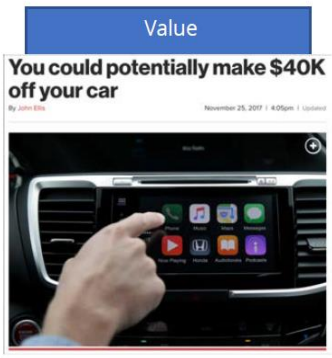
Yesterday

Today
Potential for material harms

Tomorrow
Potential for material value



Four basic groups of risk
1. information collection
2. information processing
3. information dissemination
4. Invasion



Source: Best Buy

Exhibit 62: Privacy concerns

In the six months to July, 2018…

69% chose not to download an app due to excessive permission requests

30% said they've done so **frequently**

63% chose not to complete a purchase on their mobile because they didn't trust the company

28% said they've done so **frequently**

Due to privacy/security concerns:

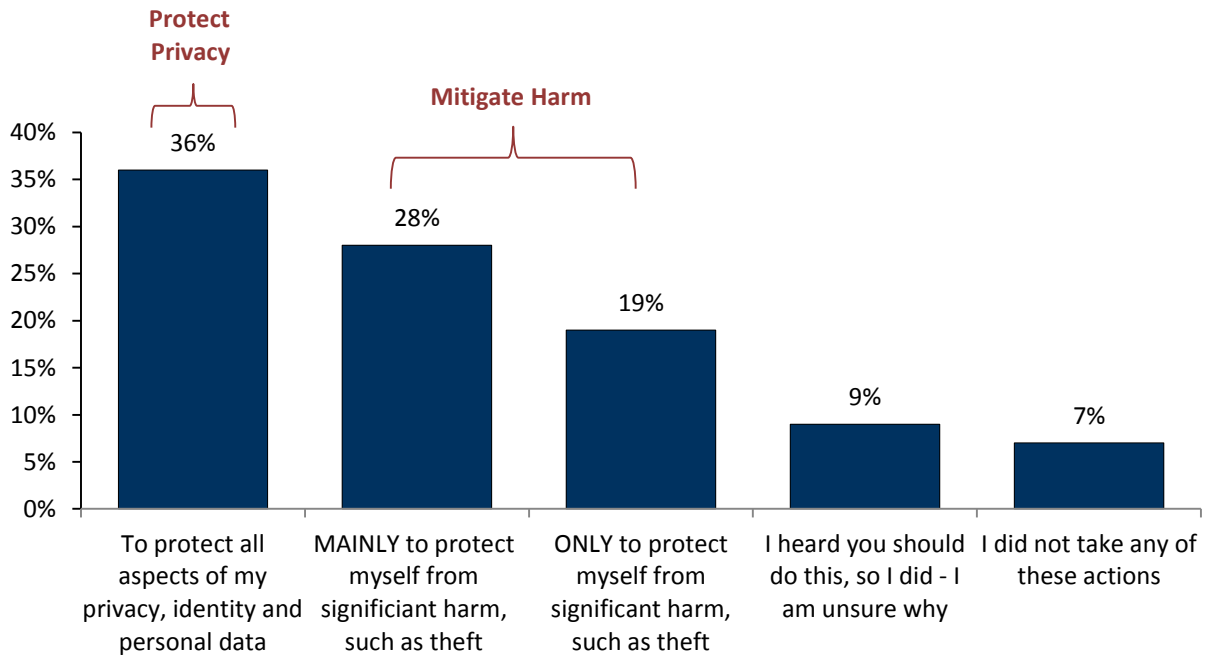
- **31%** deleted an app or service
- **26%** stopped using an app or service
- **12%** chose to use a competing app or service

Preview MEF 2018 Trust Study,

Responses to: In the past 6 months, have you chosen not to install an app because it asks for too many permissions to access features on your phone (such as access to location, microphone, camera)?; In the past 6 months, have you chosen not to complete a purchase on your mobile device because you didn't trust the company?; In the past 6 months, have concerns over privacy and/or security caused you to [take these actions]

Source: Praxis

Exhibit 63: Why users took more protective action on mobile



Source: Praxis

"You have got to own it"—Self-sovereign IDs could be a game-changer

Although the Internet was built on a decentralized and open protocol, it lacked a standard from which to directly identify individuals or organizations, which ultimately gave rise to specific companies and websites establishing usernames and passwords for individual identification. As the power of the Internet began to accrue to centralized organizations, large amounts of siloed-data specific to each site have emerged, resulting in large-scale data breaches, rising privacy concerns, and lack of control over one's own identity.

Exhibit 64: The identity issue remains today

"On the Internet, nobody knows you're a dog."

Source: The New Yorker 1993, RBC Capital Markets

We believe self-sovereign IDs will emerge as the solution, both securely protecting one's identify, through cryptographic encryption, while empowering the individual to determine with whom and how to share their digital identity and data.

We believe self-sovereign IDs will emerge as the solution, both securely protecting one's identify, through cryptographic encryption, while empowering the individual to determine with whom and how to share their digital identity and data. The ultimate goal is to achieve four basic requirements:

1) **Governance:** The network must be "Trusted" by all stakeholders
2) **Performance:** Providing self-sovereign IDs at Internet scale
3) **Accessibility:** Ensure the identity is available to all
4) **Privacy:** Strongest privacy standards in the world

The evolutionary process is developing across four stages as illustrated in Exhibit 65.

1) **Centralized:** In which the consumer's identity is owned and controlled by a single entity
2) **Federated:** Enables user portability by allowing the user to sign on to multiple sites with the credentials of another; think of using your Facebook credentials to sign in and create accounts on various websites
3) **User-centric:** Relies on independent personal data stores (sometimes large social networks), but is still beholden to the contractual user agreements
4) **Self-sovereign ID:** Independent of individual data silos, is decentralized, and entirely controlled by the individual

Exhibit 65: Evolution to self-sovereign IDs

Source: The Path to Self-Sovereign Identity, RBC Capital Markets

We believe two significant technological innovations are occurring to enable self-sovereign IDs to come to fruition: 1) the World Wide Web Consortium (W3C) is standardizing the format of digitally signed credentials; and 2) public blockchains can provide decentralized registration and discovery of the public keys needed to verify digital signatures.

Blockchain enables self-sovereign IDs

The significance of standardizing digital credentials is that an entirely new global ecosystem can be created consisting of credential issuers, owners, and verifiers, which would enable the exchange of interoperable verifiable claims.

The significance of standardizing digital credentials is that an entirely new global ecosystem can be created consisting of credential issuers, owners, and verifiers, which would enable the exchange of interoperable verifiable claims. An example would be if Matt wanted to open a banking account with XYZ bank, the bank then requires two forms of proof-of-identity, to comply with "Know Your Customer (KYC)" rules. Matt chooses two government-supplied verifiable claims: 1) a postal address, and 2) a driver's license. Once confirmed and the account opened, Matt is then issued a **digitally signed credential**, which can be utilized across multiple access points when KYC regulation is required. This simple use case can be replicated in healthcare, insurance, education, retail etc., thus developing a credential repository, stored in a public blockchain and embedded and controlled by the individual via a self-sovereign ID. With an estimated one seventh (~1.1 billion) of the world's population not having a legal identity today, we believe the implications for self-sovereign IDs are great, not the least of which is to democratize finance.

What if *blockchain was used for ID authentication purposes like your Facebook ID, with the authenticity of your identity being based on the culmination of all your historical transactions? Would opening a bank account and applying for a loan be easier because your transactions are recorded and easily transferable? Would the number of mortgage brokers and personal bankers decline as processing would be automated? Would there be an increase in the number of online loan providers? Would a FICO score become obsolete because all financial information is in one's blockchain ID and could be transferred? Would credit rating agencies become more like FASB, a non-profit organization standard-setting body?*

The potential to create new "gig-like" business models through the "monetization of self" by controlling and owning one's own data and only sharing this data with companies, entities, and governments of the individual's choosing could disrupt traditional advertising models.

The potential to create new "gig-like" business models through the "monetization of self" by controlling and owning one's own data and only sharing this data with companies, entities, and governments of the individual's choosing could significantly disrupt traditional advertising models. We could see businesses created (similar to Filecoin, which incentivizes open hard-drive sharing by earning Filecoins for a user's available hard-drive space), by incentivizing users to share their data in return for "data coins." In this regard, companies like Facebook and Google that freely capture our data, would be required to incentivize/compensate the users for data capture in order for their existing economic business models to work. We could foresee a scenario whereby Facebook and Google begin to embrace the blockchain in such a way as to issue their own individual tokens (think Facebook coin or Google coin) as the behavioral incentive mechanism to capture individual data, although we think this is an extremely unlikely event—black swan—in the next 10 years.

Whose data is it, really?

At the heart of much of this is that we "give" our personal information to third parties, whether that is through emails, digital exhaust and cookies or sharing personal information online. Who owns that data, under what conditions and for how long are key ethical dilemmas currently being faced by the social media reality. Facebook is at the center of this due to now known ethical faults in how third parties could access and manipulate user information (e.g. Cambridge Analytics), but versions of this will extend to all social media platforms, internet platform operators and the myriad of consumer companies that want to use those platforms for better understanding their customers.

Could the data about a thing be more valuable than the thing itself?

Author and futurist John Ellis wrote "The Zero Dollar Car—How the Revolution in Big Data will Change Your Life" introducing the idea that in the future the data about the things we do and consume will be more valuable than the things themselves. For example, if you are eating out at a restaurant and your credit card is declined, the owner could present a survey on your eating habits to complete that would pay for the meal. The same principle could be applied for vehicles where consumers may be able to receive 50% off a car purchase in exchange for sharing the data on where the car is driven with the manufacturer. Maybe cars will even be free, paying for themselves as they are driven and the data is shared.

***What if** personal digital data becomes decentralized and fully owned by individuals instead of corporation? Will this slow the recent acceleration of AI? Will corporations have to compensate individuals with tokens for their data?*

Theme II: The Calibrated and Augmented Self—From "Mass" to "Me"

"Catering to the masses"—this was the business model that enabled companies to provide goods and services to a generation of Baby Boomers that had similar needs and wants.

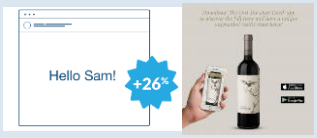
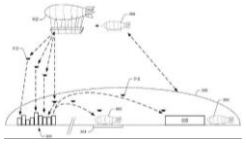
"Catering to the masses"— this was the philosophy that enabled so many consumer companies to create significant amounts of value over the past few decades. Think about P&G, Walmart, General Mills, Kraft, Coca-Cola, Halston, etc. These companies were able to provide goods and services to a generation of Baby Boomers that had similar needs and wants. Advancements in manufacturing enabled mass production of these products—and economies of scale drove up margins.

However, over the past few decades, there has been a proliferation of choice (ranging from different flavored Oreos to cable channels), which has raised consumer expectations. With the explosion in choice, consumers have been trained to seek products/services that are more aligned to their specific wants and needs. According to a Deloitte study, close to 40% of consumers are interested in customized products. We believe this number will only grow over the next few years. However, based on our "Imagine" framework, we believe today's customized offerings will pale in comparison to what will be broadly available to the consumer in the year 2025. Today's consumer may be about mass personalization. However, tomorrow's consumer will be about "bespoke consumerism".

As we imagine the world in 2025 based on our framework, we are excited to be consumers. However, as analysts following consumer companies, our enthusiasm is a bit more tempered. We believe the converging forces of big data, AI, advancements in genomics/science, the rise of 3D-printing among other change forces will flip traditional business models and value chains upside-down. Are apparel companies prepared for VR shopping and the age of 3D printing? Are today's large CPG companies equipped to deal with consumers 1-on1? Can packaged food companies capitalize on consumers becoming more aware of what they should be eating based on their DNA? These are the questions we believe investors should be asking consumer company management teams and boards.

In the remainder of this section, we discuss how we believe the entire consumer value chain (from data to go-to-market) could evolve based on our Imagine 2025 framework.

Exhibit 66: Summary of consumer supply chain evolution, from mass to bespoke consumerism

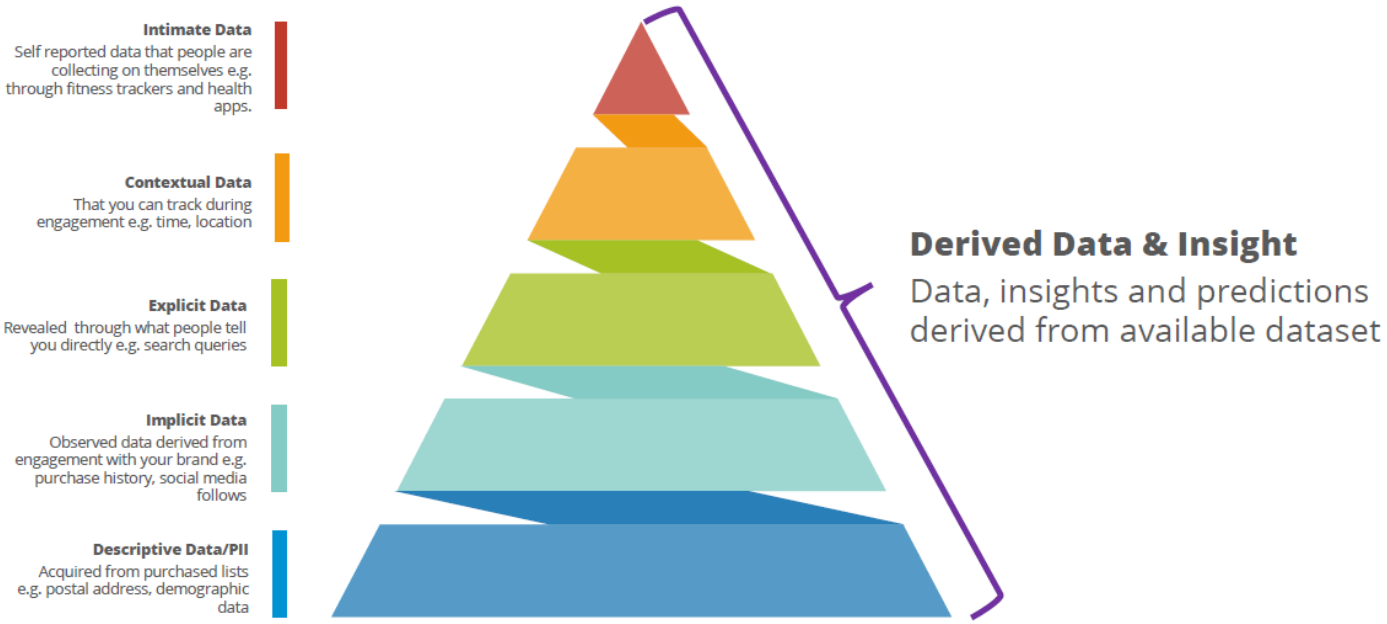
Value Chain	Past	Present	Future
Data	Mass Receipt Scanner Data 	Mass Search and Digital Omni-Channel 	Predictive Analytics Based on Bio Data 
Product	Mass Customized Packed Food 	Mass Personalized Diet Specific Meal Kits 	Bespoke 3D Printed Meals Based on Personal Gut Biome 
Manufacturing	Mass Customized Production Line 	Mass Personalized Delayed 3D Printed Production 	Bespoke Instant 3D Printed Production 
Consumer Engagement	Mass Print Circulars and Catalogs 	Mass Personalized Email and AR 	Bespoke Text and Voice  
Route to Market	Mass Brick and Mortar 	Mass Personalized E-Commerce and Scanless 	Bespoke Anticipatory Daily Drone Delivery 

Source: RBC Research, Company Presentations, Google Images

Value Chain Step 1: Data—the Holy Grail of Bespoke Consumerism

Many of the large-cap consumer companies have built their empires on the back of "knowing more" than their competitors (and in many cases their customers). As we mentioned in the previous section on artificial intelligence, the world is becoming smarter thanks to the ubiquity of smartphones, sensors, and mini-computers. According to Gartner, there are more IoT (internet of things) devices around the world than people. Each smartphone, smart watch, smart car, internet search is creating robust data that providers of goods and services can use to better serve their consumers' needs. Decades ago, robust data for consumer companies was based on gender, age, and race. Today, companies are becoming more sophisticated and harnessing data that looks at transaction history, social media communications, and online activity. However, in the future, we believe the amount of data companies will have about us will expand to our location, our driving routes, our sleep patterns, glucose levels, social activity, and personal gut health among others.

Exhibit 67: A breakdown of the different types of data

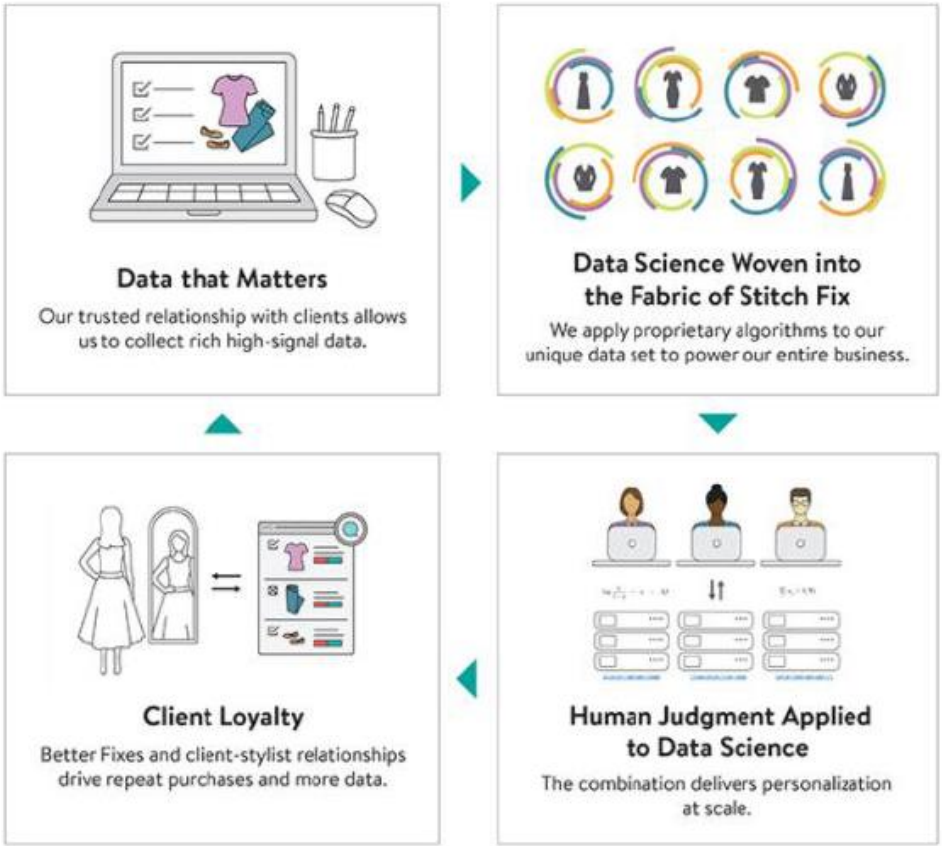


Source: Company Presentation

Currently, we see consumer companies (brand owners and retailers) leveraging data in new ways, which we expect will only grow and improve over time. For instance, although traditional retailers have also been trying to capitalize on the loyalty of their customer bases, we note that the new-age retailers have been going a step further to not only predict what the customer may want but to dictate to the customer what they need (or deliver it to their door). In addition to Amazon's algorithm making suggestions to you for several years now, subscription and personal-styling business models (like Stich Fix) have been getting a lot of attention.

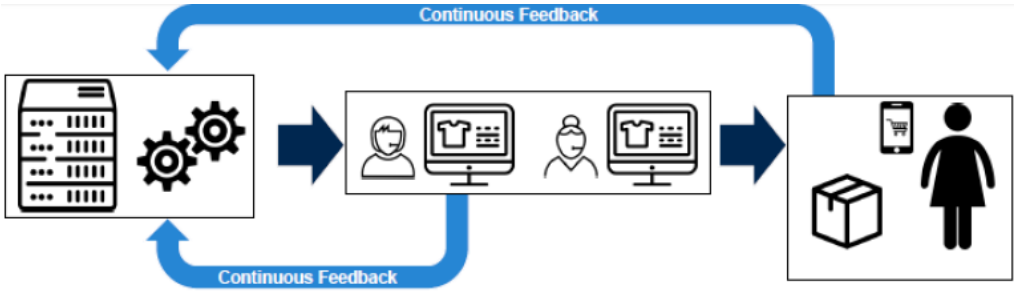
Although Stich Fix is certainly not the only one, we do believe it is one of the most successful models that combine a subscription-based selling model and personalized-styling approach. As we look out, we expect traditional retailers to adopt this hybrid 'data meets personal stylist' approach and further expand on the feedback loop it creates based on repeat interactions. The more data points, the better the predictive analytics will become.

Exhibit 68: Taking customer data to next level



Source: SFIX filings

Exhibit 69: Retail feedback loop



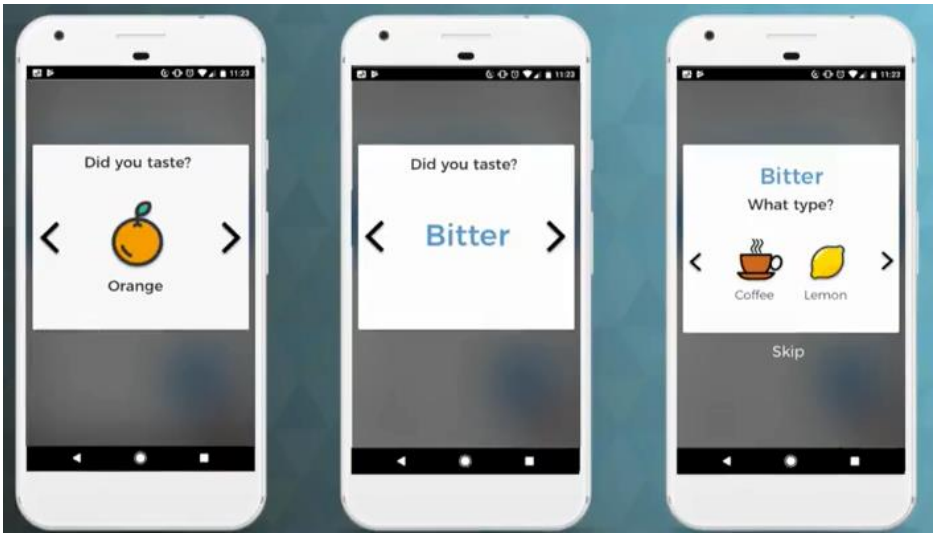
Source: SFIX filings

Importantly, these types of analytics and business models are not just for the apparel/retail business. Interesting start-ups are leveraging AI to provide a better picture of what foods consumers will want to consume. Consider this: **Gastrograph AI** is an example of a company that uses AI to create predictive results to determine precise, hyper-personalized flavor profiles that best meet the preferences of different consumer demographics. The technology analyzes everything from socioeconomic status to smoking habits to the ambient environment to create detailed predictions of foods that people would like.

Gastrograph AI collects taste preference and perception data by asking consumers and professional tasters a series of questions after trying a specific product. The data is aggregated and artificial intelligence enables the company to identify a consumer's sensitivity to specific

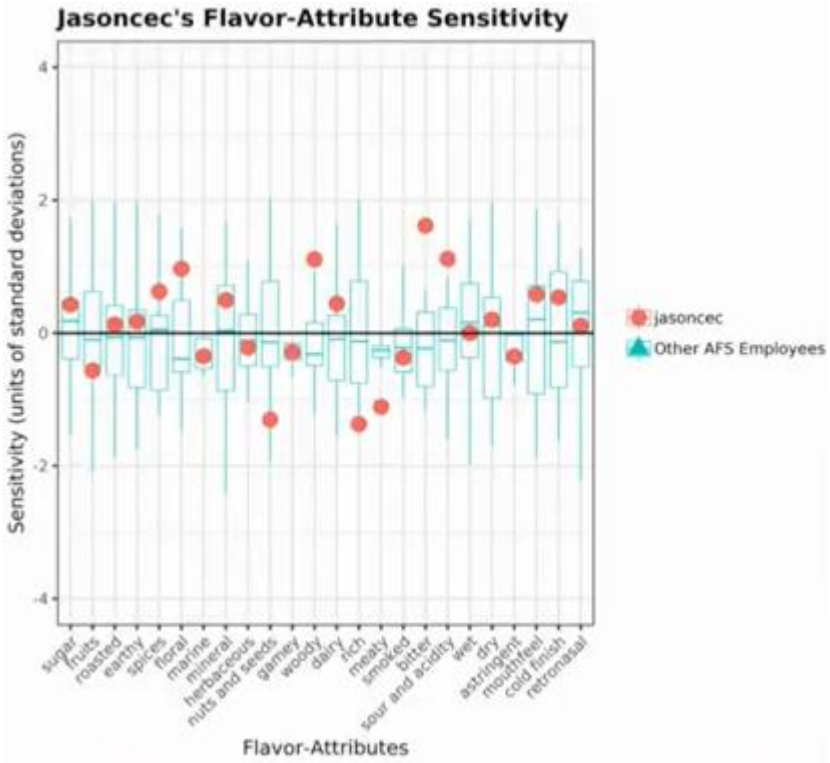
flavorings. For example, the data can identify that an individual may prefer lemon to lime flavoring. The software also uses predictive modeling to suggest flavors that may appeal more to different demographics based on the environment in which they live.

Exhibit 70: Retail feedback loop



Source: Gastograph AI

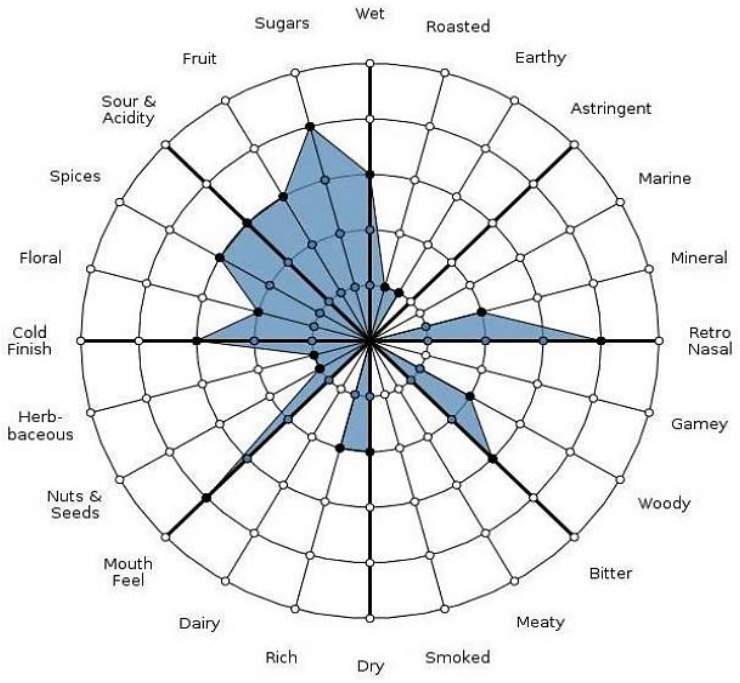
Exhibit 71: Example of a specific consumer's flavor profile



Source: Gastrograph AI

As this technology evolves, we believe companies will be able to determine what will appeal most to consumers and allow products to come more quickly to market at a cheaper cost. In addition, these types of predictive analytics may give rise to innovations in the supply chain. If a company is able to accurately pinpoint a demographic that will have the greatest demand for a new product, they can make important inventory and distribution decisions around that information, further increasing efficiency and reducing cost of launches.

Exhibit 72: Gastrograph AI aims to predict consumer preferences for new products



Source: Gastrograph AI

"If I had asked my customers what they wanted, they would have said faster horses." – Henry Ford

As we think about the year 2025, we believe AI will give consumer companies the opportunity to proactively predict and order products before consumers even know that they need them.

Could the customer no longer "always be right"?

We hear it repeatedly from consumer companies "the customer is always right!" Remember that Henry Ford once said, "If I had asked my customers what they wanted, they would have said faster horses." Or when Steve Jobs said, "It's really hard to design products by focus groups. A lot of times, people don't know what they want until you show it to them."

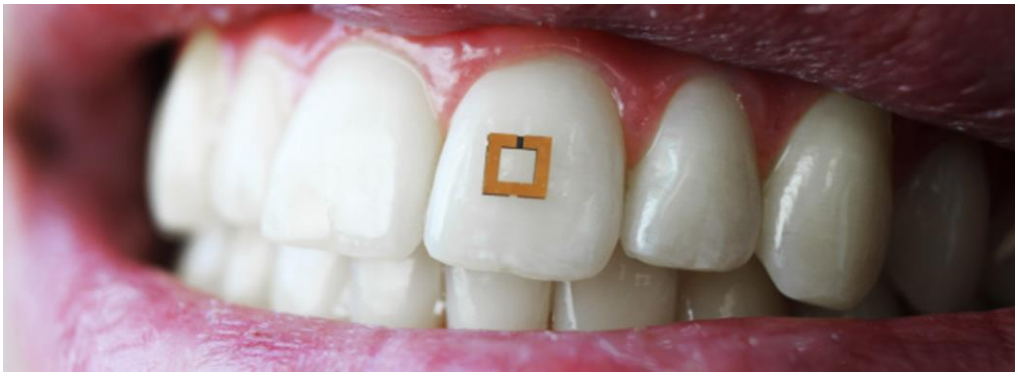
But let's face it, Henry Ford and Steve Jobs were visionaries who had a very unique knack to understand what consumers wanted before the consumer knew they wanted it. We would not put the majority of consumer company management teams in the "Steve Jobs" bucket.

With that said, the good news for consumer executives (who are willing to invest) is that you no longer need intuition and vision to radically serve consumers' needs in ways consumers are unable to articulate. Why? We break this idea down into two steps:

1) **Better understanding the consumer through AI:** The reality is that consumers may not be entirely honest (either intentionally or unintentionally) when providing feedback to companies on their preferences. But Consumer companies can now invest in the technology of startups like Gamalon (which created an artificial intelligence system that can process natural language and then explain what ideas are present and how they are organized) to detect emotion and intent on consumer feedback surveys. This allows consumer companies to bring consumer feedback surveys to life, understanding consumer needs and desires behind the sales data, as if a marketer was having an entirely frank, 1x1 dialogue with each consumer.
2) **True consumer understanding through AI + Biology:** While the first instance is able to understand what consumers truly think and prefer by their actions (filling out a survey, making a purchase), phase II takes it a step further and does not require any survey input or purchasing behavior, it just requires access to our bodies. Using a combination of advancements in AI and biotech, companies will be able to know exactly what consumers are thinking and *feeling*.

   With an increase in wearables from watches that can constantly monitor our blood pressure while knowing our location, to glasses which can scan our eye movement and pupil dilation, more bio data will be available for ourselves (and shared with those who want to sell us things). Wearables actually might not be required at all, as micro devices in our gut or throughout our body are collecting data. To that point, Researchers at Tufts University have developed a tooth sensor that can track glucose, salt and alcohol, and wirelessly transmit the information to a device. It is easy to imagine how advancements in this technology can have an impact on nutrition management. Diabetics could monitor their sugar intake and broadcast the information to their doctors. People with high blood pressure could monitor their salt intake. Those with celiac disease can better avoid gluten. The device could also potentially detect physiological states, like changes in saliva that signal developing gum disease. Or, perhaps it could detect chemical markers of fatigue, warning you that you are too tired to drive.

Exhibit 73: Tooth sensor



Source: Tufts University

Even the cameras on our phone or computer screens will be able to detect movement in our eyes or facial expressions. A simple example of consumer engagement using this data would be a device noticing a change in the body's adenosine, nitric oxide and cytokines levels (aka feeling tired) and prompt (or even automatically) have coffee delivered from a local coffee shop while at work. It may also recommend the consumer takes a walk outside (given it is a

sunny day and the weather is ideal) to go pick up the coffee themselves at the counter (because of course it was already pre-ordered). In this example, the consumer knows they are tired, they think and feel it.

> ***What if*** *the future of the smartphone is not hardware that is carried externally, but rather chips carried internally? What if credit cards, phones, and keys are all physically replaced this way? How far are humans willing to go with invasive technology?*

But what if it was taken another step further where consumers are engaged on a hyper-personalized and bespoke basis, for reasons the consumers themselves does not know or can explain? For example, IBM offers it's "Tone Analyzer" to improve customer satisfaction during service calls. The tool can pick up on seven different types of tone via conversations with customer service agents and chatbots: frustration, satisfaction, excitement, politeness, impoliteness, sadness and sympathy. Before the customer explicitly says it out loud, the chatbot will be able to respond to sadness and satisfaction.

Knowing yourself like never before

One of the fastest-growing fields in biology and medical science involves genetic testing and genome mapping, and the impact of genetics on various disease vulnerabilities in individuals.

Basic tests, which target single genes to find specific results related to a single outcome (Huntington's, Alzheimer's, etc.), only cost about $100. Whole genome sequencing is getting less expensive all the time and is quickly moving out of the lab and into hospitals. Direct-to-consumer kits (such as 23 and Me, among others), while far less accurate, can be bought off the rack at Walmart for as little as $29.97.

Exhibit 74: Genetic testing types

Genetic test	Description	Quality	Main providers and owners of the data	Approximate cost of a test	Risk of adverse selection
Single gene analysis	Identifies mutations in a single gene responsible for a particular disease (single gene diseases)	High	Specialized healthcare providers	USD 100	**Now: Low,** as single gene diseases on average affect approx. 1-2% of population **Medium term: Low**
Whole genome sequencing	Analysis of the entire human genome and genetic variants associated with diseases	High potential	Now moving from the research sector to hospitals and clinics, primarily to analyze and better target treatments for cancers	USD 1,000 within the next few years	**Now: Low,** data processing requirement to incorporate patient's medical history and clinical symptoms not yet available **Medium term: High,** processing capabilities rapidly advancing
Direct-to-consumer genetic tests	Investigates a small proportion of the genome, i.e. SNPs suspected to be associated with diseases	Low	Private companies; no healthcare professionals need be involved	USD 200	**Now: Low** **Medium term: Medium,** accuracy of tests will improve

Source: PartnerRe

The implications of more accurate and less costly genetic testing will have significant lateral implications for industries outside of healthcare. For instance, having a better understanding of your DNA could be used to better tailor a diet to each individual's nutritional needs.

Value Chain Step 2: Product—From sku to SkYou

With better and more insightful data, product design will rapidly evolve. Historically, suppliers produced products in mass, one product (same flavor, fragrance, color, size and functionality) distributed far and wide with an important marketing message. Today, suppliers have come a long way in offering consumers many more options without materially increasing price, such as putting a consumer's favorite name or color on a product, offering the product in more combinations, shapes, fits and sizes. Good examples of mass

personalization today include meal-kits, Coca-Cola freestyle, personal clothing by way of selecting size, fit, fabric and color. Consumers can even get a customized 3-D printed blade-handle from Gillette.

Exhibit 75: Gillette 3D printed handles

Source: Procter & Gamble

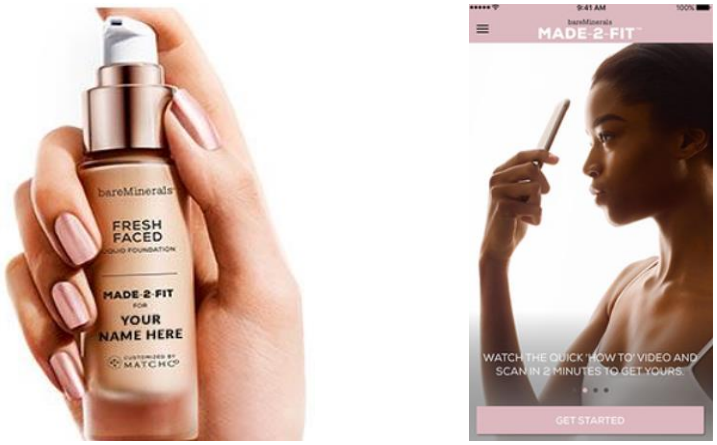
But with new and more data available today, we expect product innovation to reach a completely new level, transitioning from mass personalization to bespoke. We believe the notion of "stock keeping unit" or SKU will become obsolete. We believe the SKU will turn into a SKYOU, tailored specifically for each consumer's bespoke needs and preferences, including their biology. We see this bespoke phase as frankly a winner-takes-all scenario for each category. The company who can deliver bespoke products at a fair price, completely independent of brand and marketing, will win.

MADE-2-FIT allows users to create their own perfectly customized liquid foundation in just a few minutes.

One driver behind bespoke consumerism will be necessity borne from diversity—the diversity of the consumer and the diversity (proliferation) of choice. The two approaches to these challenges are to curate and to customize. Shiseido-owned makeup brand BareMinerals meets the diversity of the customer through the customization approach. Launched in 2017, the company's app MADE-2-FIT allows users to create their own perfectly customized liquid foundation in just a few minutes. While custom foundations are not a new idea to those who remember the Prescriptives makeup counters of the 1990s and early 2000s, this is a more precise method, done at home, driven by technology, and made possible by the advances in phone camera quality. In the app, users are guided through taking several close-up images of different areas of the face; the company then creates a foundation to perfectly match the user's skin tone, which can then be ordered through the app, made with the user's name on the bottle. We expect custom offerings like this, fueled by technological advances, to proliferate across brands, products, and markets, driving down price and increasing availability.

To take this a step further, we expect beauty companies to create bespoke products for consumers not only based on skin tone, but on age and skin moisture levels among other factors. For instance, AmorePacific recently introduced IOPE Tailored Solution, which consists of a Tailored Mask and Tailored Serum, personalized for every customer. The technology allows customers to create a 3D printed sheet mask customized according to face shape by scanning each customer's face with a smartphone app. The tailored serum that comes with the mask pack will provide a customized solution through an accurate skin analysis, and be especially designed to address personal skin conditions (it can exfoliate, improve wrinkles and skin firmness, moisturize, etc.).

Exhibit 76: Personalized makeups



Source: BareMinerals

Exhibit 77: AmorePacific's first 3D printed customized facial mask

Source: AmorePacific

From "A" diet plan to "MY" diet plan: In the future, hyper-custom and personalized diet options will not be a premium option but a baseline expectation. Manifestations of this are already apparent such as Arivale, Day Two, Vitagene, Vitamin Packs and Suggestic.

Arivale: Based in Seattle, Arivale uses blood tests and genetics to build a health profile. The profile includes information on health risk, environmental toxins and nutrient levels, and helps the customer manage his or her diet, heart, weight and inflammation, as well as 60 days of nutrition coaching.

Day Two: Based in Tel Aviv, Day Two provide personalized health and nutrition advice based on the composition of a person's microbiome in a stool samples.

Vitagene: Based in San Francisco, Vitagene runs a customer's DNA through its AI platform, which compares the sample to a database of peer-reviewed research on genomics, nutrition

and exercise. It then maps the results to a recommended diet, exercise and supplement plan. Customers can also buy monthly supplements according to DNA and lifestyle.

Vitamin Packs: Seattle-based Vitamin Packs offers supplement subscription service, and uses AI to analyze information gathered through a five-minute online assessment. By analyzing details about a person's health history, medication, lifestyle and wellness goals, the platform will recommend personalized vitamin packs for customers.

Suggestic: Uses an app-based platform to gather users' usual preferences, with an option to include genetic, microbiome and lab testing data from the company's partners. Suggestic's algorithms will then make diet recommendations and/or change suggestions. The app is an augmented-reality menu reader that highlights what is OK to eat on ~500,000 menus in the United States.

In the future, hyper-custom and personalized diet options will not be a premium option but a baseline expectation.

And, while these companies and their technologies are interesting on their own now, we expect these are products that could (can, and should) become features, driven by Big Data, AI, and utilization of existing technology. One example becoming increasingly popular today is Habit, a start-up that received a $30M investment from Campbell's and creates customized meal plans based on a consumer's genetics. Habit engages consumers in a two-step process: 1) the consumer drinks a Habit Challenge shake at home and takes three blood test samples to send back to the Habit Lab; and 2) Habit uses the test results to assess how the consumer's body responds to food and develops an easy-to-navigate eating plan accessible through the Habit app.

> ***What if*** *food and beverage companies could offer a bespoke shake for each consumer to drink each day, immediately providing them with the daily nutrition specifically required to keep that person healthy, energized and satisfied?*

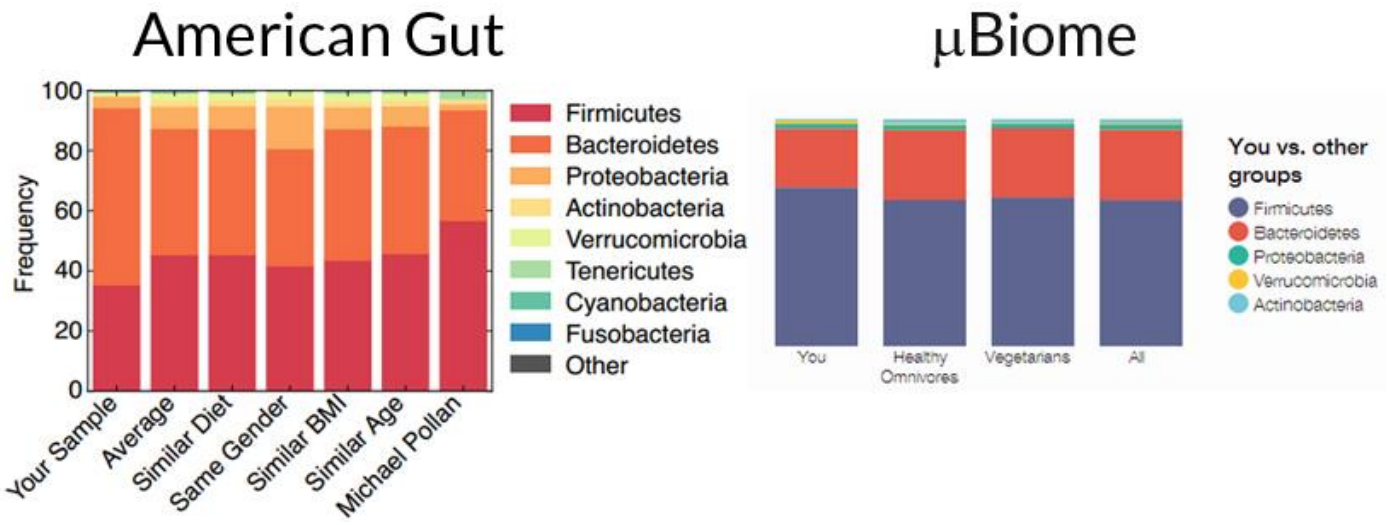
It is not hard to imagine that companies can leverage data—including bio data—to create meal kits or supplements (that are automatically delivered to us) that perfectly align to what our bodies need. If you have a big project at work that requires long hours, you can have meals made to help reduce stress and help with energy levels. Or if you are signed up to run a marathon, groceries/meal kits will be delivered to you to help you with energy and hydration.

Exhibit 78: Habit Nutrition Plan (synched with Fitbit)

Source: Habit

Gut health is increasingly being discussed as a way to improve overall health. Viome's approach to dieting focuses on the role microbiomes (micro-organisms in our body) play in human health and disease. With a customized diet targeting relative differences in microbiome composition, Viome is able to limit the risk of obesity, diabetes, heart disease, autoimmune disease, mental health, Alzheimer's disease, Parkinson's disease and colorectal cancer.

Exhibit 79: Viome offers a customized diet based on a better understanding of microbiomes in our digestive system



Source: Viome

It is foreseeable we may never have to buy clothing off the rack in store or online again.

Personal designers and downloaded clothes for all? Looking out to the future, it is foreseeable we may never have to buy clothing off the rack in store or online again. Rather, working with a customer designer who may be either a real person or an AI, we can digitally design our own clothes that will be downloaded and printed by a 3D printer in our very own homes. Israel-based 3D printer clothing designer Danit Peleg commented: *"We used to buy CDs, and we had to go to the physical stores to get music and now we can just download it everywhere… I believe that the same thing will happen with fashion eventually — clothes will become more and more digital."* Ministry of Supply, another 3D printing clothing designer, noted that materials could also be customized for each individual and that the benefits of 3D printed clothing are not limited to aesthetics and fit but also airflow, the ability to move seamlessly and ultimately to last longer.

Exhibit 80: 3D printed clothing by Danit Peleg and Ministry of Supply

Source: Danit Peleg and Ministry of Supply

To take this a step further, researchers at the University of Central Florida have created color-changing fabric called ChroMorphous by weaving micro-wires into thread. The battery-powered fabric is controlled by an app and physically changes color when turned on. This technology is still in its infancy, but certainly suggests the IoT is applicable to the world of fashion. How many dress shirts would you own if changing the color and style were as easy as pressing a button on an app?

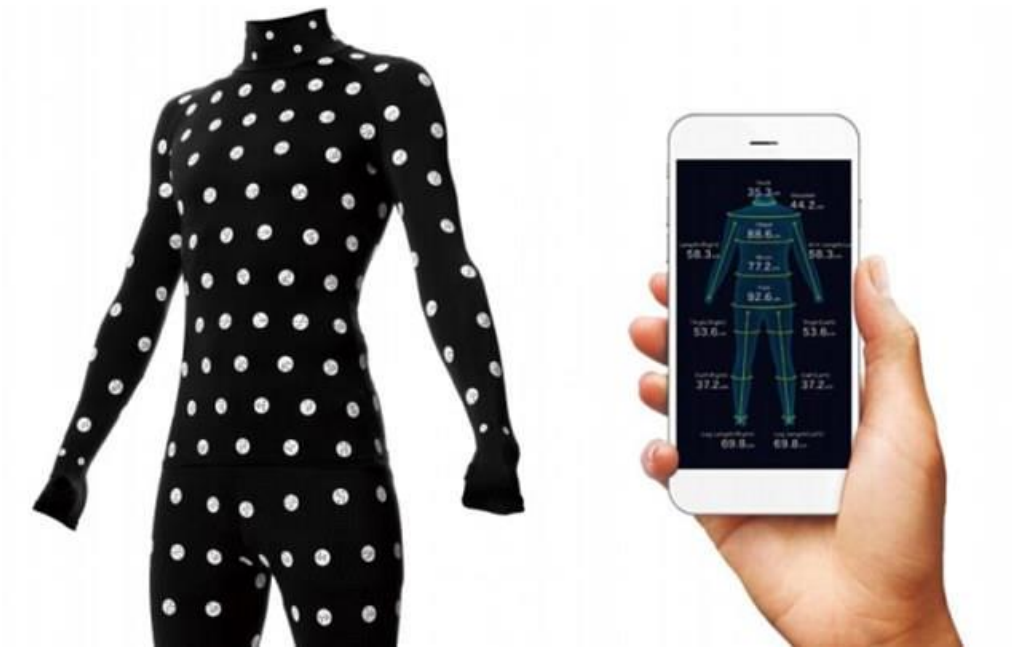
Exhibit 81: ChroMorphous Fabric

Source: University of Central Florida

Startups Metail and Amazon-acquired Body Lab launched with the goal of merging the human form with digital content. Body Lab's goal was to create true-to-life 3D body models and was implemented to predict and measure the 3D shape of the body. This technology suggests that the traditional argument in the name of stores —"Customers like to touch and feel the product"— could be under assault as technology could assist in size/fit selection along with giving a customer a sense of what he/she could look like in an item. In December of 2017, Amazon was issued patents that include an augmented reality mirror. The mirror is set to offer a blended reality display that puts your image into a virtual scene, and puts you in a virtual version of your desired attire. The blended-reality display, described in the patent, relies on a system of cameras, projectors, displays, mirrors and lights that can add layers of pixels to your moving image on a real-time basis.

In addition, Zozo from Japan is improving sizing technologies with its Zozosuit—a close-fitting body suit with hundreds of small dots that act as markers. Shoppers take photos of themselves wearing the suit and the brand's app captures their precise 3D measurements, so they order clothes from the brand that should fit perfectly.

Exhibit 82: Japanese company Zozo is able to perfectly size consumers using body suit technology



Source: RBC Capital Markets. Google Images.

Value Chain Step 3: Manufacturing—Better, Faster… Who is the Owner?

Our dialogue with company C-suites indicates a majority of companies understand the power of bespoke consumerism, however, for many businesses, demand for personalization runs counter to the dominant model of providing high-volume products or services through mass distribution or generic service suppliers. The move from mass production to mass personalization to bespoke consumerism can have big cost implications, so there must be a net benefit to the business to pursue this model. The challenge is to determine how many options are necessary for a product or a service to feel unique while still being profitable. The evolution of this step in the supply chain is straightforward. Historically production lines in facilities would mass-produce products—one facility, for example, with multiple production lines, very quickly mass producing the same products often with different lines each

producing flavors, fragrances, colors and sizes. Today, leveraging 3D printing technology one production line is able to produce personalized products with a few variants and it may take a few weeks. In the future, production devices (including at home 3D printers) will be able to produce bespoke products with a combination of variants within a few hours.

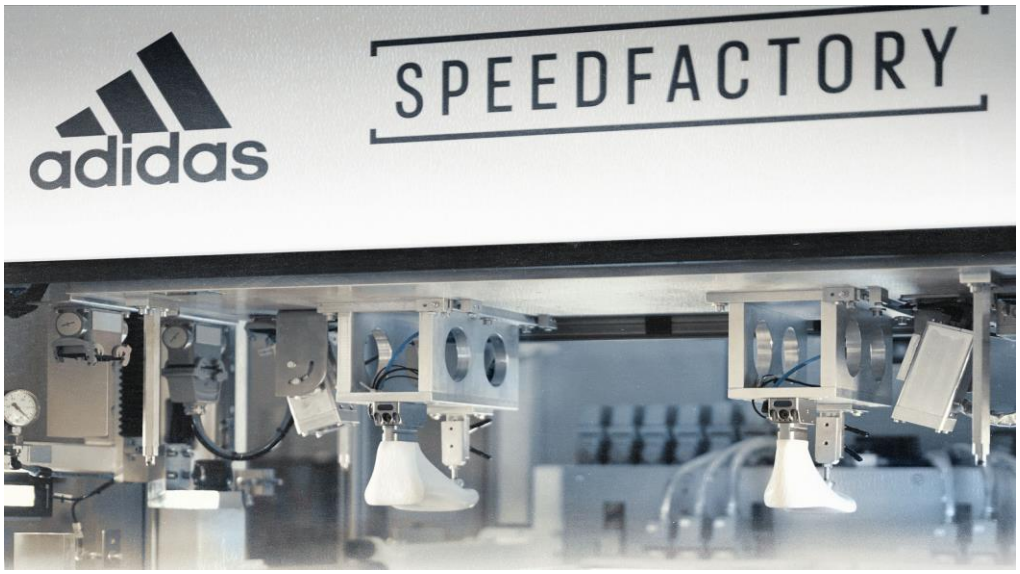
We expect all consumers will be able to affordably design their own shoes (in store or even at home) with a completely custom sole, made specifically for their size, weight, and gait, and see a finished product within minutes (in store) or within a day (at home).

Years ago, footwear companies were early adopters of 3D printing to help create fast prototypes for new sneaker models. However, today, 3D printing is starting to become a part of the supply chain. Nike teamed up with Hewlett Packard to use 3D printing to reduce time-to-market for new products. Several of the biggest brands in footwear, including Nike, adidas, Vans, Under Armour, and Converse, already allow users to create custom versions of their shoes online that turn around between 3 to 5 weeks. For example, at Nike's Soho retail store in New York, consumers have the opportunity to design their own shoes at the "NikeLab Bespoke iD", which offers a customizable and personal design experience with one-on-one appointments with dedicated Nike Design consultants. Consumers can choose an Air Force 1 high, Air Force 1 Low or an Air Max 1 and over 400 premium materials, to be tailored to their exact specifications. Consumers must first make a reservation and meet with a designer in a private appointment. They will leave the appointment with hand-drawn sketches and digital renderings of their completely custom shoe. The "handcrafted" shoe will then arrive for pickup or delivery in 6-8 weeks.

Nike teamed up with Hewlett Packard to use 3D printing to reduce time-to-market for new products.

While this level of personalization did not exist a few years ago, we believe it will pale in comparison to what will be available by 2025. In fact, we expect all consumers will be able to affordably design their own shoes (in store or even at home) with a completely custom sole, made specifically for their size, weight, and gait, and see a finished product within minutes (in store) or within a day (at home). adidas sees this as one of the end goals for its new manufacturing process called Speedfactory (which leverages robots and 3D printing to create a more localized and customized manufacturing process).

Exhibit 83: adidas Speedfactory leverages 3D printing technology to create custom sneakers



Source: adidas

Today, China is regarded as the "world's 3D printer" but protectionist trade policies with China could change that. If developed-market trade with China abates behind trade policy, then reinvestment in 3D printing technologies will accelerate.

Right now, high-end 3D printing clothing may cost over $1,000 (excluding the cost of an expensive, over $1,000 3D printer itself) and take 100 hours to print. Like all advancements in technology, we expect both cost and time to completion to come down over time and are already noticing this reflected in industry projections (not necessarily at an exponential rate). However, the cost reduction in 3D printing over time may accelerate if the US continues to instill protectionist policies. Today, China is regarded as the "world's 3D printer," but protectionist trade policies with China could change that. If developed-market trade with China abates behind trade policy, then reinvestment in 3D printing technologies will accelerate.

The Next Industrial Revolution?

The industrial revolution essentially came from steam and electric power improving transport and manufacturing. The advancements in creating/harnessing energy suddenly enabled materials (such as trees from a forest) to be transported to factories where items were then made in scale by machines. This created factory jobs making cities grow in size very quickly. Shops located near these factories naturally flourished as customer traffic increased.

We believe 3D printing technology (combined with internet connectivity) will catalyze change, similar in magnitude to the industrial revolution. If 3D printing capabilities continue to increase while cost comes down, it will become a staple of every home. Today we are really only printing items made of plastics or composites, but what if technology to create liquids, medicine, or even food is uncovered? What if you could print a bottle of shampoo without leaving the house? If the need for factories decreases, will people still choose to live in cities where the cost of living is higher? The only requisite will be printing materials, which could conceivably be pumped into your home printer like a water tap.

What if *printing materials could be pumped into a home printer like a water tap? What if consumers could 3D print personalized products in their own home? What if the need for factories decreases?*

What if *automation, the Industrial IoT, and 3D printing capabilities removed the need for manufacturing in low-cost regions? Could this drive companies to reinvest in the US and other developed markets where higher-skilled workers reside?*

3D printing food?

Companies like Natural Machines (the makers of Foodini) are pushing the envelope of what is possible. Today, many 3D printers are simply being used to make food more aesthetically pleasing (shapes, designs, etc.). We urge investors to look past this application and focus on finished or near-finished product printing. For example, the Foodini can essentially make a pizza from scratch—it very precisely prints the dough in the shape of your choosing, applies sauce, and adds cheese and other ingredients.

Exhibit 84: Foodini picture

Source: Natural Machines – Foodini

What happens when 3D printers can communicate and/or are built into household ovens and pizzas can be printed and cooked while you are commuting home from work? What will happen to the upwards of 75k pizzerias in the US when a printer makes a more consistent pizza in a controlled environment thereby ensuring a sanitary cooking space? Will grocery stores evolve from finished product goods to primarily packaged ingredients sold in mass to feed in-house 3D printers? Will your 3D printer communicate with your personal indoor vertical farm, letting it know that you are running low on tomatoes?

Consumers were skeptical of the microwave oven too

We share a healthy level of skepticism on 3D printing, but consider the microwave. Despite first being introduced for household use in 1955, microwave ovens did not become widely adopted until the late-1970s, largely because consumers were skeptical of the safety of 'zapping food with electromagnetic waves' (it didn't help that the technology was stumbled upon by Raytheon—an aerospace & defense company known for making missiles). The safety concern was exacerbated in 1973 when a nonprofit organization called Consumers Union published findings suggesting that no microwaves could be considered "completely safe," in part because there was no solid data on safe levels of radiation emission. Overtime, consumers became more comfortable with the technology, and today 96.8% of US households have a microwave oven.

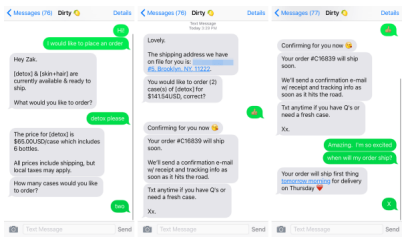
While we do not suspect consumers today have any qualms about the safety of 3D printers, we do believe it is equally difficult to imagine mass adoption (in-home use) and the impact these emerging technologies could have on consumption.

Value Chain Step 4: Consumer Engagement—Bespoke Relationships

Traditionally, consumer engagement has been through mass scale advertising and promotion. One television commercial broadcasted during select television shows, one catalog sent to a select group of households. There would be some variation and specific demographic targeting driven by available data, but this form was largely static. Today, suppliers and retailers alike are able to leverage nascent AI capabilities to engage consumers with personalized email mailing lists, featuring the consumer's name and personal recommendations based on past purchase history. Online retailers can recommend products of potential interest during the shopping experience. In the future through bioanalytical data, consumer and retail companies will frankly know more about the consumer than the consumer knows about themselves and can engage

the consumer accordingly. Among many examples, marketers may understand in real-time if a consumer is tired and geographically near a coffee shop, the marketer could then text the consumer, in a friendly manner reflecting the consumer's current state, a coupon to get coffee nearby. Think about the possibilities available with the data Amazon can collect at AmazonGo stores (purchase history, what time you enter the store and leave, what items you picked up and for how long, what areas of the store you spent the most time, how promotions affected your behavior, etc.).

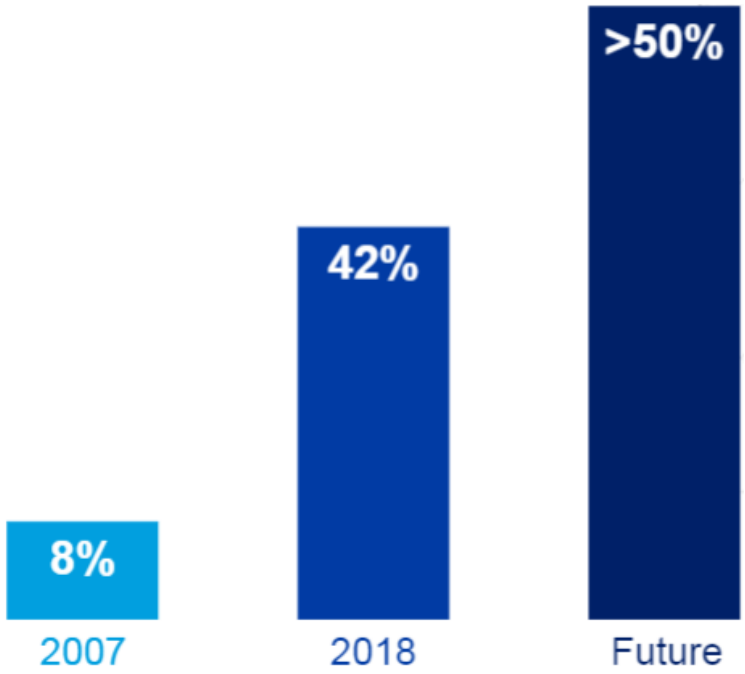
Exhibit 85: How consumers are engaged will completely change

	Past Mass TV, Radio and Print Engagement	Present Mass Personalized Digital Engagement	Future Bespoke Virtual Reality Engagement
Media and Merchandising			
At Home			
In Store			

Source: Google images

CPG companies are well aware of the shift in consumer engagement. P&G on its analyst day noted that the market's collective advertising spend on digital media has grown from 8% in 2007 to 42% today, and will soon exceed 50%. 70% of today's digital media is consumed on a mobile device. Wearable devices are projected to grow from 1 million in 2015 to 200 million in 2021.

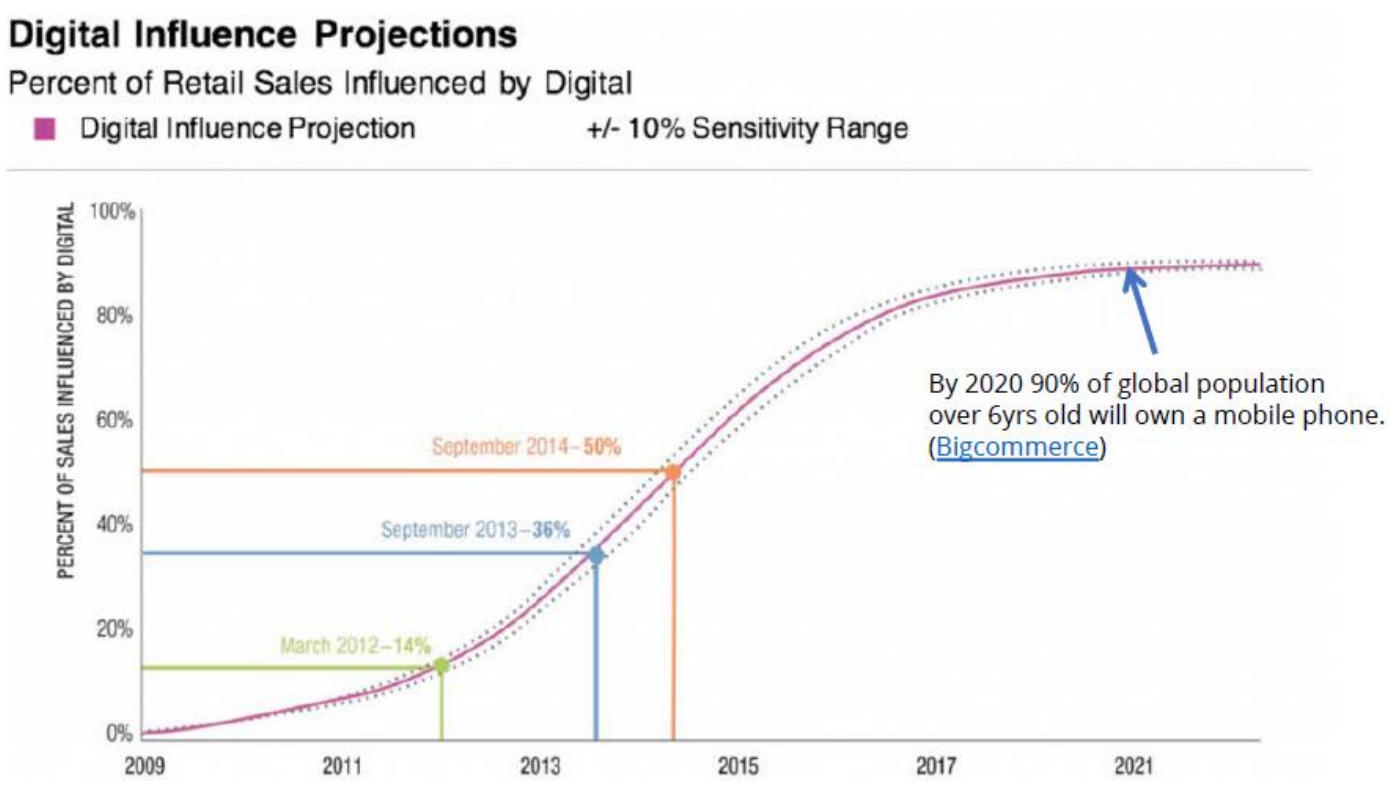
Exhibit 86: P&G estimated % spend on Digital Media



Source: Google images

With companies leveraging data to design and quickly manufacture bespoke products for consumers, the consumer engagement process will also evolve to be a bespoke experience. The evolution of digital-relationship management will drive a significant shift in promotional behavior from the "one size fits all" approach to sharply targeted/individualized actions that should enhance effectiveness and optimize promotional cost/benefit. The media that companies use, how consumers are engaged at home, on the go, and in store will all completely change, all transitioning from mass to bespoke. This is a big opportunity for those who get it right as a Deloitte study found well-executed personalization can deliver 5-8x the return on investment on marketing spend and lift sales by 10% or more. This type of consumer engagement will only become more mainstream as more consumers around the world own a smartphone.

Exhibit 87: By 2020, 90% of the global population over 6 years old will own a smartphone



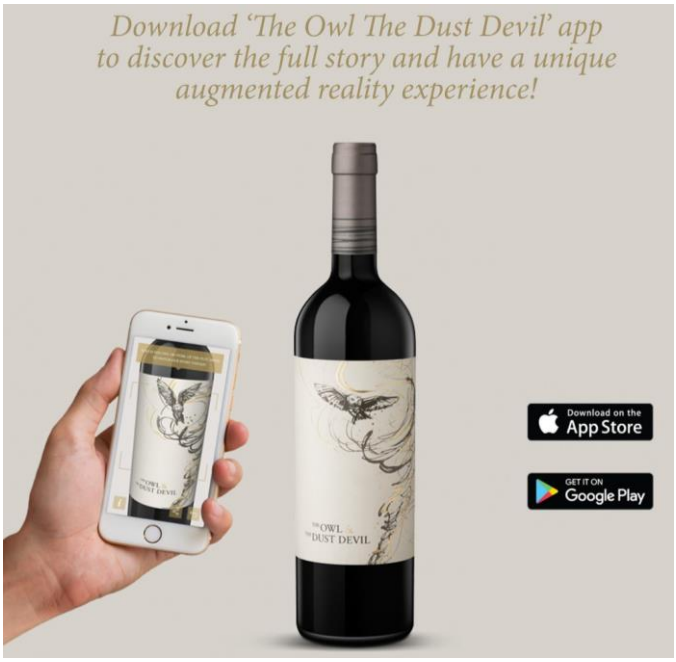
Source: Praxis

AR/VR both in stores or at home will have a growing impact on retail

According to a 2016 report from Deloitte, 84% of customers indicated they used a digital source for shopping-related activities before or during their visit to a brick-and-mortar retailer (Perkins, 2016). This research shows that using AR from navigation around the store, product selection, purchase and checkout and product usage, shoppers can finally take the convenience of online shopping instore. Through the use of AR, retailers can customize their storefronts, product selections, and offer directions to precisely what the customer is looking for in the store. Also in terms of navigation, large retail stores, in particular, present a challenge as shoppers can find it difficult to locate what they are looking for.

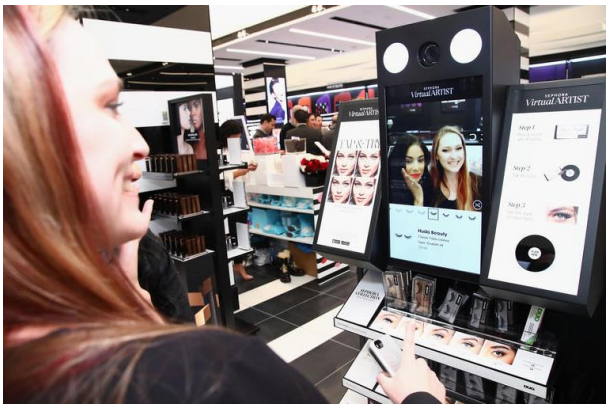
By using AR technology and in-store data it can improve the amount of value to a physical store, AR can help customers locate particular products with AR flags and direction signs. This idea has been piloted in a few Lowe's stores where with any AR-enabled device, a customer can follow turn-by-turn digital directions that appear before them in order to pick up every Lowe's product they need in the most efficient route (Lowe's, 2017). This technology would enable every consumer to see personalized search results and recommendations when they use any AR device whether it is a smartphone or a pair of glasses. Suppliers are also beginning to use Augmented Reality to help tell their brand's story. The Owl and the Dust Devil is one example, where by downloading the wine brand's app and scanning the bottle label, the products details are brought to life in story format on the consumer's phone.

Exhibit 88: The Owl and the Dust Devil augmented-reality application



Source: The Owl and the Dust Devil

Exhibit 89: Sephora is one of the luxury leaders using AR/AI: Virtual Artist and 3D mirror ('try before you buy')



Source: RBC Capital Markets

Seeing the future

Virtual reality experiences will not be limited to the home or any stationary place.

The retail and purchasing experience will all take a step further towards bespoke with the combination of wearables. Unlike the prior example that offers mass personalization through the use of augmented-reality-capable smartphones and in-store interfaces—virtual reality will provide a completely bespoke experience. Importantly, virtual-reality experiences will not be limited to the home or any stationary place.

Even in the event consumers are not at home but would still like to have a virtual-reality shopping experience, Google Glass eyewear could provide a virtual-reality shopping experience anywhere and anytime. Google Glass is a wearable, augmented-reality device developed by Google's X unit. The first iteration of Glass for consumers was discontinued in 2015; Glass Enterprise Edition, however, has been targeted for businesses where it has

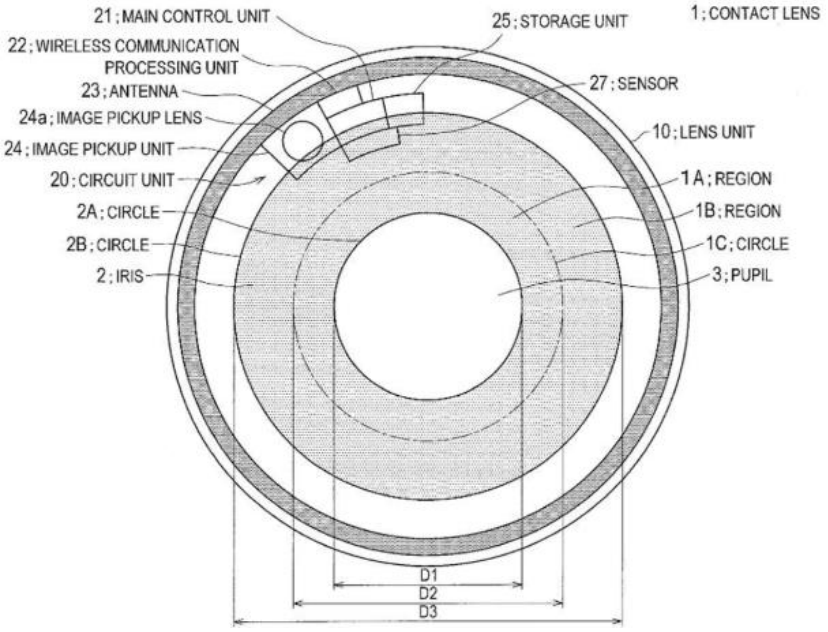
gained traction as a device that increases efficiency, accuracy, and safety. Users can access apps, manuals, and training videos with instructions, all the while keeping their hands engaged on their work. The technology has been tested, and adopted by companies such as Boeing, GE, Volkswagen, and DHL where it has shown positive results, including increased worker productivity. Similarly, start-up Augmedix utilizes Google Glass technology to allow remote transcribing of doctor-patient visits, freeing up providers from time-consuming charting, increasing efficiency and patient volumes.

We are also seeing steps taken towards making a seamless experience for wearable-enabled virtual reality. In 2016, Samsung issued a patent for a contact lens with the ability to record what the wearer sees. Sony also issued a patent for contact lens with embedded "image pickup lenses" and the ability to take user input through deliberate blinks. Google also has a patent for contact lens with an embedded camera. Although Google just recently paused its glucose-sensing eye-contact project, the company says it will still focus on other eye-related projects.

Exhibit 90: The evolution of "Wearables"

Source: RBC Capital Markets. Google Images

Exhibit 91: Sony's patented contact lens with embedded "image pickup lens"

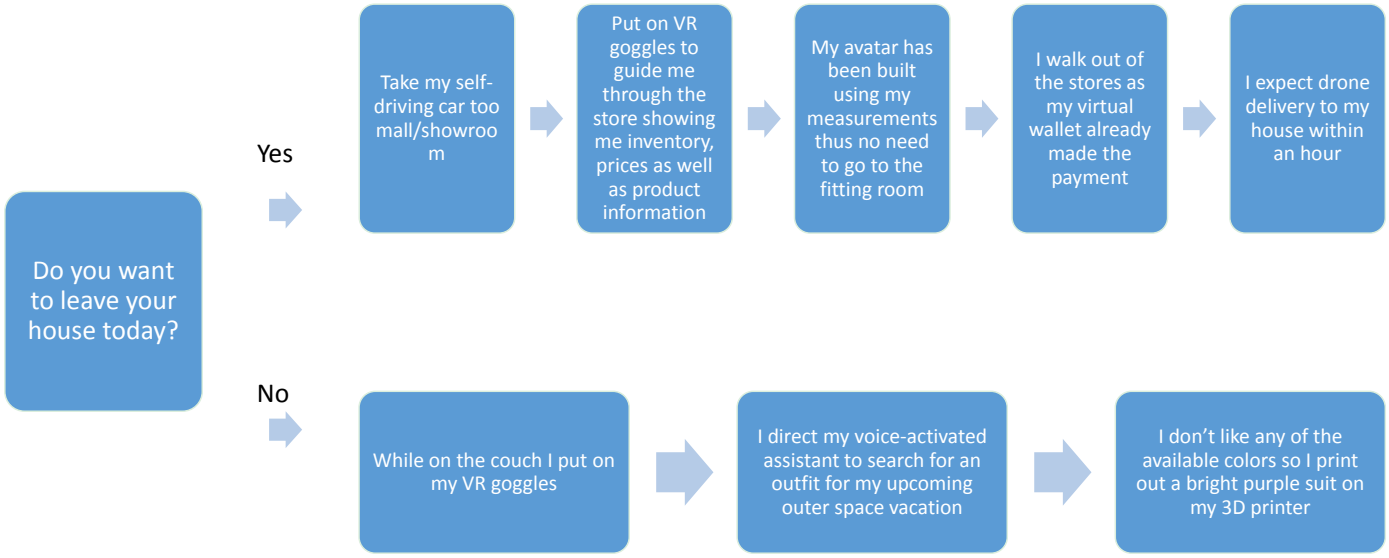


Source: Sony patent, Inverse.com

Value Chain Step 5: Go-to-Market—When you want it, where you want it

The catalogs and circulars of yesterday were accompanied by direct-selling reps, large-scale brick-and-mortar retailers and shopping malls. These routes to market offered plenty of variety, but nothing personalized for consumers. In hindsight they also lacked convenience—direct selling and catalog orders could take weeks before delivery, while malls, food stores and department stores often entailed lugging around items and waiting in long lines at times. Today, Amazon Prime and Amazon Go make for levels of convenience that were unimaginable years ago. The convergence of Big Data, e-commerce and artificial intelligence is driving a complete evolution of the food retail channel, which is quickly transforming from a commodity business to a highly personalized shopping experience. Led by Amazon and strong incumbents, like Kroger, the next five years will feature: 1) lighter in-store labor models; 2) more personalization through increased home delivery and unique one-to-one promotional offerings; 3) rapid consolidation; and 4) through VR, the ability to have a brick-and-mortar shopping experience anywhere, anytime. In the future, we expect to see a world where Amazon, among other retailers, fully anticipates a consumer's demand for goods and delivers those goods daily, in some cases placing them right in the consumer's refrigerator.

Exhibit 92: Reimagining retail journey 2025



Source: RBC Capital Markets

In-store

We do not expect in-store brick-and-mortar shopping will completely vanish, but we do believe it will completely evolve. If a consumer chooses to leave their home and go out to purchase a product, that process must still be incredibly convenient for the consumer and be an experience. Today, Walmart is making a stride forward on convenience by partnering with Waymo to pick up customers using an autonomous vehicle and bring them to the store—often times to pick up click-and-collect products already waiting for the consumer. We would expect restaurants to share this approach by also using autonomous vehicles and Uber and Lyft services to sponsor consumer rides in exchange for eating (or especially drinking) at a particular location.

As it relates to shopping in-store, lines are also being eliminated behind Futureproof Retail and Amazon Go locations. Start-up Futureproof retail is partnering with brick-and-mortar retails, leveraging their technology that allows consumers to self-scan products with their phone and walk out the door, never having to wait online. Amazon Go takes this technology a step further where through the use of spatial recognition, unique customer tagging (through the customer's app), and overhead cameras, customers can simply grab the products they want and walk out—both increasing convenience and removing a large labor component from physical retail. These labor savings could provide Amazon with a funding source to add labor/investment to the second disruptive force: **delivery/personalization**.

Exhibit 93: Amazon Go—the future cashier-free store

Amazon opened its first Amazon Go store in Seattle in January 2018.

Source: CNN

We believe Amazon will force a wave of industry consolidation as incumbents scramble to keep up.

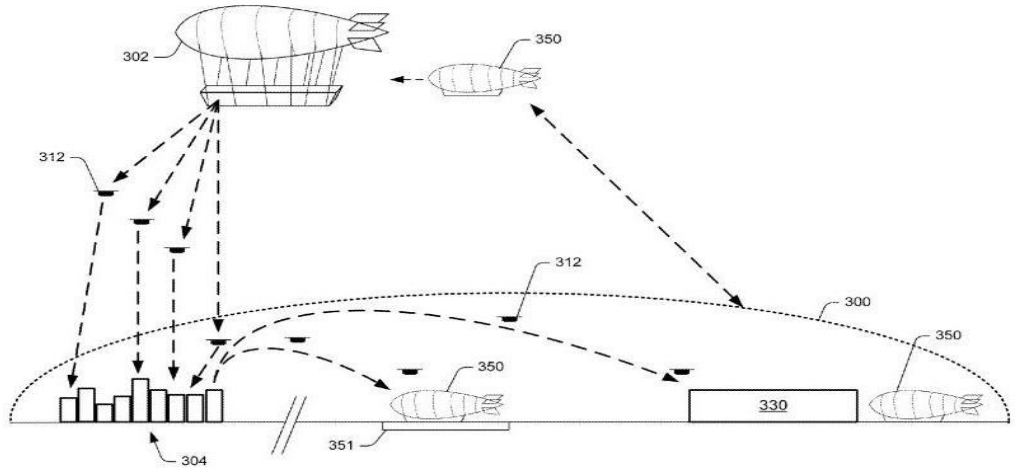
Taking labor out of the store allows Amazon to put funding where it is needed: re-investing either behind last-mile delivery costs or behind price. Amazon is already testing home/car entry order delivery and staging convenient pickup lockers. Ultimately, the last-mile "labor" may come in the form of drone delivery. Universally, shoppers' habits are based on price and convenience. On price, Amazon's knowledge of its customers will result in greater promotional funding from vendors and cross-merchandising opportunities.

***What if** physical shopping consisted of simply tapping an item on your phone or your wearable to add to your virtual cart and then simply walking through a scanner to process the items in your virtual cart? Would there be a need for the service industry and specifically cashiers?*

Away from store

Last-mile delivery has become increasingly important as e-commerce gains traction. Amazon has been talking about its drone-delivery model (Prime Air) since 2013, with the stated aim of a completely autonomous order-to-delivery time of 30 minutes. Start-ups like Hivemapper have made the advanced geolocation services of pinpoint drone delivery possible. Amazon has been doing a private trial and successfully completed its first drone delivery in England in December 2016. However, recently the FAA has approved drone pilot programs for 10 companies, including Alphabet and Uber (not yet for Amazon). This is one step closer to making drone delivery a reality. Amazon has even filed a patent to deliver the drones from a blimp warehouse.

Exhibit 94: Amazon has filed a patent for a flying blimp warehouse



Source: CNBC

Exhibit 95: Amazon Prime Air

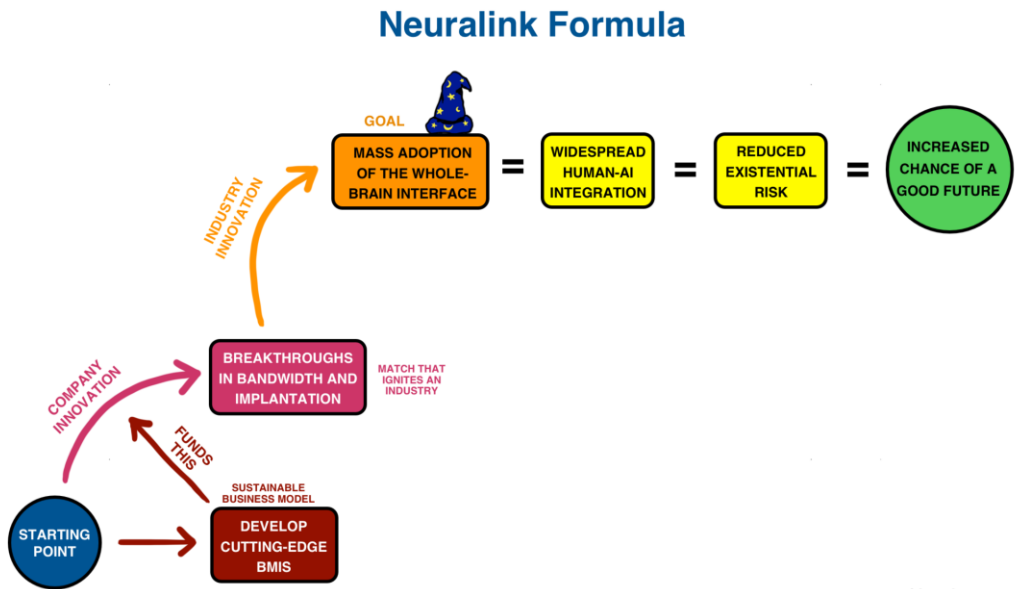
Amazon has filed a patent to launch drones from a blimp warehouse in the sky.

Source: The Daily Mail

Putting a magic hat on and making products appear from nowhere

As we mentioned earlier, we believe voice would be a leading method of ordering products in the future, and Amazon is already leading the way here with Alexa. Eventually, we believe monitors in our kitchen cabinets, refrigerators and closets will be able to determine our specific needs and through AI order consumer products for us. Amazon now also offers a service where delivery personnel could enter your home, placing the product inside your door and upon live request from you (monitoring the delivery on your phone) place the product in your refrigerator or cabinets for you. With increased trust over time, consumers may no longer have to even monitor the delivery since cameras will keep record of the inside home delivery (should something go wrong). Taking this whole scenario a step further, what if you could telepathically order products? Neuralink, a company supported by Elon Musk, is developing ultra-high bandwidth brain-machine interfaces to connect humans and computers. With further advancements in neurology, consumers would be able to simply direct Alexa to order something in their minds.

Exhibit 96: With Neuralink technology, even voice could be taken out of the order-processing equation



Source: WaitButWhy

Theme III: In Cloud We Trust

Our theme name for the Cloud is "In Cloud We Trust". But in reality, it should be "In Cloud We Must". In a nutshell, the cloud is really an enabler for growth. Cloud is a force multiplier for a business, not a technology distraction to be dealt with. However, before we dive deeper into understanding the future of Cloud Computing and its widespread implications across the consumer space, we thought it would be helpful to understand cloud-computing basics:

To begin, just consider the following according to "Augmented: Life in the Smart Lane" by Brett King:

- Between 1990 and 2005, the capacity of hard disks increased a thousand-fold, and it continues to increase today.
- We produce the same amount of content as stored in the Library of Congress, the largest data library in the world, more than 8,500 times per day.
- Today, the US National Security Agency (NSA) collects as much information as held in the entire Library of Congress every six hours.
- There is already enough storage or disk space in the world to store everything people write, say, perform or photograph every day—with ease.

Exhibit 97: Organizations of all types, the world over, are becoming increasingly dependent on and trusting of cloud computing

Source: What's Big Data

Transitioning from on-premise (traditional software) to cloud (modern software)

Prior to the advent of the cloud computing delivery model, software was traditionally sold as a perpetual, upfront, license-based, on-premise solution where the customer would buy, implement, and support and/or maintain the code in-house while waiting for enhancements from the software sponsor. However, we are starting to see the transition of software requirements from on-premise (traditional software) to cloud (modern software).

The on-premise software model, which typically requires heavy upfront costs, began to break down around 2005 as the cloud computing delivery model was introduced, thereby freeing

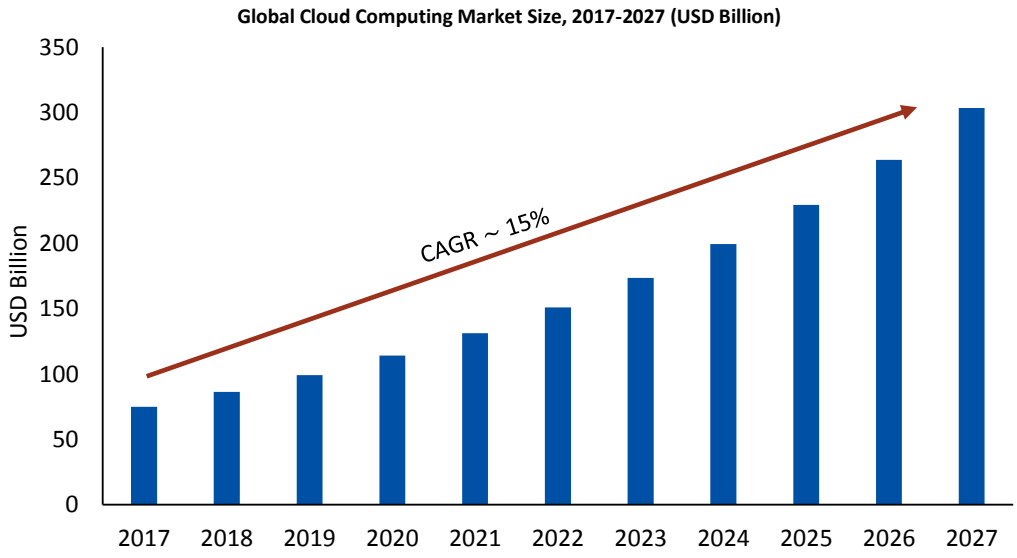
the customer of many vendor and consultant dependencies. The new cloud model allows customers to subscribe to a service in a vendor-hosted model, which is accessible over the Internet via a web browser. This model removes the upfront software investment, as well as the additional costs to maintain and support the software on an ongoing basis—leading to increased convenience and cost savings for subscribers.

We believe some of the greater growth opportunities in software should come from further adoption of cloud computing services in all segments of the market, including the small and medium business (SMB) market, Global 2000 companies, and the further development and implementation of XaaS (Anything as a Service).

Global cloud computing market to grow at an impressive ~15% CAGR over the 10 years from 2017-2027.

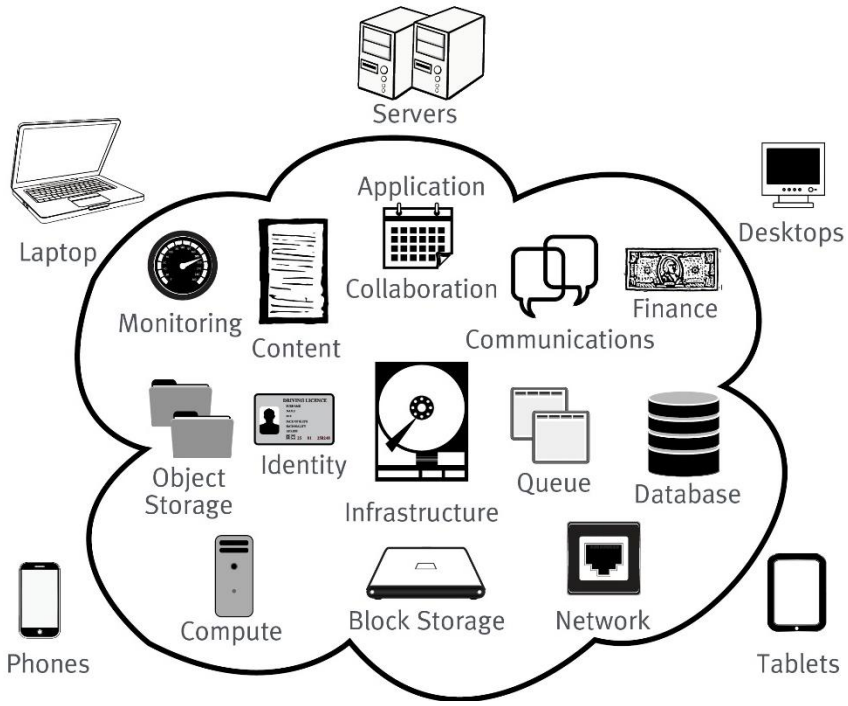
This transition is happening quickly, driving the global cloud computing market to grow at an impressive ~15% CAGR over the 10 years from 2017-2027, according to Market Research Future.

Exhibit 98: Global cloud computing growth



Source: Market Research Future

Exhibit 99: Examples of cloud computing



Source: RBC Capital Markets

In the example above, we illustrate cloud computing as a series of tasks that are accessed via a variety of endpoints including desktops, laptops, tablets, phones as well as internet of things devices, which we will discuss later in this section.

At its core, cloud computing is a "utility-like" method of delivering solutions versus the traditional method, which we refer to as "on-premise."

Cloud is a new substitute for nearly everything in computing, leaving us more and more dependent on this technology

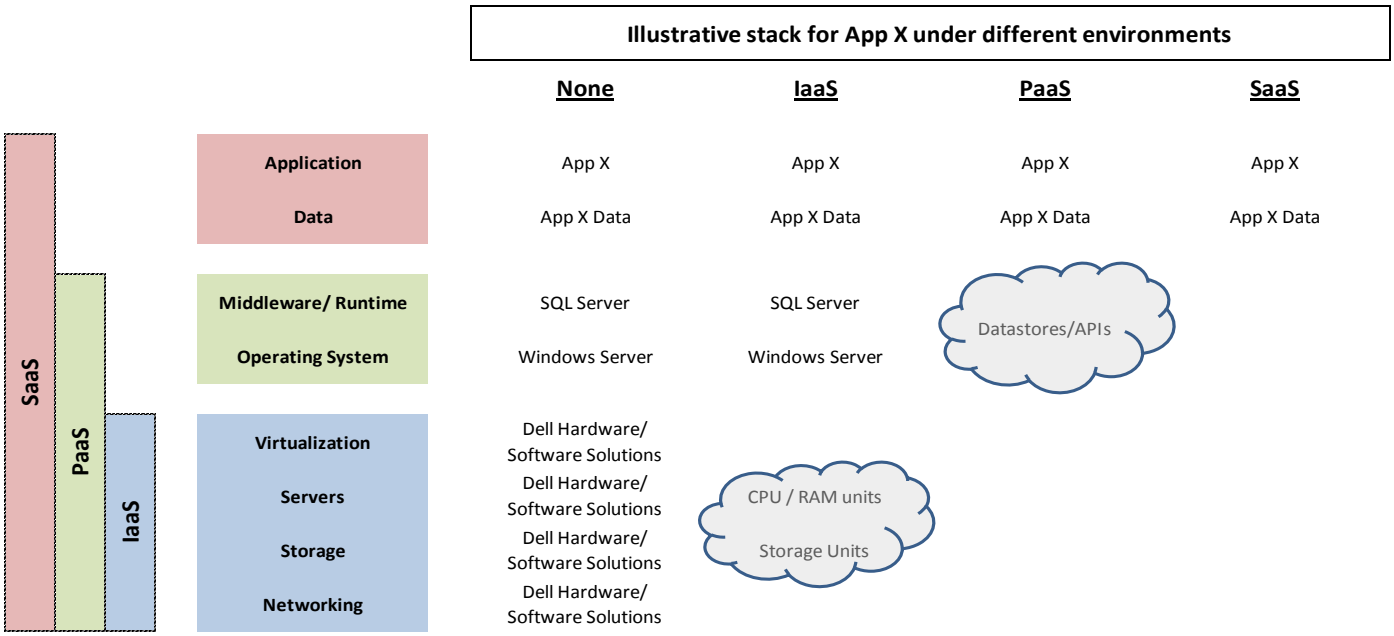
In the next exhibit, we illustrate how the rise of cloud applications has abstracted everything but the application layer—the final point of contact at the end user. When applications are delivered from the cloud, the vendor takes on responsibility for delivering the application, the underlying infrastructure (database, storage, compute, etc.), the operations of the stack (i.e., keeping it up and running) as well as upgrades and innovation at the application layer.

Infrastructure as a Service (IaaS)*:* On-demand cloud services that provide underlying network infrastructure like physical computing resources, data portioning, scaling, backup, processing, and storage.

Platform as a Service (PaaS)*:* Cloud services that allow developers and companies to develop, run, and manage applications without the complexity of building and maintaining the relevant infrastructure (Runtime, middleware operating system, virtualization, servers, databases, storage and networking).

Software as a Service (SaaS)*:* A licensing and delivery model in which software is centrally hosted and delivered on a subscription basis, basically on-demand software.

Exhibit 100: The end user is concerned with less the higher up the stack we go



Source: Strategi; RBC

By 2020, a corporate 'no cloud' policy will be as rare as a 'no-internet' policy is today. We think about the implications of "the cloud" on the consumer space along the following vectors: 1) enabling growth, 2) reducing costs, 3) emerging competition, 4) the catalyst for alliances, and 5) more secure.

1) The Ultimate Enabler

Ultimately, we see Cloud as the ultimate enabler—if a consumer business has unique ideas and innovation, the cloud enables organizations to bring those ideas forward quickly and at scale. For example, the cloud services offered by AWS and Azure are ubiquitous in that for the same price a company based out of a garage could purchase just as much compute and storage at the same price as a Fortune 500 company. For those consumer companies with a unique message and innovation to sell, there are several ways the cloud enables communication, execution and in turn growth.

1) **Enables efficient cross-department communication –** cloud services are applicable to R&D design capabilities, manufacturing, distribution, salesforce customer management and execution and end-consumer engagement as well as corporate functions.
2) **Is Bespoke to business needs in real time** – as business units look to pursue new opportunities, with the cloud they will be able to target those business opportunities right away, not waiting for the organization to deploy additional applications, storage space, networks and systems. The cloud enables employees to use systems within minutes.
3) **An International growth driver –** the cloud facilitates connectivity across numerous locations, which enables different offices to remain in contact and to work with the same IT resources and information. Web-based cloud environments also reduce much of the risk involved with global expansion by allowing organizations to tap into new markets without needing to maintain a physical presence in that particular area of the world.
4) **Brings organization to the bleeding edge of back-end IT innovation** – how about having Amazon, Microsoft and Google as your new R&D team? As soon as AWS, Microsoft and Google, among other cloud providers, come up with a cloud innovation, the innovation is immediately available to your organization. You no longer have to invest yourself in

software capabilities. For consumer companies, these resources could be reallocated to brand building, enhancing the consumer experience and/or invest in innovation.

5) **The cloud is always on** – too often do employees across industries experience downtime periods for IT maintenance and upgrades that disable them from completing work. With the cloud, that is never an issue, it is always on.

Can the cloud help optimize promotions with big data

Promotional spending is a big bucket of spend in every consumer company's P/L. Offering products on sale is an easy way for a company to lure consumers away from one brand and convince them to buy theirs instead. The hope is that a consumer will enjoy the product so much that he or she purchases even in the absence of a sale next time. What if the consumer will not purchase the product again? Or what if the consumer would have purchased the product anyways so the sale is simply lost revenue?

Approximately 2 out of 3 promotions are ineffective and lose money, but big data has the capability to change this. Kraft Heinz is an example of a company that is leveraging advanced analytics data and software for in-depth consumer insights to better optimize promotions and in-store execution. Kraft Heinz will have employees in stores measuring data points that will be analyzed by the company's partner in this endeavor, IBM. The goal of the IBM partnership is to generate information to optimize pricing, promotions, and inventory levels in real-time.

We are at the start of the use of data analytics for promotional pricing and spending, but already there are elements around us that point toward customer-by-customer optimization being the norm. Consider a world where all coupons are digital and optimized based on prior shopping history and artificial intelligence. Applying this data, a 40-year-old bargain hunter with three children might get a coupon for a certain brand of peanut butter, but a different 40-year-old who also has three children would not get a coupon for that particular product because she has purchased that particular brand of peanut butter every two weeks for the past 10 years. This would allow companies to optimize trade spend and increase margins across their portfolio. The use of these algorithms and data can also be applied on the retail/restaurant side of the business to draw in new customers while maintaining strong margins.

One question that remains to be unanswered is: *"Who will own the data?"* No one wants to offer any sort of concessions today when it comes to owning the rights to consumer data. Amazon and Walmart own two of the largest pools of consumer data, and the speed of additional data collection is only increasing as the world becomes more digital. The problem with most consumer companies selling through these massive retailers is that they have little control over things like consumer data. Digital marketplaces keep the data for their own personal use, creating a major headwind for the industry, which is why people like Kraft Heinz have in-store employees collecting additional data.

With retail/restaurant delivery, some companies have agreements with the third-party services to share the data jointly. It is not clear where the industry is moving and who will own the data in future, but this is a critical piece to continue to watch in the next 5-10 years.

Keep in mind, for the cloud to enable growth, internet is required

A primary hang-up for Cloud as an enabler for organizations globally is that connectivity to the internet is required. This does not help the salesforces of Coca-Cola and Unilever selling products in the far corners of the world nor would it help Colgate among most companies in emerging market-manufacturing facilities today. Even in the US, EJ Gallo invested in best-in-class cloud capabilities (salesforce CRM, a data warehouse from SAP and MapR for its data lake) but ultimately decided to keep most software on-premise, primarily because of the

remoteness of its locations including its 15 wineries and 23,000 acres of vineyards across California. But this is the opportunity looking to 2025 and beyond.

Alphabet seems to continue moving forward with its Project Loon internet balloon service, bringing rural internet to Kenya this past summer. Meanwhile Facebook, SpaceX, Boeing, Intelsat and OneWeb (a business backed by Softbank) are all working to launch satellites that will bring reliable internet to remote areas. We would not dismiss any of these parties. OneWeb's specific approach is to create a "global low-earth constellation" of satellites that will provide high-speed internet connectivity, equivalent to terrestrial fiber optic networks, to everyone, everywhere on earth. The company is also looking to revolutionize satellite manufacturing, noting that no one has ever made a satellite in one day and the company plans to make several every day.

Exhibit 101: OneWeb global internet satellite coverage

Source: SpaceNews

2) Win-Win: A Value Proposition for Client and Provider

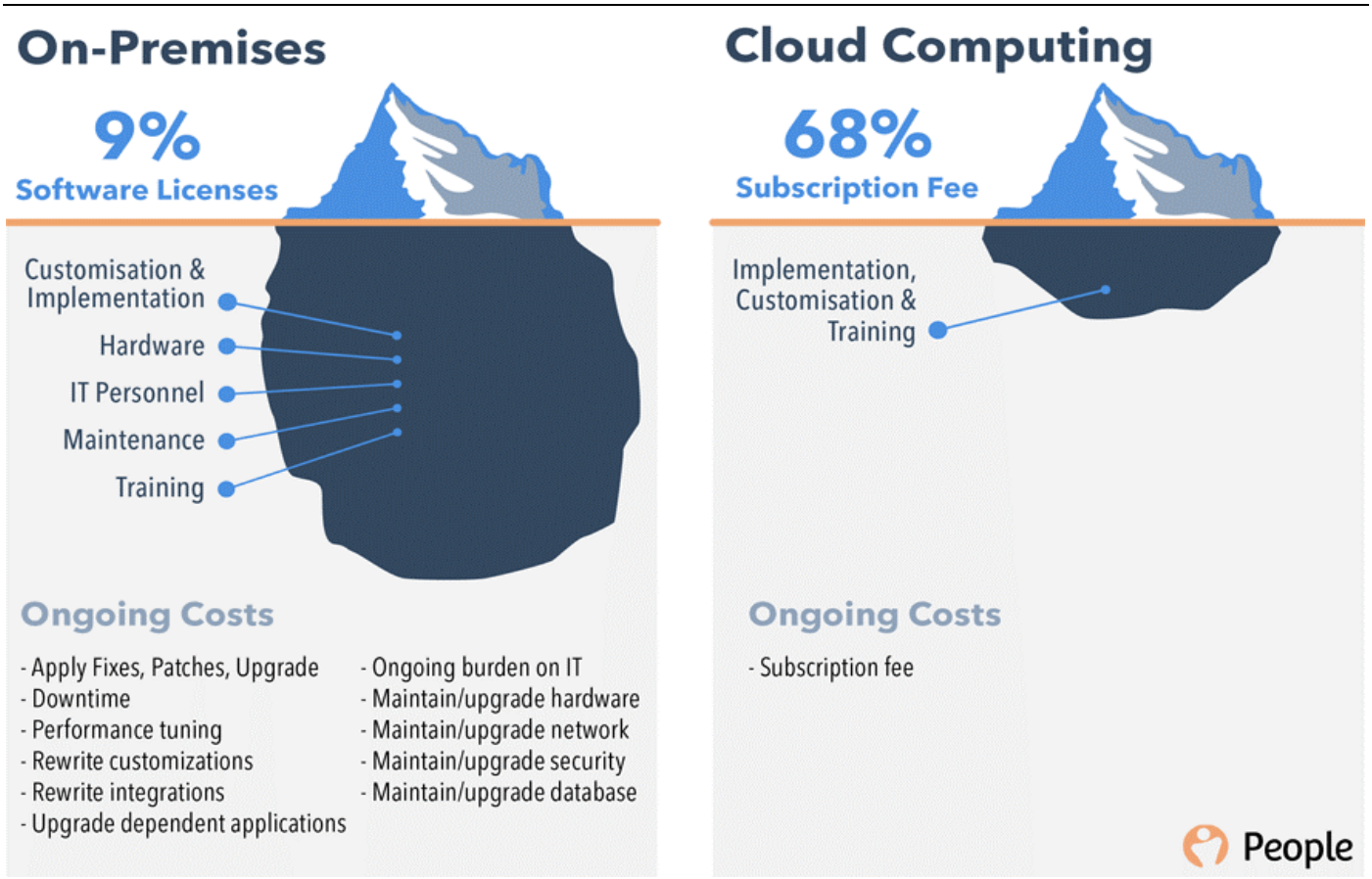
In addition to spurring growth, the cloud is cheaper than on-premise software storage solutions by as much as 40%+ over a 10-year period (a percentage that is only likely to increase as cloud services quickly become more affordable). To understand cloud-driven cost savings, a comprehensive view of a company's spending across departments and the three financial statements is critical.

I. Accounting for the trade-off in capex spend for SG&A spend: In addition to substantial dollar savings over a 4+ year period, migrating to the cloud also leads to differences in accounting for IT related spend. Building out and maintaining on-premise software centers is considered intensive capex spending, whereas spending on cloud services is an ongoing SG&A subscription spend model. Management teams that are incentivized on earnings will likely be more reluctant to switch to the cloud because the cost shifts to increase SG&A, directly weighing on EBIT, net income and EPS. The cloud also makes businesses more asset light. Company-owned on-premise data centers are considered assets that depreciate over time and provide a boost to the asset column of the balance sheet, compared to cloud services, which are an ongoing expense/liability. To this end, long-term FCF remains king. Management teams that are incentivized by long-term FCF generation will have an easier

time deciding to make the cloud transition than those incentivized by near-term operating margin and EPS to which a cloud transition is a direct near-term hit.

II. Looking at the costs beneath the service: Management teams must recognize that without a doubt the subscription component of software spend is significantly higher for cloud versus on-premise (as much as 68% of total cost versus on-premise 9%). Cloud migration also may include incremental spending up front, leading to savings versus on-premise over the long run. However, outside of implementing, customizing and training employees as the cloud rolls out through an organization, the subscription is the only type of ongoing costs. With on-premise software, while the software license is much cheaper, there are a series of underlying costs, many of which are ongoing. These include the same customization, implementation and training costs affiliated with cloud (costs that are required as software changes whether it is on-premise or not) as well as the very expensive costs of Hardware (capex), real estate for both the servers and IT personnel (owned or leased), maintenance (capex) as well as the ever-increasing cost of IT personnel. More specifically, these underlying costs beyond the subscription fee include fixes, patches and upgrades to the software and servers, downtime (which is disruptive for employees), employee and management distraction, performance tuning, rewriting customizations (an element we would only expect to increase as business becomes more dynamic), application/hardware/network/database upgrades and, most importantly, upgrades to security. All the while, there may be even more hidden HR costs associated with IR personnel turnover and procurement volatility around the hiring of third parties to assist with changes and expenses.

Exhibit 102: Price comparison between on-premise and cloud computing software



Source: People

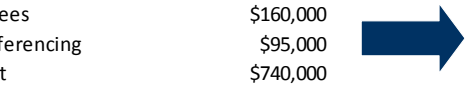
The cloud shift also increases revenue for software providers… and that is a good thing for all?

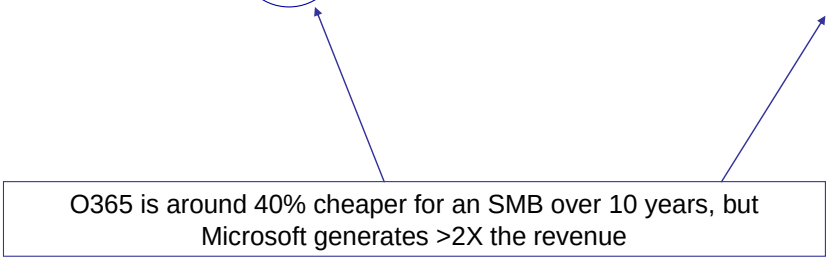
Transitioning to the cloud is a win-win for cloud providers, it: 1) enables cloud customer growth as we previously explained; 2) reduces long-run costs for cloud customers; and 3) increases the revenues for cloud software providers by 2x or more versus legacy software (think Microsoft, Amazon and Google, 3 of the 4 most valuable companies in the world). Why is this a good thing for consumer companies? Well, theoretically these funds will be used to reinvest (which these companies have a very strong track record of) to develop better cloud solutions that enable more growth and save more costs for consumer companies. The issue here, no surprise, is Amazon, which uses its AWS profits (following aggressive reinvestment) to fund its very disruptive profit-losing consumer business.

Exhibit 103: Example of the O365 win-win for SMB customers and Microsoft

Office Costs	
Implementation	$90,000
Hardware	$110,000
Licenses	$120,000
Hosting Fees	$160,000
Web Conferencing	$95,000
IT Support	$740,000
Total	**$1,315,000**
Annualized Cost to Customer	$131,500
Annualized Revenue to Microsoft	$12,000

O365 Costs	
Implementation	$17,000
Hardware	$21,000
O365 Subscription	$270,000
Administration	$440,000
Total	**$748,000**
Annualized Cost to Customer	$74,800
Annualized Revenue to Microsoft	$27,000





Source: Company reports, RBC Capital Markets

But cloud cost savings require up-front investment and patience

The irony is that while cloud adoption can result in lower total costs, many executives are reluctant to spend and make the cloud transition. Instead of transitioning what we see as new business units within an organization starting out on the cloud, while the legacy systems remain on premise. This is particularly true as it relates to costs associated with XaaS. A Deloitte survey found that more than one third of executives cite cost concerns as the top challenge; with 45% noting that XaaS expenses (even though they skew lower) are difficult to predict and plan for. Costs could also be duplicative if organizations are using cloud-based software without central IT's visibility and involvement. The key is to actually commit and get going with the transition to cloud as cost reductions are fully achieved as the company becomes more comfortable using its services for IT needs. One progressive step forward we would expect companies to take looking out to 2025 is to leverage DaaS (Desktop as a Service) where employees will not even have a local hard drive / laptop at their desk but simply work off their monitors, keyboard and phone. These devices may give way to voice and even telepathy as we have discussed in this report—driving further cost/capex savings. All that is solid melts into the cloud, right?

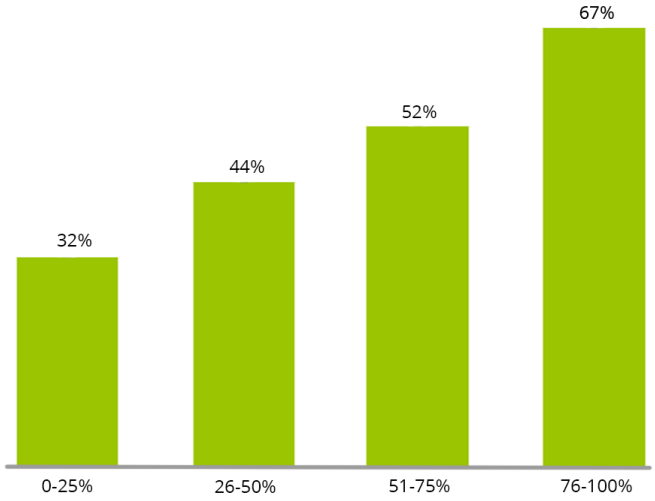
What if *current valuations are not accounting for the long-run margin tailwind related to migrating to the cloud? Will players who transitioned to the cloud be at a structural advantage for funding A&P and R&D versus players who maintain legacy on-premise systems?*

What if *data shortage becomes an issue? If data growth sustains the rampant pace we have seen and supply additions do not scale as they historically have, will we see a fundamental re-evaluation of data storage costs as the delta between data growth and capacity growth widens?*

Exhibit 104: Cloud software becomes more cost efficient over time

Figure 1: Companies With a Greater Proportion of XaaS Are Likely to Achieve Cost Reductions

Mostly/fully achieving cost reduction through XaaS

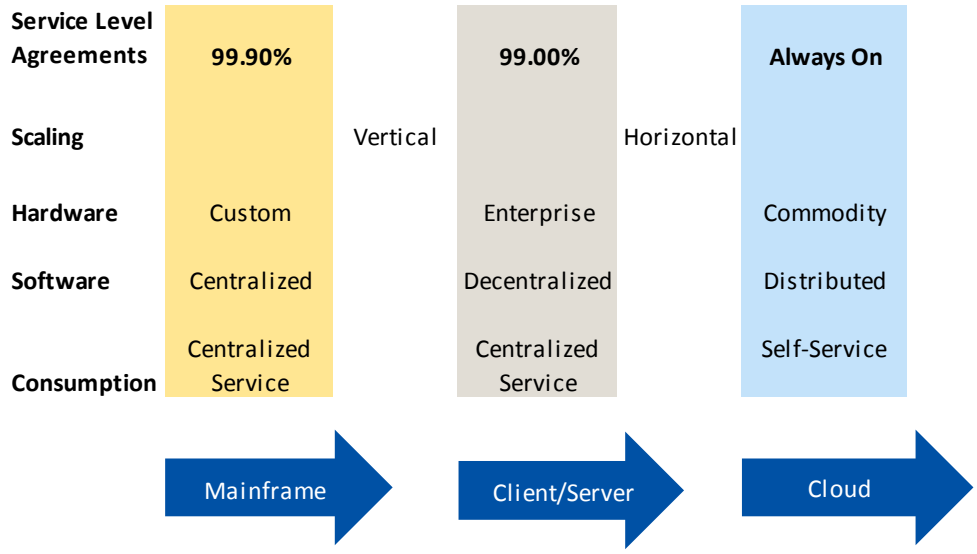


Source: 2018 Accelerating Agility with XaaS study by Deloitte

3) Instant Scale for the Ankle-Biters

Getting into more detail on the future of cloud and transitioning from the prior Agility Imperative theme, it is clear that cloud also plays a role in agility. The rule of thumb in Silicon Valley is that disruption does not happen unless something is 10x Cheaper, 10x Better or 10x Faster; but you will not get funding from VCs until you can fulfil all of the above.

Exhibit 105: A cloud world moves faster



Source: Cloudscaling.com, RBC Capital Markets

Inevitably, once there's a large audience, companies have to disrupt themselves through innovation or they will be victims of their own success.

We are seeing increasing conversations at the C level of companies that are trying to embrace Digital Transformation processes that center on the same concepts. For example, Agile Development—not just for engineers, but trying to introduce the concept of Moving Fast and Breaking Things across standard business processes/project management—becomes more relevant and possible in a cloud centric world with faster feedback loops.

Inevitably, once there is a large audience, companies have to disrupt themselves through innovation or they will be victims of their own success.

How do companies become irrelevant? Slowly, then suddenly

Companies are starting to realize that nothing is sacred—not even low-margin businesses like grocery that can be re-imagined under the cloud (IoT farm-to-table avocados?).

Because a cloud world is inflationary (winners get bigger quicker), the countervailing observation is that legacy players are deflationary. Being caught on the wrong side of relevance has seen disastrous consequences (one need look no further than the traditional and specialty retailers that failed to embrace/adapt to the e-commerce revolution).

A trend investors have been watching for the past several years is a number of infrastructure vendors going private, including BMC, TIBCO, Informatica, Compuware and Riverbed, while other public vendors have underperformed, including CA and Teradata. Why is this happening?

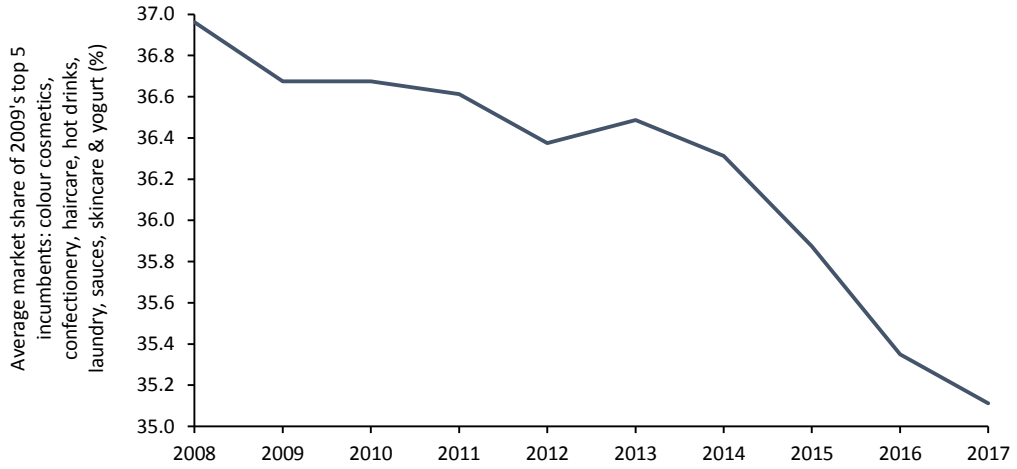
As more services move to the cloud, it means CTOs need to purchase less on-premise infrastructure hardware and software for private clouds. That means less load balancers, less middleware, less general datacenter plumbing. Instead of customers absorbing the cost for infrastructure, cloud or platform vendors assume those costs that can be spread over a larger number of customers. It is effectively an economy-of-scale situation where the economics favor the cloud and platform players vs. the on-premise vendors. Effectively, the spending on overall infrastructure software and hardware decreases and at the same time shifts.

Reinvestment to compete with the Day One mindset: The pace of innovation/investment is torrid in Tech land relative to other "undisruptable" industries, especially in a world where capital is abundant. Companies are starting to realize that nothing is sacred—not even low-margin businesses like grocery that can be re-imagined under the cloud (IoT farm-to-table avocados?).

The ankle biters are attacking in staples…

In general, we believe that the large consumer goods companies are clinging to what has worked for them in the past rather than tackling, let alone embracing, the sort of changes envisioned in our Imagine 2025 report. A lack of cutting-edge technological investment, agility and innovation has led incumbents in the staples space to lose market share in recent years. Those taking share are the "ankle-biters"—numerous start-ups whose on-trend, personalized and innovative products resonate more with the modern consumer.

Exhibit 106: The staples incumbents are losing market share

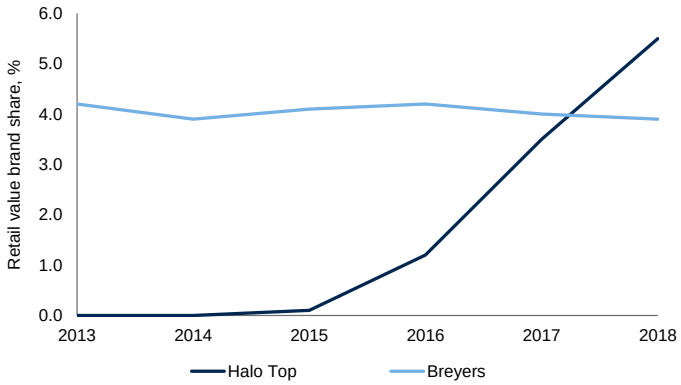


Source: Euromonitor, RBC Capital Markets

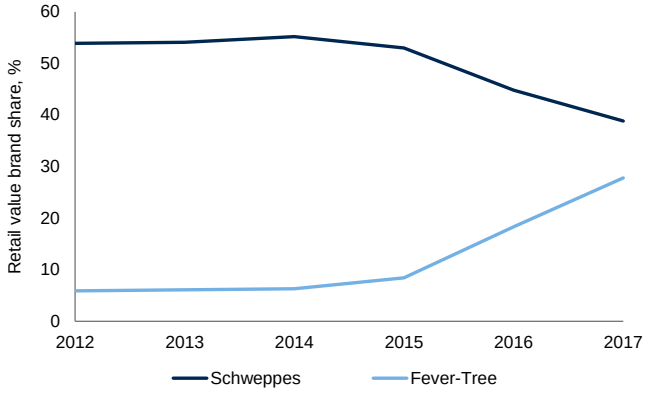
So far, the incumbents have responded by acquiring these "ankle-biters", or simply launching copycat brands. For example, after low-calorie ice cream Halo Top usurped Breyers in the US market, Unilever launched a similar high-protein, low-sugar ice cream in July. However, as you can see from the chart below, this was too little too late. Similarly, in the UK Coca-Cola Europe's Schweppes brand has been losing market share to premium tonic brand, Fever-Tree. The launch of premium Schweppes 1783 did nothing to stall its remarkable growth and it has now reached 30% value share in the UK's off-trade tonic water market. We think that, as global leaders in many of their categories, instead of following others, the staples incumbents should be increasing investments into their own technology and innovation in order to create original products that drive these emerging trends. Furthermore, there are simply too many of these "ankle-biters" to acquire them all.

Exhibit 107: The ankle-biters

Halo Top vs Unilever's Breyers in the US ice-cream market



Fever-Tree vs Schweppes in the UK tonic water market



Source: Euromonitor

Importantly though, this incumbent versus challenger issue is not limited to staples but also applies to retail and more discretionary categories, the small competitors are winning.

Exhibit 108: Retail 2.5 started 5-10 years ago

Category	Incumbent	New Competition	
Women's Intimates	Victoria's Secret	aerie AdoreMe thirdlove True & Co	Lively
Apparel	Gap/ Banana Republic/ J. Crew	Everlane bonobos untuckit MM Lafleur Revolve Bombfell	Dia+Co Tradesy Gwenie Bee Le Tote Rent the Runway
Beauty	Department stores / ULTA/ Sephora	Glossier Beauty Pie Birch Box Ipsy	Function of Beauty Blush Deceim
Jewellery	Department stores/ Zales/ Kay	Catbird Au Rate Vrai & Oro Mejuri	
Footwear	Nike/ Nine West/ Cole Haan	allbird APL M. Gemi Greats	
Luggage	Samsonite/ Tumi	AWAY	
Underwear	Hanes	Mack Wheldon	
Shaving	P&G (Gillette)	Harrys Billie	
Mattress	Seeley	Casper Purple Leesa	
Eyewear	Luxotica	Warby Parker	

Source: RBC Capital Markets

Shopify enabling direct to consumer for all? Including the little guys

Shopify is a leading cloud-based commerce platform designed for small and medium-sized businesses. Shopify's mission-critical software enables merchants to manage product and inventory, process orders and payments, build customer relationships and leverage analytics and reporting across all of their sales channels. Shopify's website includes guides for everything a startup would need, including intros to start-up legal advice in countries across the world. We suspect small start-up businesses across consumer and retail are using Shopify to grow their direct-to-consumer offering at scale for a very low cost—competing head to head with the largest consumer players in the world. Shopify's long list of customers include Kylie Cosmetics, MVMT watches, Bombas socks and Death Wish coffee among others.

***What if** barriers to entry for delivering products at scale to consumers are completely broken down?*

Taking it a step further—is the cloud empowered Clothing as a Service (CaaS) the future of fashion?

According to online plus-sized retailer Gwynnie Bee, subscription is a superior model for the modern fashion consumer—and the company is white-labeling its CaaS (Clothing-as-a-Service) platform, which will allow retailers to offer a subscription clothing rental business alongside their existing way of doing business. Most Gwynnie Bee customers prefer to swap items rather than own them because they are renting fashion-forward items that may be too on-trend (and therefore too temporary) to invest in. To work with the CaaS platform, retailers are required to send over their inventory, and Gwynnie Bee takes it from there, performing all of the delivery and cleaning logistics in their own warehouses, building a consumer-facing, front-end suite in the retailer's name, and getting paid on a per-customer basis every time a consumer signs on with the retailer's CaaS offering. In this way, the consideration barrier becomes much lower and consumers are more willing to wear many more types of clothes than they are willing to buy outright, which can ultimately lead to more purchasing on the whole as consumers expand their taste and broaden their fashion preview.

4) The Catalyst for a Collaborative Action

Have you ever been unable send an email because the attachment was too large? By 2025, those days should be long gone. The cloud enables data and information sharing in ways that just years ago were impossible leading to more internal and external collaboration with the future's most valuable asset, data. Cloud services such as Dropbox, Box, Google Drive, Amazon Drive, Microsoft OneDrive, Hightail, MediaFire, ShareFile, SugarSync and Tresorit all enable companies (and consumers) to share data both internally and externally. This process is becoming more seamless each year. The issue today we understand is that as much as 70% of data across corporations is not digitized and even if it is digitized, it rests on on-premise servers and that are not fully integrated with the cloud. In the end, the cloud will enable consumer companies to better seek and partner with alliances, a theme we believe will be critical for survival looking out to 2025 and beyond and write about in the next theme, Collective action.

5) As secure as the NSA?

Important to understand that when data is uploaded to the cloud it is disseminated into as much as a million independent files, making it near impossible for hackers to find and piece together. This compares to on-premise where data is sitting idle on physical servers that can be infiltrated by hackers and enable the hacker to easily migrate from one data set to another. A factor to consider as well is who is defending the data. Would you rather have the talent and capabilities of Amazon, Microsoft and Google defend your data or do you trust your own consumer organization?

***Will** valuations change for businesses that are at elevated hacker risk because they either refuse to or are unable to migrate to the cloud?*

Addressing the elephant in the room

Amazon. We would be completely remiss to not discuss Amazon's Amazon Web Services (AWS) business, which is the global leader in cloud services. At its heart Amazon is a tech company, one of the most advanced in the world, and it proves that with its innovation productivity at the expense of margin each quarter. We believe it must be intimidating for consumer companies (suppliers and retailers alike) to read about Amazon's consumer business advancements each quarter, let alone the company's AWS advancements, which are written in a cryptic language to anyone not immediately familiar with the tech and more specifically the cloud industry and how the cloud works. To that end, we thought it would be helpful to translate Amazon's latest AWS advancements to more familiar terms for ourselves, executives and other consumer industry members not operating in tech/cloud-specific functions.

Exhibit 109: Translating Amazon Web Services Developments for one and all

AWS Developments Per Amazon's 3Q18 Earnings Press Release	Translation
Together with DXC, AWS announced a multi-year, global agreement to build a new multi-billion dollar DXC - AWS Integrated Practice that will deliver IT migration, application transformation, and business innovation to global Fortune 1000 clients. The DXC - AWS Integrated Practice will offer clients secure, cloud-first solutions that combine the breadth and depth of cloud services offered through AWS with DXC enterprise services to enable them to innovate in their industries, be more agile, and better adapt to dynamic market conditions with speed and at scale while also modernizing their operations for a digital era.	DXC, like many other third party companies, is a service provider that consults companies on migrating to the cloud. Amazon is simply announcing here that they have expanded their partnership with DXC, and while we understand DXC is cloud provider agnostic, this expanded partnership may be a catalyst for companies migrating to AWS rather than AWS cloud competitors.
AWS announced the general availability of new High Memory instances for Amazon Elastic Compute Cloud (Amazon EC2). Built to run large in-memory databases, including production deployments of SAP HANA, Amazon EC2 High Memory instances deliver 6 TB, 9 TB, and 12 TB of memory today, with 18 TB and 24 TB instances coming in 2019. AWS announced the general availability of T3 instances, the next generation of burstable general-purpose instances for Amazon EC2, providing up to 30 percent improved price performance than previous generation T2 instances. Designed for applications with variable CPU usage that experience occasional spikes in demand, T3 instances enable customers' applications to burst seamlessly to meet temporary traffic peaks and then scale back down to operate at typical traffic levels. T3 instances feature Intel Xeon Scalable processors and support up to 5 Gbps in peak network bandwidth.	These updates relate to an upgrade of AWS's computational and storage capabilities, now also being offered at lower price points. Importantly, one of the benefits of the cloud and cloud services is that cloud users have the option to purchase as little or as much computational and storage capabilities as they need at a specific time (which is what Amazon Elastic Compute Cloud - Amazon EC2) refers to. An example would be during Cyber Monday, brands may require additional compute/storage to handle increased web traffic to their brand's website. Whereas during other parts of the year these capabilities are not required. Overall, an excellent, cost efficient solution for online retailers who have made the cloud migration.
AWS announced general availability of a high frequency instance (z1d) for Amazon EC2, as well as the next generation of memory optimized instances (R5), and memory optimized instances with local storage (R5d). z1d instances are designed for workloads requiring the highest single-thread performance along with a large amount of memory; these are workloads such as electronic design automation, relational databases, and financial simulations. R5 and R5d instances deliver improved price-per-gigabyte for memory intensive applications, such as high performance databases, in-memory caches and databases, and big data analytics.	Amazon is increasing the availability of its previously announced, highest computing capacity services.
AWS announced the general availability of Amazon Aurora Serverless, a new deployment option for Amazon Aurora that automatically starts, scales, and shuts down database capacity with per-second billing for applications with less predictable usage patterns. Amazon Aurora Serverless offers database capacity without the need to provision, scale, and manage any servers, and brings the power of the MySQL-compatible database built for the cloud to applications with intermittent or cyclical usage patterns.	AWS has developed capabilities to become increasingly more tailored to customer's preferences and needs, becoming more accurate and automatic in the level of services provided and their corresponding cost.
At VMworld 2018, AWS announced Amazon Relational Database Service (Amazon RDS) on VMware. Amazon RDS on VMware is a service that will make it easy for customers to set up, operate, and scale databases in VMware-based software-defined data centers and hybrid environments and to migrate them to AWS or VMware Cloud on AWS. Available in the coming months, Amazon RDS on VMware will support Microsoft SQL Server, Oracle, PostgreSQL, MySQL, and MariaDB databases.	Amazon as a whole is trying to undercut Relational Database Service dominant Oracle, by offering similar functionality at a much cheaper price. The partnership with VMWare adds value to AWS's hybrid (part cloud, part on-premise) offerings.
Together with VMware, AWS announced the expansion of VMware Cloud on AWS into the AWS Asia Pacific (Sydney) Region, with additional regions expected to go live in Q4 including Asia Pacific (Tokyo), EU (Ireland), U.S. West (N. California), U.S. East (Ohio), and AWS GovCloud (U.S.). VMware Cloud on AWS offers customers an operationally consistent and familiar way to run, manage, and secure applications in a hybrid cloud, with access to a broad range of innovative and comprehensive AWS services and robust disaster protection. New customers include Massachusetts Institute of Technology, Playtika, and Stagecoach.	AWS is launching VMWare's hybrid Cloud in new markets. The hybrid cloud is the concept that some data will have to be in the cloud, while other data is on premise. For context, MSFT has been winning share because they have good hybrid solutions (companies are already using office for example).
AWS announced two more Amazon Lightsail instance sizes at the top end of the range, 16 GB and 32 GB, and reduced pricing by up to 50 percent for existing instances. Amazon Lightsail gives customers access to the power of AWS with the simplicity of a virtual private server. This marks the fourth time AWS has reduced prices thus far in 2018, and the 67th time since its inception.	Amazon Lightsail is a virtual private server - a "virtual machine sold as a service". Here they are just introducing more power at a lower cost. Servers are physical hardware that companies own, now effectively with Amazon Lightsail companies theoretically no longer need to own any metal servers at all. Soon employees will also no longer have desktop servers at their desk.
AWS announced the general availability of IoT Device Defender, a fully-managed service that helps customers keep their connected devices safe by auditing device fleets, detecting anomalous behavior, and recommending mitigations for any issues found. AWS IoT Device Defender makes it easy to maintain and enforce IoT configurations - such as ensuring device identity, authenticating and authorizing devices, and encrypting device data - while allowing customers to work at scale and in an environment that contains multiple types of devices.	In addition to the stronger compute, more tailored service, and cloud transition advancements all at a lower cost as mentioned above, AWS is also stepping up security to keep customer information safe at scale. The US Department of Defense, CIA and NSA are AWS clients.

Source: Bureau of Labor Statistics and RBC Capital Markets

Additional updates from AWS re: Invent 2018

AWS's late November AWS re:Invent 2018 event in Las Vegas had 53,000 in attendance (a 23% increase from 43,000 last year in 2017) —reaffirming more people across industries continue to embrace the cloud paradigm shift, with AWS as the leader. With the rate of cloud innovation above and new innovations described below, AWS is generating $27B in run-rate revenue last quarter (+46% y/y) that represented $2.1B in dollar growth vs Azure's dollar growth of $1B. Below, we outlined the key updates AWS shared at its event.

- **S3 Glacier Deep Archive for long-term data retention:** A new Amazon S3 storage class that provides secure, durable object storage for long-term data retention and digital preservation. S3 Glacier Deep Archive offers the lowest price of storage in AWS, and reliably stores any amount of data. It is the ideal storage class for customers who need to make archival, durable copies of data that rarely, if ever, need to be accessed. As management noted, "you'd have to be out of your mind to manage your own tape".
- **AWS Control Tower:** This service automates the set-up of a baseline environment, or landing zone, that is a secure, well-architected, multi-account AWS environment. The configuration of the landing zone is based on best practices that have been established by working with thousands of enterprise customers to create a secure environment that makes it easier to govern AWS workloads with rules for security, operations, and compliance.
- **AWS Security Hubs:** A new service in preview that gives users a comprehensive view of high-priority security alerts and compliance status across AWS accounts. With Security Hub, users have a single place that aggregates, organizes, and prioritizes security alerts, or findings, from multiple AWS services, such as Amazon GuardDuty, Amazon Inspector, and Amazon Macie, as well as from AWS Partner solutions such as Palo Alto Networks, Splunk, Check Point, Fortinet, etc.
- **AWS Lake Formation:** A service that makes it easy to set up a secure data lake in days. A data lake is a centralized, curated, and secured repository that stores all data, both in its original form and prepared for analysis. A data lake enables users to break down data silos and combine different types of analytics to gain insights and guide better business decisions.
- **AWS Inferentia:** Is a machine-learning inference chip, custom designed by AWS to deliver high-throughput, low-latency inference performance at an extremely low cost. AWS Inferentia will support the TensorFlow, Apache MXNet, and PyTorch deep-learning frameworks, as well as models that use the ONNX format.
- **Amazon Timestream:** A purpose-built time series database service for collecting, storing, and processing time-series data such as server and network logs, sensor data, and industrial telemetry data for IoT and operational applications. Amazon Timestream processes trillions of events per day at one-tenth the cost of relational databases, with up to one thousand times faster query performance than a general-purpose database.
- **Amazon Forecast:** A fully managed service that uses machine learning to create highly accurate forecasts. Uses the same technology Amazon has used for years to forecast its own business.
- **Amazon Managed Blockchain:** A fully managed service that makes it easy to create and manage scalable Blockchain networks using the popular open-source frameworks Hyperledger Fabric and Ethereum.

The strategic Amazon conflict for consumer companies

With Amazon's cloud excellence and continued innovation clear from above, consumer suppliers and retailers alike run into a strategic challenge. AWS clearly provides best-in-class, rapidly improving, becoming less expensive and increasingly secure services (so much so that the Department of Defense, CIA and NSA have hired it for cloud services). But should consumer companies hire AWS? For many suppliers, Amazon is quickly becoming 10%+ of

annual sales. Strategically, should consumer suppliers also leave Amazon to manage a piece of or, in the future, their entire IT infrastructure? For established retailers, the conflict is just as, if not more, severe in that Amazon is their biggest competitor. Unsurprisingly, Walmart chose not to partner with Amazon and instead with #2 player Microsoft Azure (also a very strong cloud platform). But with this decision is Walmart at risk of putting its eggs all in one cloud basket and would it further lose out to retailers that may choose to hire AWS and therefore become more competitive (assuming AWS services are better and cheaper than Azure).

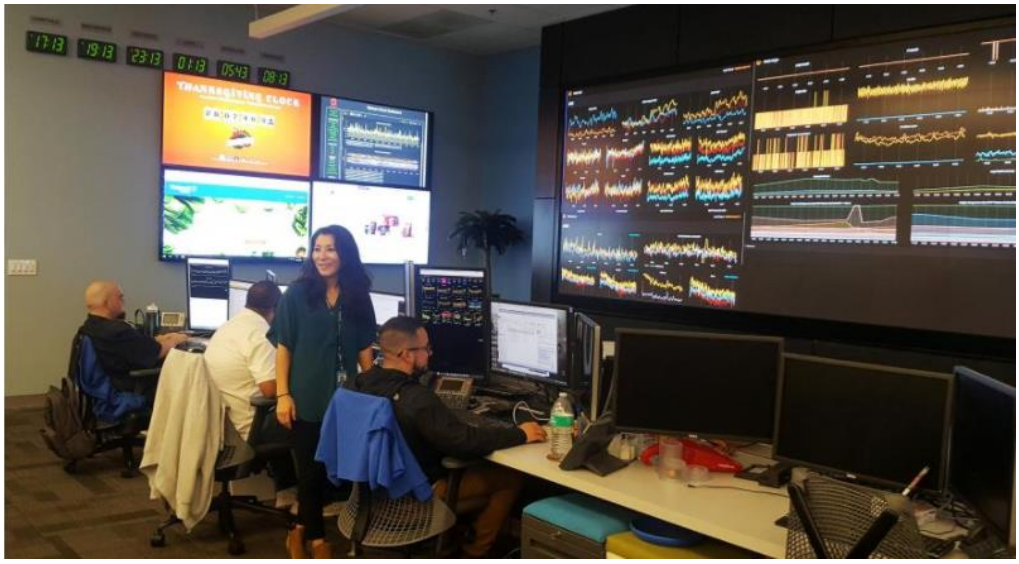
Walmart's cloud initiatives—an attempt to close the gap with Amazon

As Walmart fights to narrow the e-commerce gap with Amazon, the retail giant has made significant investments behind the scene in the cloud with Microsoft Azure and on-premise support its website. Over the past five years, Walmart has spent millions of dollars building six giant server farms, each larger than ten football fields. These facilities, using cloud technology, are enabling the company to crunch limitless amounts of data gathered on its consumers (whether it be in-store or online).

While many retailers are capable of renting out servers from massive data rooms that are run as third parties, Walmart is: a) simply too big to successfully use any single 3rd-party; and b) looking to expand on its online capabilities by driving online sales through the power of big data. Further, Walmart believes that the development of a more cloud native environment will allow it to further expand on its global IoT platform. Where, for example, connected HVAC and refrigeration units can be seamlessly controlled through the power of machine learning to reduce energy usage or selecting the most efficient routes for Walmart's thousands of trucks in the supply chain.

According to the Reuters, the effort is helping Walmart stay competitive with Amazon on pricing and more effectively control key supply chain functions, such as inventory management. Additionally, Walmart is using cloud data to manage in-stocks of items more frequently purchased through voice shopping devices such as Google Home. From an in-store perspective, using the data of Walmart's countless transactions, the company has sped up the process by which customers can return online purchases to their local stores by 60% and with this same set of data, adjust prices at its locations across different regions. Further, this partnership was announced just weeks after reports suggested that Microsoft is working on technology to rival Amazon Go technology for cashier-free stores. Walmart has not confirmed that this technology will be part of the Microsoft partnership, but given Walmart's abundance of forward-thinking initiatives, it would make sense that this would be an easy win for both companies.

Exhibit 110: Walmart's network operations in Sunnyvale, CA



Source: Reuters, RBC Capital Markets

The internet of things underpinned by cloud

Before moving on, we also wanted to discuss the internet of things, which is underpinned by the cloud and will have a far-reaching impact across the consumer product and retail landscape—small appliances, tools, security systems, voice, augmented- and virtual-reality products will all be enabled in part by the cloud.

Breaking down what makes the Internet of Things possible

Cloud: With billions of devices expected to be connected by 2025, the amount of data generated would be enormous. Companies cannot afford to develop in-house infrastructure to process and store this data, and that is driving the need for the cloud to process and store data continuously. Cloud computing is the ideal way, in our opinion, to address the demand for deploying hundreds of application servers that are needed to support these devices.

Data management: As more and more devices become connected, they transmit large amounts of data through sensors and other machines that need to be managed and analyzed continuously across large data systems. The need to manage unstructured and geospatial data coming from the devices is becoming increasingly important. IoT calls for specific capabilities to handle diverse data constantly streaming from numerous sources. It is driving data management from the central repository toward the edge of the network, saving time, improving efficiency, and preventing the need for overwhelming databases. Managing the data at the edge also allows for performing some of the real-time analytics without the need to access the central network.

Application enablement: Application enablement is a middle-ware platform primarily needed to ease connectivity, manage devices, and data-collection activities of any IoT solution. One of the better ways to link the IoT devices to applications is through the application-enablement platform. This allows for the creation of a reliable, scalable, and cost-effective platform for the IoT solution. Application enablement also provides features such as access control and easy options for any future changes.

Connectivity management: This piece of the IoT platform stack is required to ensure the connectivity paths between the devices and servers are managed and monitored. It also

provides additional tools such as real-time connectivity status, reporting, troubleshooting, and profile creation.

Device management: Device management involves managing multiple IoT devices remotely for specific functions such as reboot, factory reset, firmware download, or firmware update. Several devices can be managed at once through an application programming interface (API) on the managing agent. For example, retail products that are connected through IoT at the end consumers can all be upgraded for firmware remotely. Connectivity logs within individual devices help address specific problems remotely without the need for in-person troubleshooting.

Hardware: Hardware in the IoT platform includes the end devices that are used to collect information and transmit for analytics. The hardware specific to IoT consists primarily of sensors to collect information and RF chips to transfer information to the cloud through the network.

Driving forces behind IoT

We think IoT is creating a fundamental shift in how enterprises approach their businesses. Organizations across all industries are seeing incremental benefits from sensor data that identify areas of both cost and operating efficiencies. In recent years, the explosion of data volumes and the number of connected devices used by consumers and enterprises have vaulted the IoT market and its ancillary markets, such as networking, as organizations have begun to invest in network infrastructure and capacity to manage the high data traffic from the sensors. We expect the IoT industry to remain prominent and grow at a more than 20% rate over the next several years.

Expanding use cases: In its early stages, a connected device was primarily used for tracking and asset management. With technological advances, sensors have become increasingly more powerful in a smaller form factor. These advanced sensors enable use in cases beyond simple location-based services such as home automation, connected vehicles, smart energy, service management, and factory automation, among others.

We believe software and component companies are best positioned to reap the benefits from a broader IoT adoption.

From an end-market perspective, we are most bullish on markets that have a defined refresh cycle (automotive) or industries that can enjoy substantial cost savings from IoT (industrial, manufacturing, and energy).

Robust growth expected for software and component companies: We believe software and component companies are best positioned to reap the benefits from a broader IoT adoption. Analytics software provides the end tool that makes sense of the massive amount of data collected from the devices, enabling companies to gain real-time visibility into their business. Beyond the software vendors, component companies that supply endpoint chips and sensors should also see robust growth as more organizations seek to gain competitive advantage by making everyday objects “smart.”

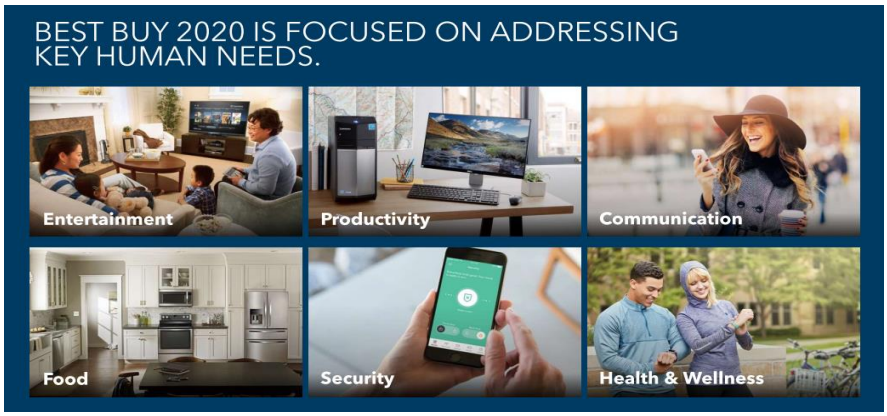
End-market beneficiaries: From an end-market perspective, we are most bullish on markets that have a defined refresh cycle (automotive) or industries that can enjoy substantial cost savings from IoT (industrial, manufacturing, and energy). We highlight our expectations for key end-markets below.

Best Buy leverages cloud capabilities to bring its 2020 strategy to life

At Best Buy’s 2017 Analyst Day, management shared their Best Buy 2020 vision. Best Buy 2020 is designed to take advantage of growth opportunities by building a leading position in the smart-home market, and focusing on key human needs in entertainment, health and wellness, productivity and security (among others). By leveraging emerging cloud technology, Best Buy rolled out enhanced smart-home products in all of its stores, including a smart-home security offering powered by Vivint and a health and wellness program called Assured Living, which allows adult children to remotely check in on the wellbeing of aging parents. Through Best Buy 2020, Best Buy wants to transform from a traditional CE retailer into a retailer of connectivity, allowing their customers to stay connected to each other and to each

part of their lives, from things like in-house entertainment to keeping their fridge stocked or taking care of the elderly (among others).

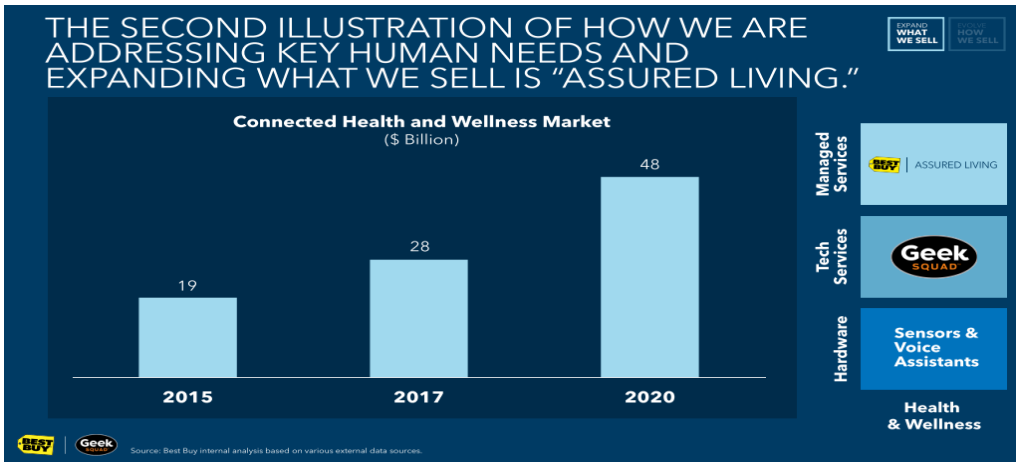
Exhibit 111: Best Buy's 2020 Focus



Source: Best Buy

Best Buy expands into health and wellness market through data connectivity: This past August, Best Buy announced the acquisition of GreatCall, a leading provider of connected health and personal emergency response services to the aging population, with more than 900,000 subscribers. GreatCall's easy-to-use mobile products (smartphones, flip phones, watches and a device that can be worn around the neck or put into a pocket) allow older consumers to stay independent longer and can reduce healthcare costs. We believe technology will be used increasingly in the healthcare field and elder care is a major growth segment, given the aging population in the US. Best Buy believes that the connected health and wellness market is poised to double in the next 3 years. Further, per the acquisition announcement, there are already ~50 million American over the age of 65, and that number is expected to grow by more than 50% within the next 20 years. In addition, according to an AARP survey, 90% of seniors want to stay in their homes as they age, and their primary concern is doing so while not burdening others. If Best Buy can continue to expand the system's user base, we believe it will further the company's goal of building high-margin annuity streams, which could provide greater consistency to their earnings base (investors generally love annuity streams).

Exhibit 112: Connected Health and Wellness market is a growth category



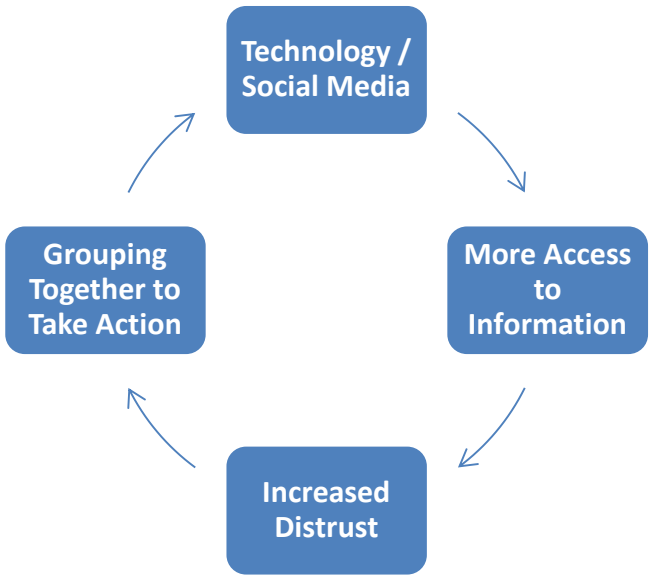
Source: Best Buy

Theme IV: Collective action—Power to the people!

Advancements in global connectivity have increased the pace at which groups can unite and catalyze change (versus relying on traditional institutions).

The idea of "collective action" is by no means a new phenomenon; but advancements in global connectivity have increased the pace at which groups can unite and catalyze change (versus relying on traditional institutions). Over the years, technology has fueled information access that provided more information to the public than ever (uncovering the dark secrets of governments and companies alike), leading to distrust, which groups of people can come together quickly to act upon based given advancements in technology, especially social media.

Exhibit 113: The Collective Action Cycle



Source: RBC Capital Markets

In 2009, Iranian presidential election protests were organized via Bluetooth (after the government shut down all Internet access to limit newsflow). Much of the Arab Spring (2010–2012) was organized on Facebook. The Me Too movement grew through Twitter/Facebook. And this year's Brazilian truck driver strike was organized via WhatsApp.

Some of the most brilliant people throughout history have wasted years of their lives on technologies already in existence. Part of collective action is improvement in the sharing of information, which can catapult society forward.

Take for example the Civil Rights Movement. The efforts of activists and countless protestors brought about legislation to end segregation, black voter suppression and discriminatory employment/housing practices—but it took 14 years (1954–1968). How would this have differed with today's technology in place?

In 2008, a terrorist organization called the FARC (Revolutionary Armed Forces of Colombia) controlled approximately 40% of Colombia. The group was notorious for terrorism, drugs, arms dealing and kidnapping (at the time FARC was holding ~740 hostages, including Colombian presidential candidate Ingrid Betancourt and her campaign manager, Clara Rojas). Frustrated with a lack of government intervention, Oscar Morales created a Facebook group called "One million voices against the FARC." 12 hours later the group had 1,500 members. A day later 4,000. Within a month, Morales and 400k volunteers mobilized approximately 12M people in 200 cities across 40 countries to protest against the regime.

This is just one example of technology's ability to unite individuals. In 2009, Iranian presidential election protests were organized via Bluetooth (after the government shut down all Internet access to limit newsflow). Much of the Arab Spring (2010–2012) was organized on Facebook. The Me Too movement grew through Twitter/Facebook. And this year's Brazilian truck driver strike was organized via WhatsApp. But collective action is not just about shedding light on social injustices or unethical practices (e.g., lack of trust in traditional institutions). It is about the power of scale, the speed of action and the catalyst for unexpected alliances.

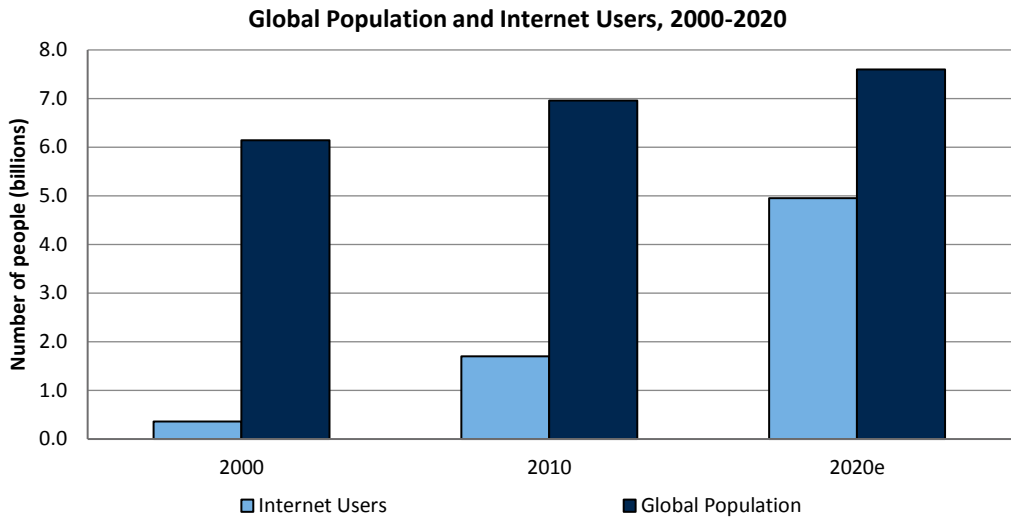
During the 17th century, Isaac Newton and Gottfried Wilhelm Leibniz (among others) each independently discovered calculus. Oxygen, too, was discovered independently by several people (Carl Wilhelm Scheele, Joseph Priestley, Antoine Lavoisier and others). Throughout history there are countless examples of "multiple discovery" including the theory of evolution of species (Charles Darwin and Alfred Russel Wallace), the blast furnace (invented independently in China, Europe and Africa), the crossbow (invented independently in China, Greece, Africa, northern Canada, and the Baltic countries), and magnetism (discovered independently in Greece, China, and India). Some of the most brilliant people throughout history have wasted years of their lives on technologies already in existence. Part of collective action is improvement in the sharing of information, which can catapult society forward.

Before the invention of the wheel, the concept of the cart, the carriage, the automobile, the wheelbarrow, the roller skate, and a million other offshoots of wheel-reliant transport were not imaginable. What if the blast furnace was invented once and others shifted their attention towards second- and third-derivative inventions? Or other fields altogether?

Just think about the exponential developments in content creation as a result of YouTube. On average, Hollywood produces 500 films per year and reaches a worldwide audience of 2.6B. Assuming an average length of two hours per film, Hollywood produces 1,000 hours of content annually. YouTube users upload 48 hours' worth of videos every minute. This means, every 21 minutes, YouTube provides more content than Hollywood does in 12 months.

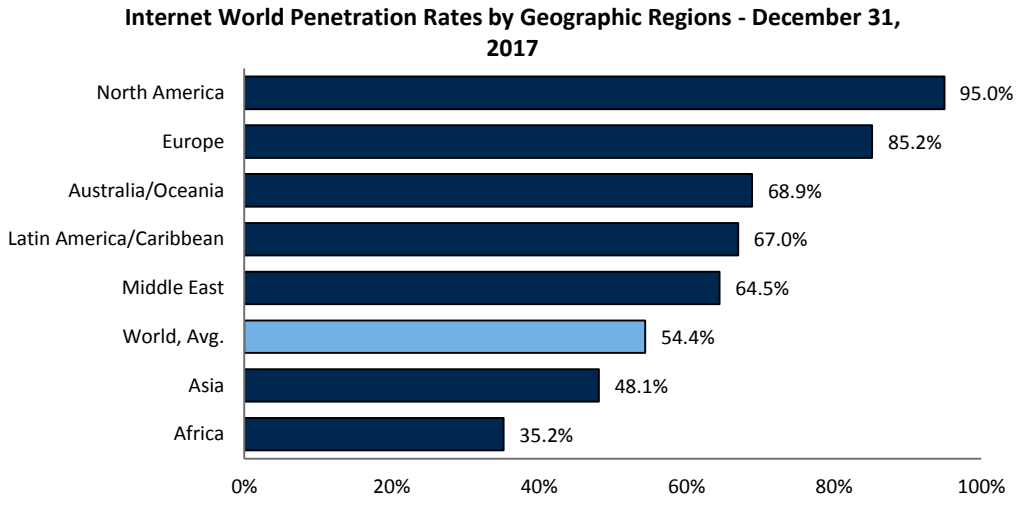
Today only about 54% of the global population has access to the Internet, but that is changing quickly. It is estimated that by 2020, this figure will jump to 65%.

Exhibit 114: Global population and Internet users, 2000–2020



Source: www.futuretimeline.net, RBC Capital Markets estimates

Exhibit 115: Internet penetration rates

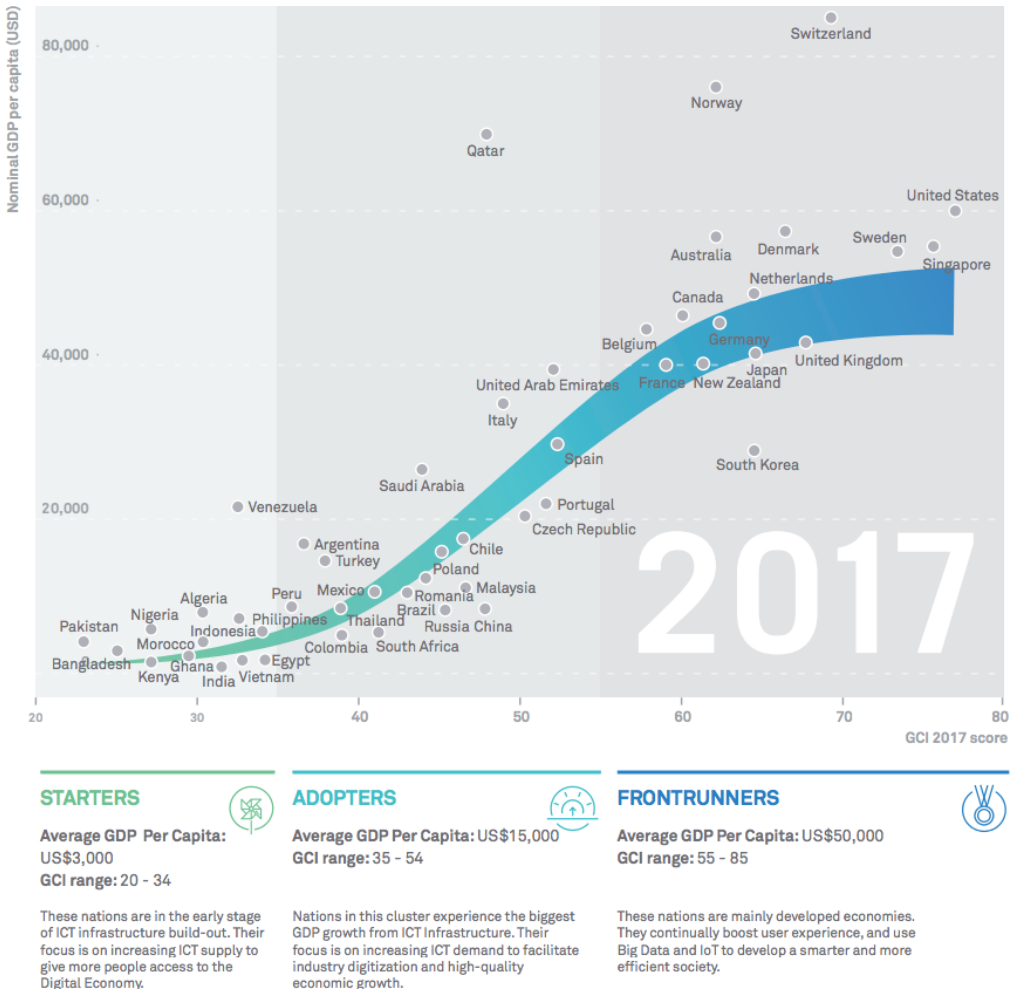


Source: World Stats, RBC Capital Markets

Exhibit 116: Global connectivity empowering the customer

World to increasingly become connected as "Starters" and "adopters" progress through the digitalization journey.

Canada, US, and UK part of frontrunners and well positioned to accentuate lead over RoW.



Source: Huawei/Oxford Economics

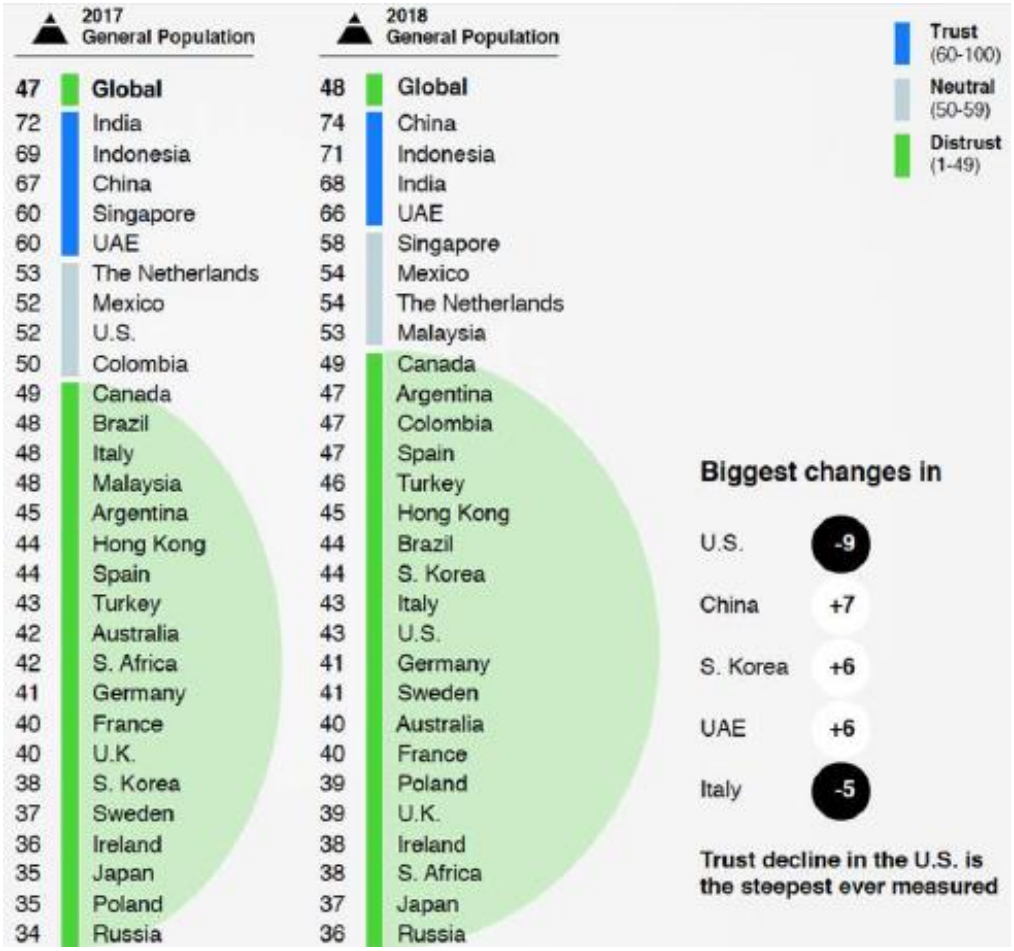
According to Pew Research, close to 50% of Americans do not trust the federal government or social media sites to protect their data.

As a result, developing countries are leapfrogging technologies (i.e., skipping landlines and going directly to mobile devices). We implore investors to imagine a world with 100% global Internet penetration (helped by lower costs of devices/access and emerging mesh technologies). Where will society be five years thereafter? What inefficiencies will be brought to light? In this section, we hope to frame potential cultural, societal and technological advancements as functions of collective action.

The Collective Action Catalyst—Deteriorating Trust

While rapidly improving connectivity is a central driver of our Collective Action theme, it is the general deterioration in trust levels between consumers/citizens and traditional institutions/organizations that is motivating this phenomenon. Based on the Edelman Trust Barometer, the world is at "distruster" levels. Interestingly, the trust level in the US had its sharpest decline ever measured in 2018.

Exhibit 117: Average trust in institutions

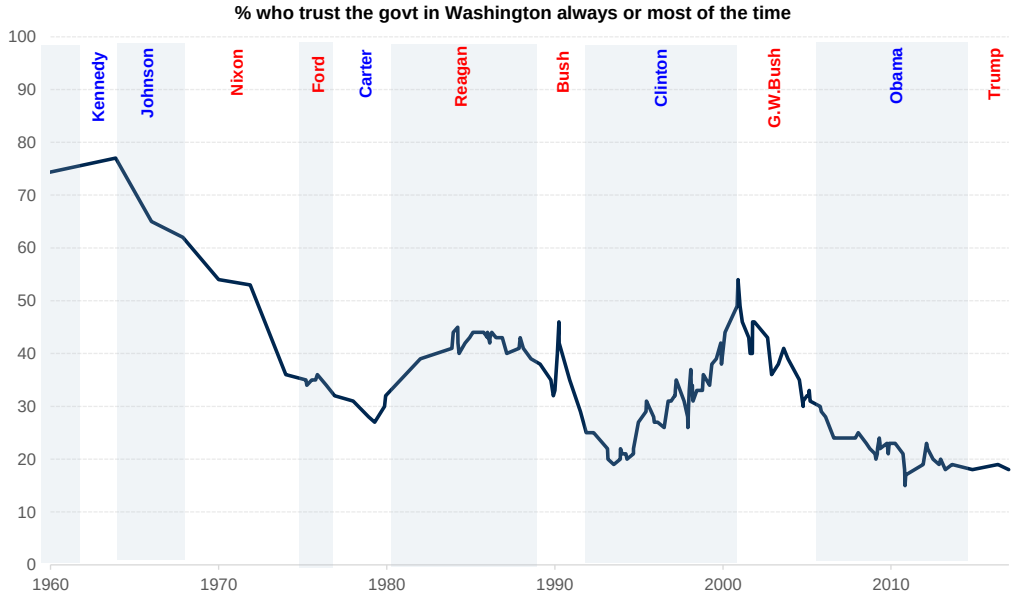


Source: PEW Research Center

We believe trust levels have deteriorated for a confluence of reasons, including lower levels of face-to-face interaction (driven by proliferation of social media) and failure of most government institutions to deliver consistent social value to its citizens (think: healthcare, education, congress).

In January 2012, the European Commission set out plans for data protection across the EU and a reform package entered into force in May 2016 that includes General Data Protection Regulation (GDPR) that will be applicable as of May 25, 2018.

Exhibit 118: Government trust levels continue to reach new lows



Source: PEW Research Center

Because of this distrust, consumers/citizens are more frequently forming organizations of their own or acting independently—in turn putting pressure on larger, traditional organizations to retain both talent and customers. Consumers have even gone as far as banking directly with one another. These emerging preferences (all in part rooted in lack of trust) manifest in the ideas we discuss in this section, including: implications to how consumer value is perceived; transparency as a competitive weapon; and the rise of new business models hinged on the gig/sharing economy.

Implication #1: The New Value Equation

Many consumer companies have gained their size and scale over many decades. These large brands and retailers were built by communicating the value to the consumer often via national TV advertising or simple retail presence. It was the marketing scale that created the competitive advantage (in addition to products that performed) and made it difficult for other brands to break through.

However, over the past several years (and likely even more so going forward), the way brands are being built has fundamentally changed. In tomorrow's market, the consumer (not the company) will dictate which brands/retailers will grow (deterioration in trust is not only happening between citizen and institution but consumer and company). The emergence of the internet and social media has leveled the playing field, giving anyone with a computer or smartphone the ability to reach billions of consumers instantaneously.

Take for example Dollar Shave Club—the company grew in popularity because of viral videos on Facebook/YouTube with minimal expense (especially relative to P&G's advertising budget). Its first YouTube video advertising the service has over 25M views. The company was eventually taken out for $1B by Unilever. However, we note that these disruptive products need to deliver product efficacy (this is where Dollar Shave Club has stumbled given the inferior shave experience relative to existing products).

Exhibit 119: Dollar Shave Club's YouTube Video has over 25M views

DollarShaveClub.com - Our Blades Are F***ing Great

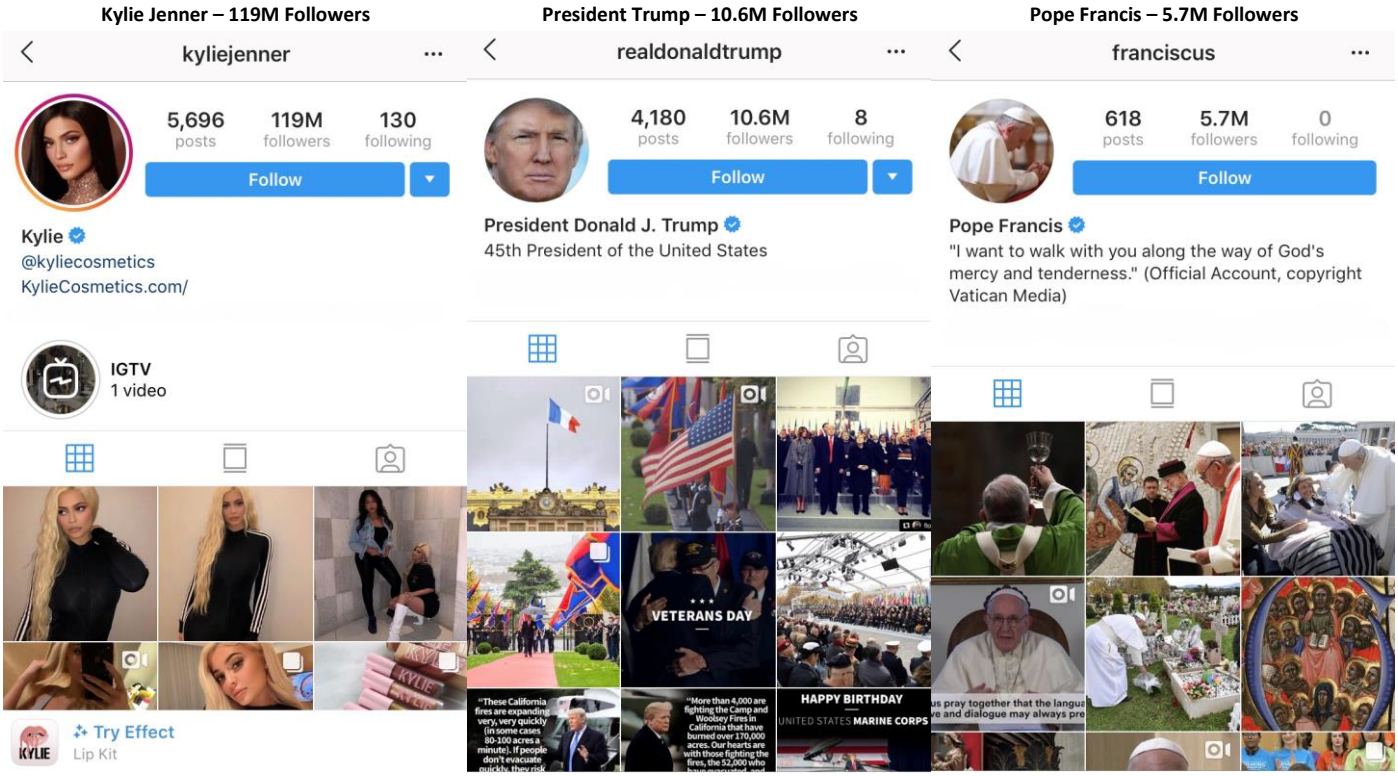
Dollar Shave Club 25M views • 6 years ago

Dollar Shave Club delivers amazing razors and grooming products for just a few bucks. Try the Club → http://www.dollarshaveclub.com/intro Artist: Kennedy Song: Karate http://www.kennedykarate.com ...

Source: YouTube.com

Kylie Cosmetics is another great example. The company has made an estimated $900M since it was founded in November 2015, making Kylie Jenner the youngest member on Forbes list of America's 60 richest self-made women (she is also on pace to be the youngest self-made billionaire). Interestingly, social media has been her main form of engagement. She is the most viewed account on Snapchat and the seventh most followed person on Instagram with 119M followers (for context, this compares to President Trump 10.6M and Pope Francis 5.7M). Despite inexperience and a non-existent reputation as a manufacturer, her first line of "Lip Kits" sold out in minutes.

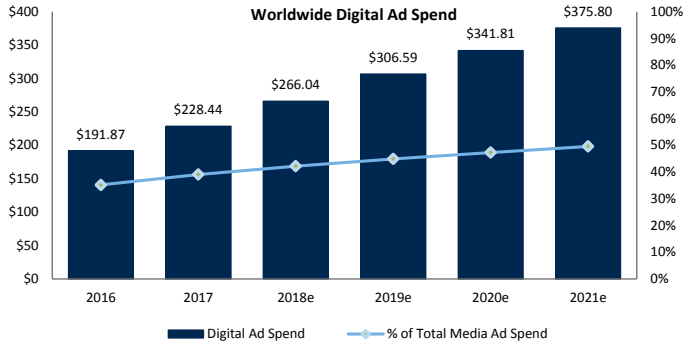
Exhibit 120: Instagram Follower Count

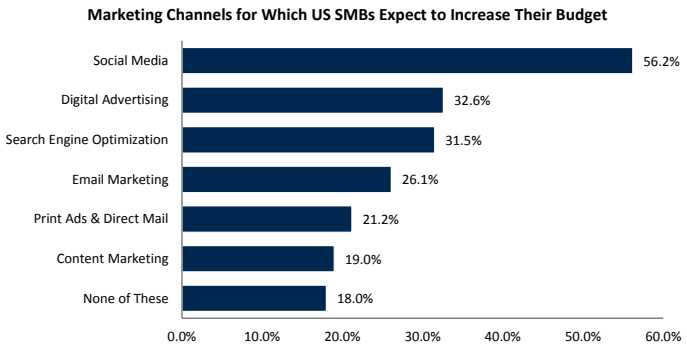


Source: Instagram

Worldwide digital ad spend is forecasted to grow at a 15% CAGR over the next 5 years, and is expected to account for 50% of total media ad spend. While we commend CPG/retail players for stepping up investments in their digital capabilities, we believe getting in front of the consumer is only half the battle.

Exhibit 121: Marketing spend shifting to digital from traditional





Source: eMarketer

Recommendation is the New "Prime Time"

It used to be the company that could get its ads on "prime time" television would get the most visibility and likely the best lift to its sales. However, today, large corporations no longer have the upper hand on traditional marketing scale due to the ubiquity of social media. Traditionally, consumer value was defined as product price over product benefit. **Today, we think recommendation is a vital component of the equation (and will become increasingly more important).**

Exhibit 122: The new consumer value equation

$$\text{Consumer Value Yesterday} = \frac{\text{Product Price}}{\text{Product Benefit}}$$

$$\text{Consumer Value Today} = \frac{\text{Product Price}}{(\text{Product Benefit} + \text{Recommendation})}$$

Source: RBC Capital Markets

According to Forbes, online reviews have been shown to impact 68% of purchasing decisions. What is most interesting is that consumers feel more comfortable trusting a total stranger online than they do a major corporation—84% of people trust online reviews as much as a personal recommendation. We suspect these figures will only rise as studies have shown that tech-savvy younger consumers are more likely to leave a review.

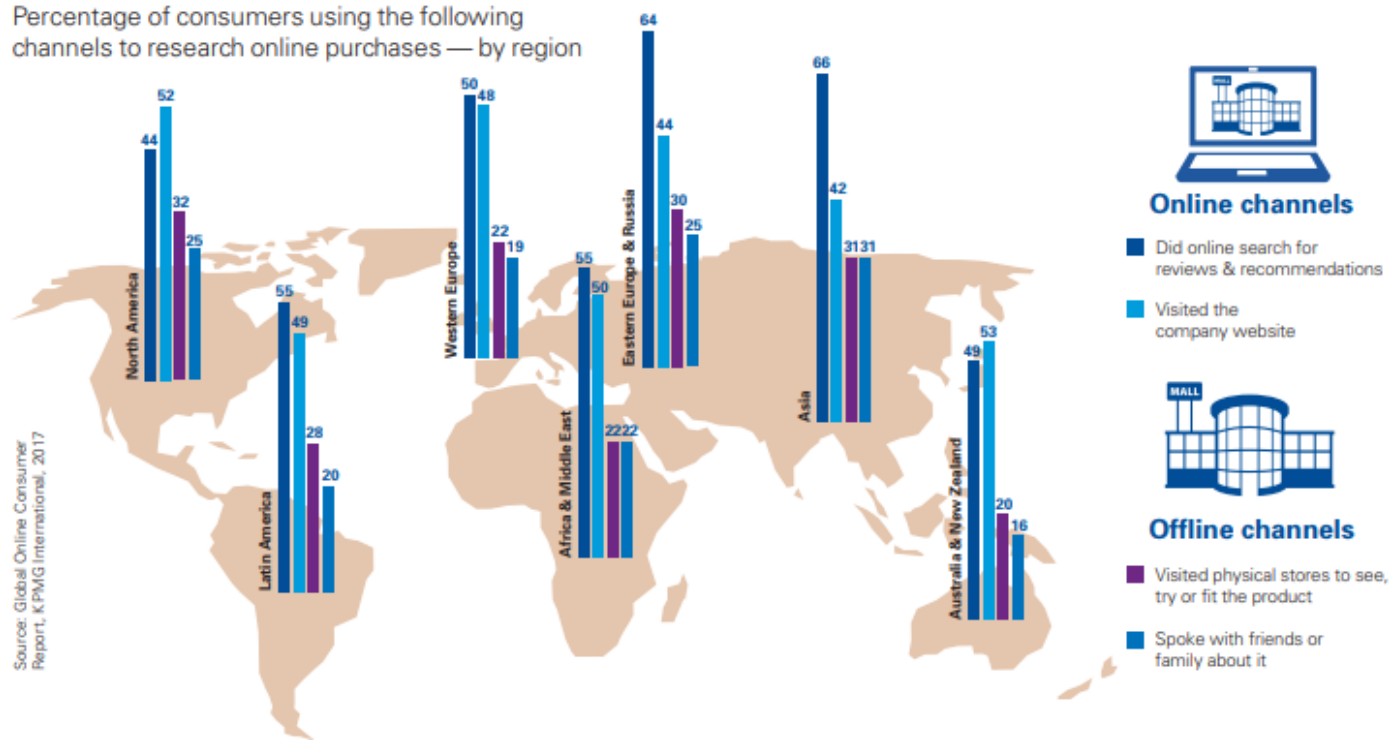
Similarly, product reviews on retailer websites are one of the most important drivers of product sales, particularly for new brands and products.

Similarly, product reviews on retailer websites are one of the most important drivers of product sales, particularly for new brands and products. Hence, an increasing number of newer brands are working with influencers to have honest reviews featured with the product to capitalize on the power of product reviews. Against this backdrop, we believe the brands that get the most "recommendations" will be the products that have the best efficacy.

Exhibit 123: Peer reviews significantly help sales of new brands and products

Source: Bazaarvoice

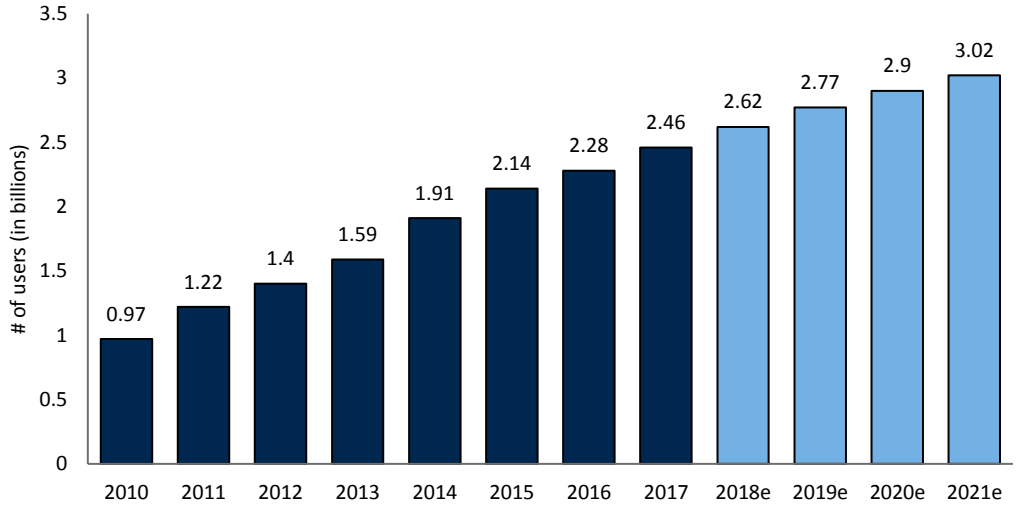
Exhibit 124: % of Consumers using the following channels to research purchases online



Source: Global Online Consumer Report – KPMG

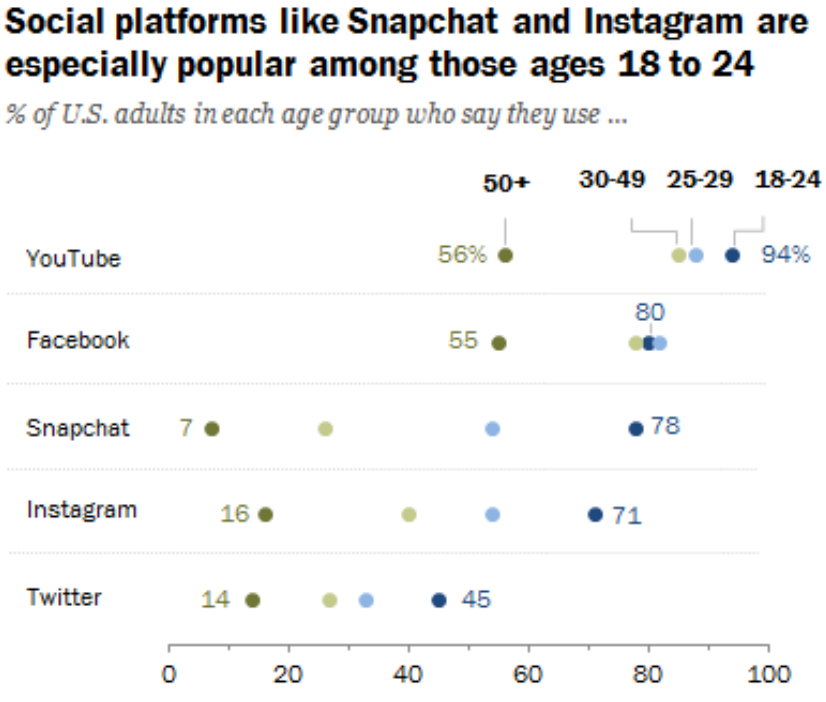
Looking at social media user/content growth metrics and retailers' shift of marketing spend to digital from traditional, coupled with consumers' willingness to hear the voice of peers versus retailers, we have confidence that over the next few years peer reviews will be the most important marketing tool for any retailer.

Exhibit 125: Total number of social network users worldwide from 2010 to 2021 (in billions)



Source: Statista

Exhibit 126: Social Media Use by Age

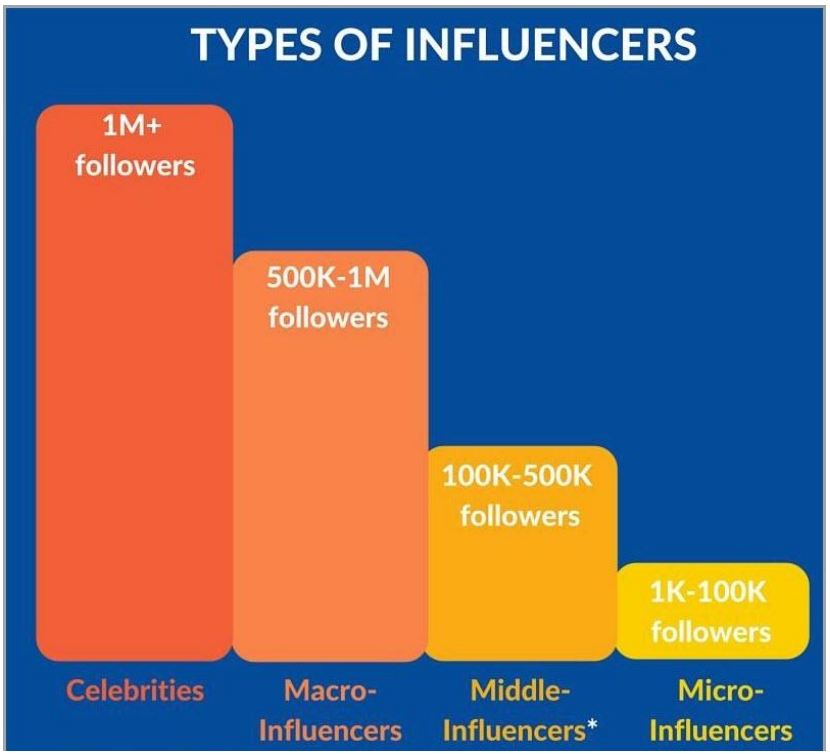


Source: PEW Research Center

It is important to recognize that peer reviews are now more than just a 5-star rating system found at the bottom of retailer's Web pages. Over the past few years, we have seen a rise in influencers—individuals who have a following in a particular niche, which they actively engage with. The size of the following depends on the size of the niche. This individual has the power to affect purchase decisions of others because of his/her authority/knowledge, position or relationship with his/her audience.

Going back to our earlier example, it is estimated that Kylie Jenner gets paid $1M per sponsored post on her Instagram. However, influencers do not have to be celebrities, and in most cases, the most influential are micro-influencers (1k to 100K followers) because consumers find their opinions more authentic.

Exhibit 127: Types of Influencers



*Middle influencers are often grouped with micro-influencers but you may sometimes hear the distinction made in marketing circles
Source: BlogsRelease

The Michelle Phan Case Study

Beauty bloggers/YouTubers have become the most powerful influencers in today's world of beauty. According to Forbes, the top-10 beauty influencers in 2017 had a total of 49.2M followers on Instagram, 11.6M on twitter, 46.5M YouTube subscribers and 16.7M Facebook likes—a total of 135M of reach in the digital world of beauty. By comparison, M.A.C Cosmetics has 17.6M on Instagram, 51.2K on twitter, 485.8K YouTube subscribers and 19.0M Facebook likes—a total of 88M of reach, 65% of the top-10 beauty influencers.

Michelle Phan, one of the very first of beauty bloggers, published her first personal blog in 2005. She began to publish videos on YouTube in 2007 and has since become the most well-known beauty blogger online. Her popularity quickly helped with entrepreneurship and in 2011 she co-founded MyGlam, which later became Ipsy. In 2013, L'Oréal launched a new cosmetic line called em by Michelle Phan.

Exhibit 128: YouTube subscriptions for Michelle Phan

Source: Socialblade

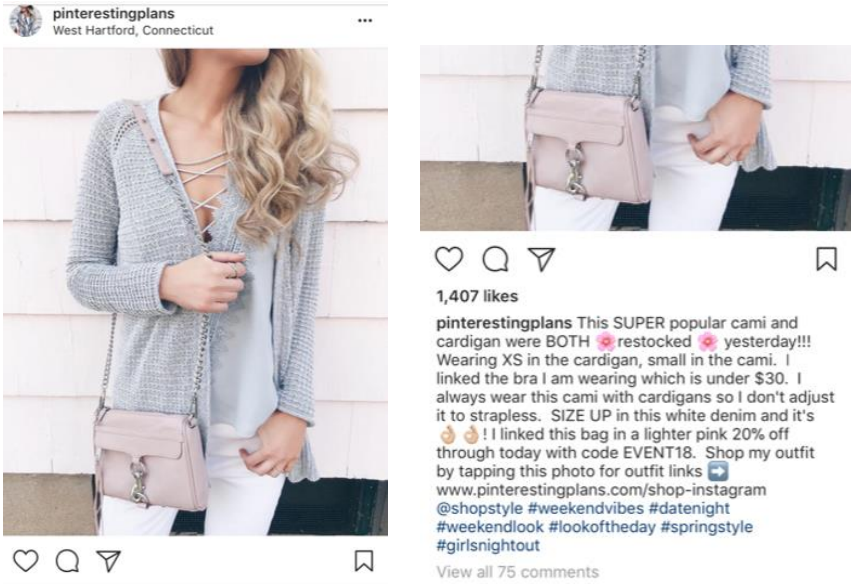
Before the days of a proliferation of online beauty tutorials, consumers used to go to the store and try on cosmetics with the help of a beauty advisor, which led to the ultimate purchase. In the early days when beauty bloggers' resources are constrained, their heavy reliance on less-expensive drugstore brands diluted the value of prestige brands by highlighting the way to create a popular look using plain brands. As the beauty bloggers became more influential and started their own brands, their previously younger followers have also grown to consume more expensive products and are used to online shopping, which further reduced the value proposition of traditional beauty brands like M.A.C.

A comparison between ipsy and another beauty subscription service BirchBox shows clearly that ipsy is a brand/ecosystem favored by millennials and younger customers. Ipsy fans are 4x more interested in YouTube and Justin Bieber, 3x more in Snapchat and 2x more in Miley Cyrus. The generation that grow up watching YouTube videos are clearly more willing to follow the lead of what they see and hear from YouTube bloggers.

Exhibit 129: Interests of Ipsy fans vs BirchBox

Source: Crimson Hexagon

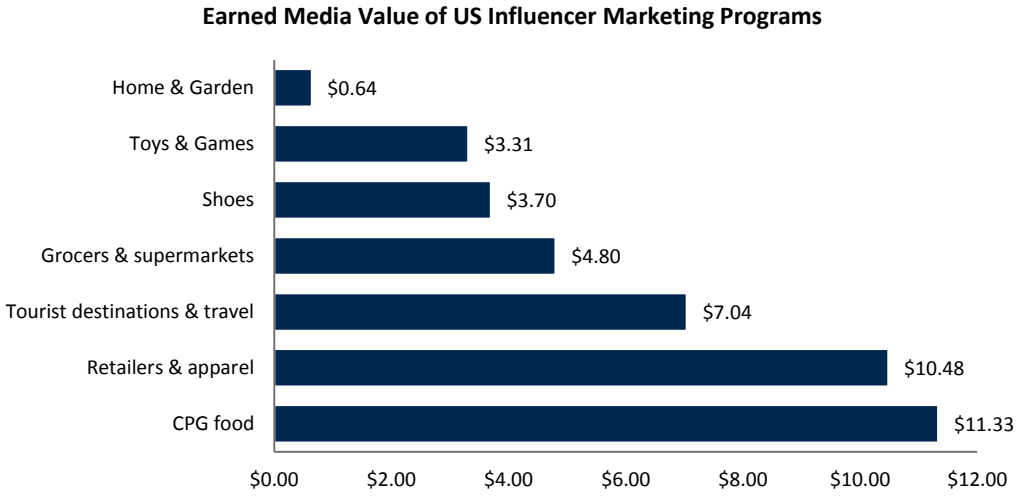
Exhibit 130: Instagram fashion influencer posts



Source: Instagram

According to a study conducted by Burst Media, advertisers who implemented an influencer-marketing program in 2014 earned $6.85 in media value on average for every $1 they spent on paid media for such programs. We do not believe many CPG/retail players are taking advantage of this dynamic currently.

Exhibit 131: Influencer Marketing ROI



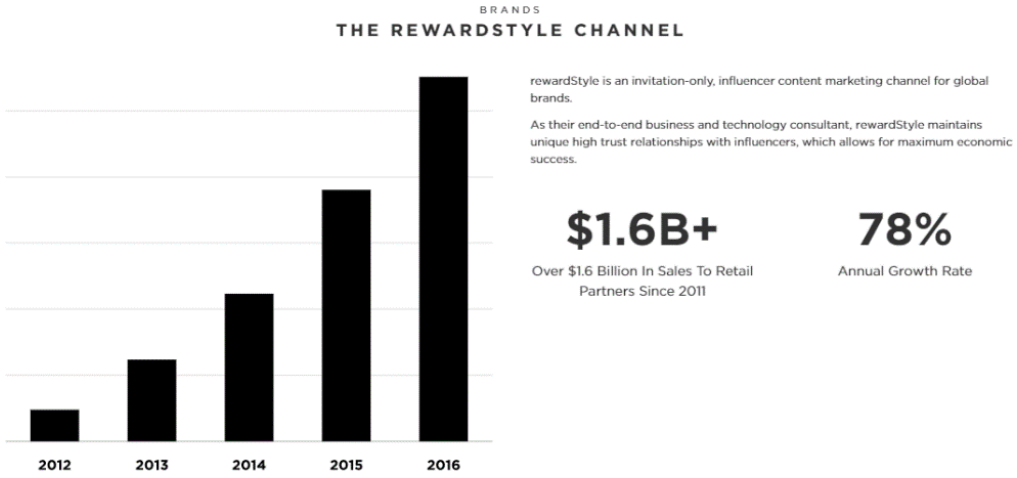
Source: Burst Media

In the retail world, where most transactions have traditionally been purely based on material value (aka lowest price), we have only recently started to see other factors play a part in purchase decision. More specifically, for decades a race to the bottom in terms of pricing has been the name of the game, particularly with the emergence of fast fashion (H&M, Zara, Uniqlo, Primark etc.). However, we believe more effective social marketing tactics will rapidly change this dynamic.

On Instagram #ootd (outfit of the day) has ~180M posts and the LIKEtoKNOW.it app, which is one of the more prominent platform influencers used to monetize posts, sends 20M+ monthly emails linking back to products, and features 1K+ new content posts daily.

For skeptics of social media marketing, we highlight that the parent company of the LIKEtoKNOW.it app, rewardStyle, has already facilitated over $1.8B of sales since 2011, which implies a 78% annual growth rate. We expect social media marketing to continue to grow at 50%+ and become the most effective marketing tool.

Exhibit 132: rewardStyle facilitated sales



Source: rewardStyle

Implication #2: Total Transparency

Transparency is no longer an option, it is a requirement. Ten years ago, consumers did not really have enough information to question environmental sustainability or corporate values. Nor did they have an efficient method of connecting with people who share similar views. Today, corporations are constantly examined under a microscope and global reputations can be tainted in minutes.

Millennials Say: Social Values > Price

According to Nielsen, 66% of consumers are willing to spend more on a product if it comes from a sustainable brand. Millennials gave an even more impressive showing, with 73% of surveyed millennials indicating a similar preference. Additionally, 81% of millennials expect their favorite companies to make public declarations of their corporate citizenship. With these stats in mind, we have begun to see emergence of 'socially conscious retailing' with brands that employ "buy one give one" philanthropy model. This altruistic model has attracted others including Warby Parker (eyeglasses), Bombas (socks), Roma (boots), Smile Squared (toothbrushes), SoapBox (soaps), Figs (medical scrubs), State (backpacks) and WeWood (watches) to name a few.

Exhibit 133: Tom's shoes is one of the first socially conscious retailers

Source: mic.com

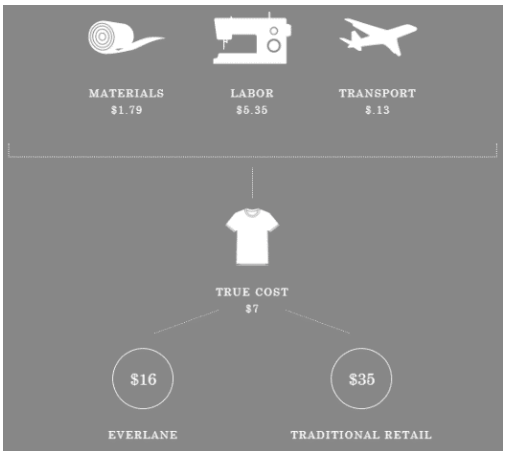
Moreover, according to a 2016 Deloitte Millennial Survey, 87% of millennials believe that a business's success should be measured in terms of more than just its financial performance. And 73% of millennials said that business has a positive impact upon wider society. Clearly, this approach proved successful, it became a storytelling tool and good opportunity to acquire customers away from traditional retail models. As we look out, we expect more retailers will not only be forced to make sure the products are ethically produced but also provide greater transparency including the whole manufacturing journey of the product.

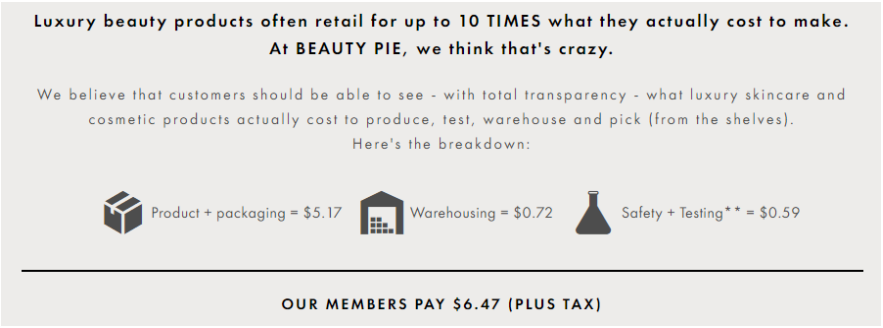
On the flipside, we see the companies that are not socially conscious as being penalized. A recent example of this is gun regulation and ESG (environmental, social and governance) adherence. Following Parkland students' gun control movements, sporting goods retailer Dick's announced that it will stop selling assault rifles. Similarly, as ESG-focused mutual funds emerge, investors move away from ETFs that include investments in gunstocks.

Transparency in Manufacturing: I Need to Know How you Made this product

Digitally native retail business models are looking for ways to help acquire customers and give them a new "story" to tell consumers. One way that some digitally native companies have come up with is to give the consumer a peek behind the curtain to see exactly how the product is being sourced, produced and ultimately priced to the end user. Founded in 2010, radical transparent apparel company Everlane sought "to exploit the market inefficiency of brick-and-mortar retail". Viewed as the pioneer of the transparent model, Everlane's website gives shoppers of its $168 modern loafer a look at how its COGS break out (materials $18.25, labor $29.16, freight $1.47, duties $4.75) and help contribute to the "only" 2-3x markup of Everlane product compared to 5-6x of traditional retailers. And while shoppers now feel empowered with knowledge of exactly what they are paying for, they can also browse information on the 23 factories around the world currently being used by the company to make goods. Other direct-to-consumer companies that take the consumer behind the scenes include Beauty Pie Oliver Cabell, Noahny, and Elizabeth Suzann.

Exhibit 134: Everlane and BeautyPie are among the few retailers that break out the production cost of products





Source: Everlane & Beauty Pie websites

This has equally disruptive consequences for the food space. Environmental-consciousness has led to an influx in vegetarian and vegan options as alternative sources of protein. Not only will big data help determine consumer preferences, as discussed in The Artificial Intelligence Race section, but it is helping to create compounds that resemble other foods that conserve resources. The most well-known example of an impersonation food is the "Impossible Burger" from company Impossible Foods Inc., which has raised over $257 million in venture funding since 2011. The company's burgers look, taste, and even "bleed" the same as traditional ground beef, but they are 100% plant-based. Over 1,000 restaurants nationwide serve the vegan burgers, including chains Bareburger, Fatburger, and White Castle. With the UN projecting the world's population to reach 8.6 billion by 2030, plant-based substitutes for traditional proteins may become an attractive solution to balance demand with the need for resource conservation.

Though the Impossible Burger may taste like the real thing, other plant-based imitation meats have not been quite as successful. With AI and big data, powerful computers will be able to find different sequencing patters of plant proteins, which is similar to the use of AI in the drug-creation process, to create accurate representations of the taste and texture of real meat. The creation of new proteins will allow people to follow their ambition to take care of the earth without sacrificing on eating patterns. There is little doubt that people will continue to demand these environmentally friendly alternatives as society's collective actions to take care of the earth do not seem to be going anywhere soon.

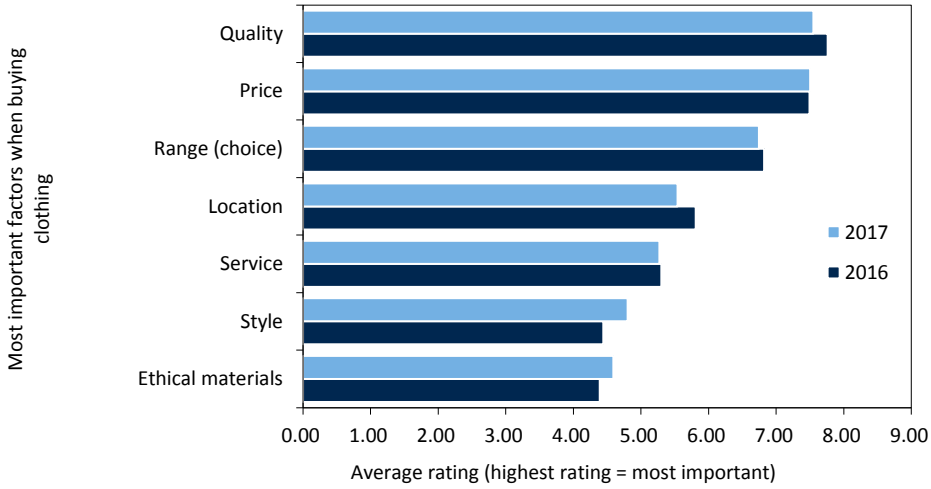
Exhibit 135: The impossible burger makes plant-based meat very possible at chain restaurants

Source: Eater; Forbes

Textile industry transparency a must

Millennials are very much aware of the textile industry's shortcomings when it comes to environmental and social issues compared to previous generations. They are more inclined to see the industry as a polluter and are more concerned about potential harmful substances in their clothing. Looking at our consumer surveys, while the most important factors in shopping purchases remain quality and price, awareness for sustainability is starting to increase.

Exhibit 136: Sweden: importance of factors in buying clothes—customers care about sustainability



Source: Survey monkey, RBC Capital Markets

Out of the fast-fashion retailers, we believe H&M is at the forefront of investing in sustainable resources and promoting sustainability. Each year, H&M produces a conscious collection, which is made using sustainable and recycled material, in addition, H&M creates ad campaigns that encourage garment recycling and runs a discount program to those who donate their old clothes at its stores.

In H&M's sustainability report, H&M states that it is committed to supporting the safety and wellbeing of factory workers, such as paying a fair living wage. On top of this, H&M's sustainability strategy actively promotes sustainable innovations aimed at transforming the fashion industry. It has set out plans for using only recycled or other sustainably sourced materials by 2030 as it aims to reduce the use of natural resources.

To raise awareness for sustainability and adapting brand positioning to be more in line with millennials, H&M's newest brand Arket names manufacturers on its website. For each product listed on Arket's website, Arket sets out where the garment is made, the name of the supplier, pictures of their manufacturing facility and factory, along with the company history. An example is shown in the chart below.

Exhibit 137: H&M (Arket) gives customers information on the manufacturer

Source: Arket website

Anything can go viral in minutes, and there is negative virality

In this day and age, it is impossible to hide anything. Bad news travels fast; and this becomes a bigger headache for retailers as negative events seem more likely to go viral than positive events. In March 2016, #Orangegate was trending because a twitter user posted a picture of peeled oranges packaged in plastic containers (the desirable part of the oranges has a natural container, after all) being sold at Whole Foods, which sparked a lot of criticism. Per the website ClickZ.com, this tweet ultimate generated 8 million impressions. Whole Foods acknowledged its mistake, and replied with a tweet, "*Definitely our mistake. These have been pulled. We hear you, and we will leave them in their natural packaging: the peel.*"

Exhibit 138: Whole Foods #Orangegate incident

The power of social media means retailers are under constant scrutiny.

Source: Twitter

Going forward, companies will be under constant scrutiny and need to allocate more resources to evaluate their actions, monitor consumers' perception, and handle consequences of any mis-steps. In addition, management teams must be willing and ready to adapt to the ever-changing mood of the consumer (i.e. create a substitute for plastic straws if the consumer calls for it). We wonder if this dynamic will cause company boards to install a Chief Integrity Officer—who has board-level representation and is responsible for making sure the integrity of the company's value equation is intact both off-line and online.

Implication #3: The Gig and Sharing Economy

The days of lifetime employment with a single company that provides a pension and retirement health insurance are long gone for most workers, and many will (either by desire or necessity) cycle through more than a dozen jobs in their working years. Much of this change in recent decades has been driven by corporate-efficiency initiatives, global competition, and changing regulations. However, in the last decade, the shift has also been pushed more aggressively by workers demanding more control over their careers, the work they do, the hours they work, and the environment in which they work.

The days of lifetime employment with a single company that provides a pension and retirement health insurance are long gone for most workers, and many will (either by desire or necessity) cycle through more than a dozen jobs in their working years.

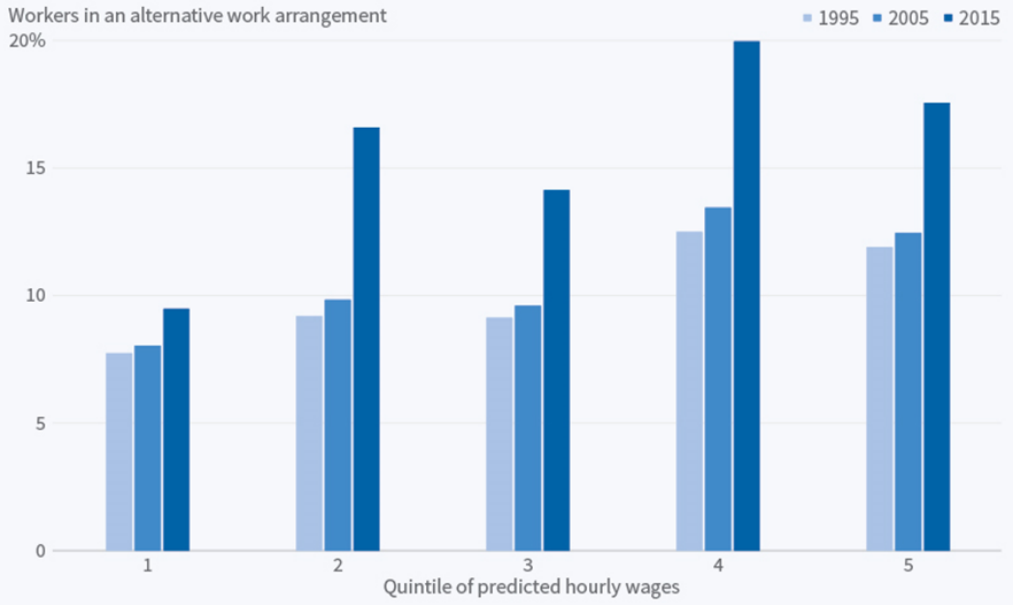
This more recent consumer-driven change has spurred growth of the "gig" economy, which Wikipedia defines as "a labor market that is distinguished by the prevalence of short-term contracts or freelance work rather than permanent jobs." Much of the recent media coverage of the gig economy has focused on the millennial generation and their desire for more work flexibility, and on the "sharing economy" through digital platforms like Uber, Task Rabbit, and Airbnb. Both are meaningful drivers, and the sharing economy is indeed growing rapidly. However, we believe that a broader definition including temporary workers, on-call workers, contract labor, freelancers and independent contractors more fully describes the sub-set of alternative or independent workers (i.e., those doing project or task-based work and without a long-term relationship with an employer).

This more recent consumer-driven change has spurred growth of the "gig" economy, which Wikipedia defines as "a labor market that is distinguished by the prevalence of short-term contracts or freelance work rather than permanent jobs."

According to a December 2016 paper in the National Bureau of Economic Research, alternative workers comprised 15.8% of the US employee base as of 2015, up from 10.7% in 2005. This is acceleration from the more modest shift towards independent workers in the prior decade. It is also interesting to note that the increasing penetration occurred across all income levels, though by a lesser rate at the lowest income tier.

According to a December 2016 paper in the National Bureau of Economic Research, alternative workers comprised 15.8% of the US employee base as of 2015, up from 10.7% in 2005.

Exhibit 139: Alternative work arrangements on the rise across income levels

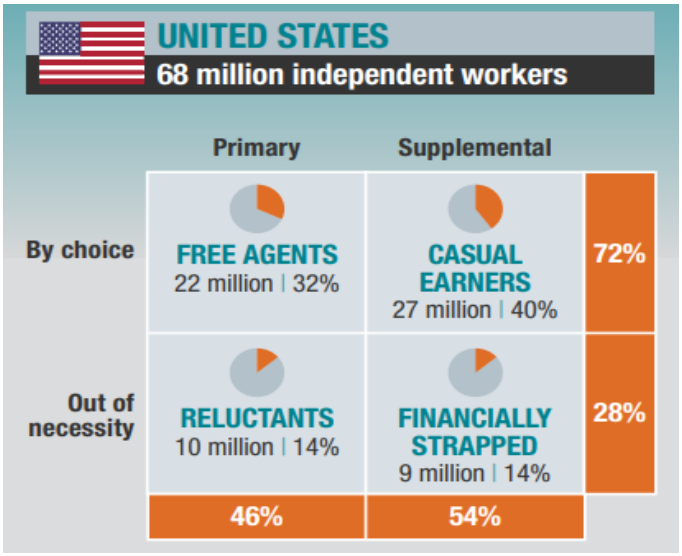


Source: National Bureau of Economic Research article, *"Putting Price Tags on Alternative Work Arrangements"* (December 2016)

A McKinsey Global Institute study (*Independent Work: Choice, Necessity, and the Gig Economy*, October 2016) takes a broader definition that includes those doing freelance or independent work for supplemental income. Under this definition, the study argues that more than 40% of US workers participate in some form of alternative work, with 28% pursuing that path out of necessity, and 72% doing so by choice.

40% of US workers participate in some form of alternative work, with 28% pursuing that path out of necessity, and 72% doing so by choice.

Exhibit 140: Breakdown of United States independent workers



Source: National Bureau of Economic Research, "The Rise and Nature of Alternative Work Arrangements in the United States, 1995-2015 (December 2016)

Motivations for independent work

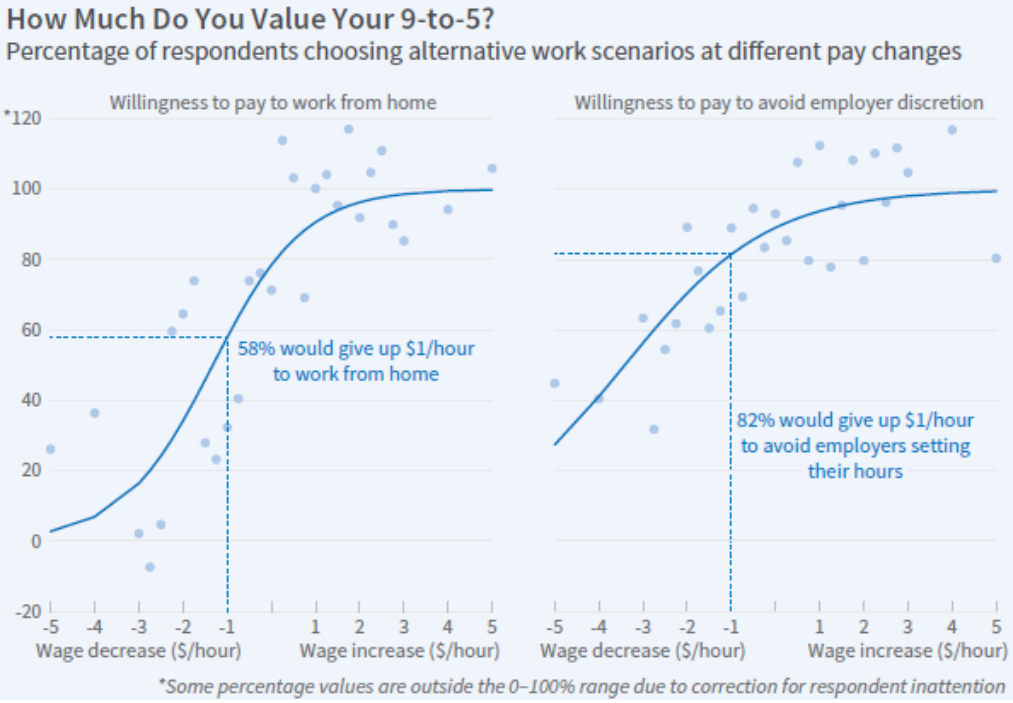
While some of this shift towards independent work is driven by corporate agendas and/or regulatory reasons, there are several motivations for workers' increasing desire to work independently. One key motivation appears to be the waning appeal of a traditional 9-to-5 long-term job with a single employer. For many, this may be rooted in the disappointment and disillusionment workers experienced during the 2001 and 2008 recessions (and for younger workers, the experience of their parents). Why should an employee stay devoted to one job/one boss if there is no reciprocity?

Another facilitator of the growing trend towards alternative work arrangements is the growth of the sharing economy and, in particular, digital platforms that act as efficient marketplaces to connect workers with consumers or companies looking to acquire their services.

Another facilitator of the growing trend towards alternative work arrangements is the growth of the sharing economy and, in particular, digital platforms that act as efficient marketplaces to connect workers with consumers or companies looking to acquire their services. This includes a wide range of businesses like Uber (ride hiring), TaskRabbit (a lower-skill freelancer marketplace), and Airbnb (accommodation rentals). These and many other digital marketplaces harness technology and provide an efficient way for independent workers to connect with those needing their services. The McKinsey report estimates that 15% of independent workers use these digital marketplaces today.

Generalizing broadly, the Millennial generation, in particular, is seen as demanding more flexibility and work/life balance, and having more desire to understand the motivations of their employer and be contributing to an organization that is doing community good in addition to just driving profits. However, rising distrust of large organizations appears to be felt across generations, which we believe is leading to the growing desire to "be one's own boss" and have more control over what work is done, what projects are chosen, and where and when work is performed. The following exhibit illustrates the appeal to US workers of non-traditional arrangements, with 58% and 82% of survey respondents willing to give up $1/hour of compensation to work from home and avoid employers setting their hours, respectively.

Exhibit 141: Survey data shows that US workers value characteristics of independent work



Source: National Bureau of Economic Research, *"The Rise and Nature of Alternative Work Arrangements in the United States, 1995-2015"* (December 2016)

With widespread Internet and mobile use and productivity software, many job functions can literally be done anywhere.

Corporate behavior and technology progress are also driving this trend. It makes sense that before the onset of wireless networks and the Internet, being in the office was of critical importance. However, now with widespread Internet and mobile use and productivity software, many job functions can literally be done anywhere. This has allowed workers to be productive outside of a traditional office setting, which we believe has been key to many workers' demands for more flexibility. The technology revolution of recent decades has also allowed corporations to successfully use more contract and temporary labor in their drive for efficiency, while the trend of outsourcing non-core capabilities has also spurred the growth of independent contractors. We believe that technology has arguably been the largest driver of the expansion in alternative or independent work (both in terms of the mix of workers and the growing desire of workers to pursue these arrangements).

Growing mix of independent workers to continue

The tailwinds driving the growth in the current gig economy are unlikely to subside, in our view. In the National Bureau of Economic Research report cited earlier, the authors calculated that ~94% of US job growth between 2005 and 2015 was from the range of alternative arrangements (contractors, temps, freelancers, etc.).

So, where does this trend go from here? The tailwinds driving the growth in the current gig economy are unlikely to subside, in our view. In the National Bureau of Economic Research report cited earlier, the authors calculated that ~94% of US job growth between 2005 and 2015 was from the range of alternative arrangements (contractors, temps, freelancers, etc.). Looking forward, we expect the growth of independent workers to continue, and for them to be a meaningful driver of employment growth from here. We see technology remaining a key facilitator. And, the relatively early stage of many of the sharing economy digital platforms likely points to continued strong growth, if not acceleration from here. The McKinsey Global Institute report cited above also indicated that 1 in 6 employees in traditional arrangements would like to become primary independent earners in the future, which supports the thesis that growth of alternative working will continue.

Implications for businesses and workers

From a business perspective, continued worker demand for flexibility, along with likely increased hiring difficulties as more qualified workers shift to independent arrangements, could pressure costs or limit growth.

While traditional employment arrangements with businesses are likely to remain the largest employers of US workers by 2025, we expect the mix of alternative workers to continue to rise, which has a number of implications for both workers and businesses. From a worker perspective, independent workers (whether temps, freelancers, or other) are less likely to get health insurance, retirement savings contributions, or many other benefits that full-time employees in traditional arrangements generally receive, which could raise the risks and/or costs for these workers. On the other hand, increased flexibility and the ability to work for oneself is a meaningful (in many cases more than offsetting) positive for many workers.

From a business perspective, continued worker demand for flexibility, along with likely increased hiring difficulties as more qualified workers shift to independent arrangements, could pressure costs or limit growth. Corporations will likely need to become more flexible and focused on employee satisfaction, and have the difficult task of creating a good work environment and employee morale while also driving their bottom lines.

***What if** corporate headquarters were no longer required because employees could more efficiently work from home and shared workspaces?*

Emerging business models

Payment option evolution coupled with improved consumer connectivity and increased security measures have led to consumers sharing their assets, and what were once private experiences, with strangers in exchange for compensation.

Payment option evolution coupled with improved consumer connectivity and increased security measures have led to consumers sharing their assets, and what were once private experiences, with strangers in exchange for compensation.

Examples of this include uberPOOL, where consumers are not only sharing rides with strangers. Another example is the Coachsurfing app, a more affordable approach to Airbnb that offers the opportunity to "stay with locals in every country on earth." In the future, we think sharing will not be limited only to experiences but consumers will also share autonomous vehicles, clothes and even furniture among other physical possessions.

These sharing services have thus far generated tremendous value and in some cases are exceeding their asset-intensive peers. Uber is currently valued at $72 B versus FedEx $59 B, while Airbnb is valued at $31 B versus Hilton $21 B. Keep in mind Uber does not own any vehicles and Airbnb does not own any rooms.

Exhibit 142: Asset light, disruptive business models have higher valuations

Market Cap: $59 B
Vehicles: 49,000 / Planes: 650

Market Cap: $72 B
Vehicles: 0

Market Cap: $21 B
Rooms: 856,000

Market Cap: $31 B
Rooms: 0

Source: Google images, FactSet

Empowering the consumer

In the retail world, where most transactions have traditionally been purely based on material value (aka lowest price), we have only recently started to see other factors also matter in purchase decisions. More specifically, for decades a race to the bottom in terms of pricing has been the name of the game, particularly with the emergence of fast fashion (H&M, Zara, Uniqlo, Primark etc.). However, we believe this will continue to rapidly change as:

1) Millennials prioritize social values over price and ask for greater transparency of the manufacturing process;
2) Growth in peer-to-peer retailing significantly surpass traditional retailers; and
3) Influencer posts and peer reviews become key marketing tools.

Uber is another great example. Before Uber, taxis either drove around aimlessly or relied on a very inefficient dispatch system. Location service technology created an efficient platform to connect passengers in need of a ride with the closest driver.

The above examples are well known and their impacts to date are understood. But discussing them helps portray how data sharing exploits inefficiencies and has the power to transform industries in just a few short years. Imagine if credit card companies and/or gyms partnered with health insurance providers and your monthly payment varied depending on an algorithm measuring your food/beverage purchases and the amount of times (and for how long) you went to the gym. What if your medical data was stored on your watch and a scanner at a restaurant could process the data and provide meal recommendations based on your vitals and prior conditions? What happens to the commercial real-estate market when companies embrace 'working from home' or shared space offices like We-Work?

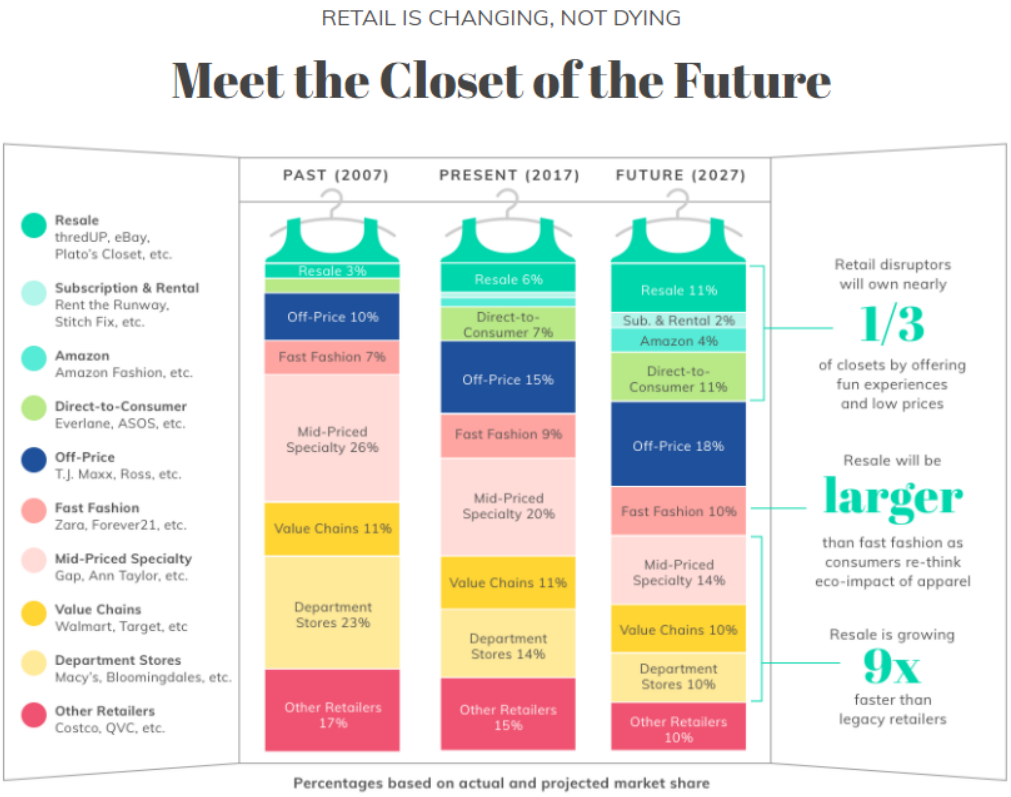
While we believe partnerships and data sharing will have a vast impact on all of CPG/retail, we believe the potential change to softlines retail is among the easiest to visualize.

Everyone's favorite customer segment, Millennials, are both incredibly wasteful and sustainability-minded at the same time. They are an impulsive generation when it comes to shopping (typically discard items after 1-5 wears) but at the same time, 77% of them say they

prefer to buy from environmentally conscious brands and they are "more likely to switch to thrift for environmental reasons'. Capitalizing on this, resale sites, as well as sharing platforms have often positioned themselves as sustainable alternatives to fast fashion: a way to satisfy a social-media-driven constant desire for newness without contributing to the negative environmental impact of buying disposable fashion from companies like Zara, H&M, and Forever 21.

We believe it is important to highlight that particularly over the last two years, the peer-to-peer or resale model has been gaining traction much faster than anticipated (showing +49% growth vs +2% growth in overall apparel category) and doesn't seem like it will slow down. More notably, according to ThreadUp, a leading resale website, over the next 5-10 years peer-to-peer purchases will account for up to 15%, a significant increase from ~5% today.

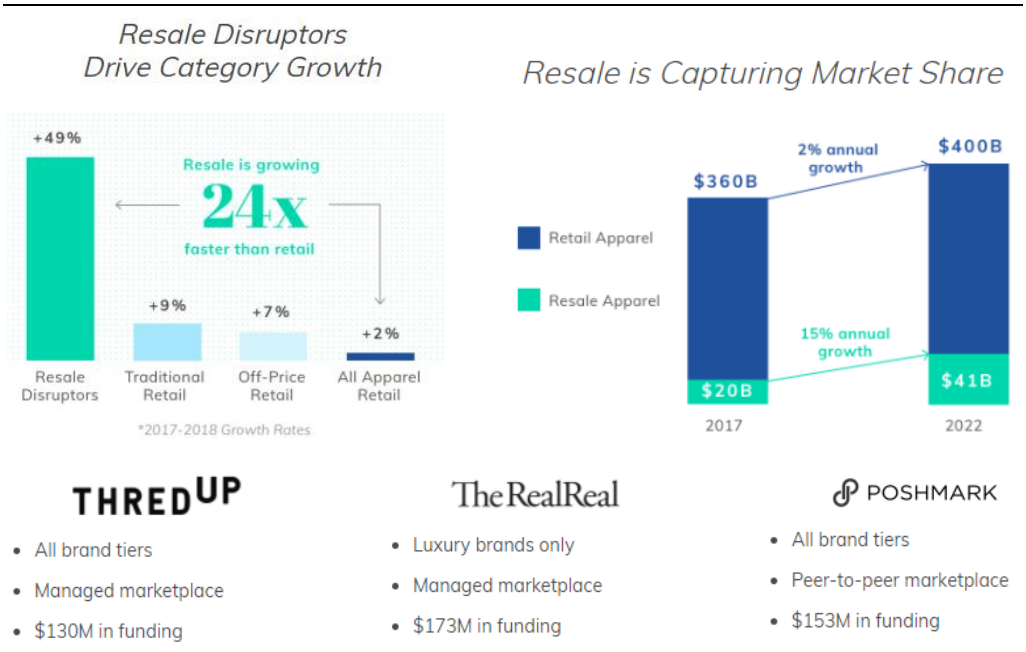
Exhibit 143: Direct to consumer is expected to account for 1/3 of clothing purchases



Source: Thread Up

Resale Is Expected To Be Bigger Than Fast Fashion Within 10 Years. Thredup says the resale market will be worth $41B by 2022, and 49% of that will be apparel. Resale disruptors—meaning online consignment sites—will own nearly one third of closets by 2027, growing nearly 24x faster than retail as a whole: 49% YoY vs. 2%. The three leading resale disruptors are said to be Thredup, The RealReal, and Poshmark, which have raised $130M, $173M, and $153M, respectively. (Fashionista, 4/3)

Exhibit 144: Resale model



Source: Tradesy

Clothing As A Service Is The Future Of Fashion. According to online plus-sized retailer Gwynnie Bee, subscription is a superior model for the modern fashion consumer—and the company is white-labeling its CaaS (Clothing-as-a-Service) platform, which will allow retailers to offer a subscription clothing rental business alongside their existing way of doing business. Most Gwynnie Bee customers prefer to swap items rather than own them because they are renting fashion-forward items that may be too on-trend (and therefore too temporary) to invest in. To work with the CaaS platform, retailers are required to send over their inventory, and Gwynnie Bee takes it from there, performing all of the delivery and cleaning logistics in their own warehouses, building a consumer-facing, front-end suite in the retailer's name, and getting paid on a per-customer basis every time a consumer signs on with the retailer's CaaS offering. In this way, the consideration barrier becomes much lower and consumers are more willing to wear many more types of clothes than they are willing to buy outright, which can ultimately lead to more purchasing on the whole as consumers expand their taste and broaden their fashion preview.

***What if** peer-to-peer sales and marketplaces replace traditional brick-and-mortar retailing? **What if** all clothing is disposable as customers print out/rent/share all items rather than purchasing and owning? **What if** the rise of the collective conscience drives proof-of-sourcing, ranging from food, clothing, and raw materials, as consumers demand specificity on providence tracking? An example would be scanning a QR code with a smart device. Will the cost of tracking inherently increase the cost of goods and services making it more attainable by the wealthy vs. the poor? Will more people be willing to pay more to support natural/organic, non-GMO, all natural or local products?*

Consumers could create and own their own data in 2025

Taking this lack of trust and increasing collective action forward to 2025, we can see a situation where it is not companies or government regulators that create and control data, but consumers themselves.

GDPR in Europe

In our opinion, GDPR will give consumers higher control of their personal data.

In January 2012, the European Commission set out plans for data protection across the EU and a reform package entered into force in May 2016 that includes GDPR that was applicable as of May 25, 2018. Under the regulation, every organization, processing the personal data of data subjects residing in the Union, will need to make changes to its oversight, technology, processes, and people to comply with the new rules. Any organization processing data relating to an identified or identifiable person, called data subject, needs to comply with GDPR and the consequences of not following it can result in fines of up to 4% of the organization's turnover or up to €20 million, whichever is higher.

Exhibit 145: Table of key GDPR components

Area	Definition	Requirement
Consent	Freely given, specific, informed and unambiguous indication of the data subject's agreement to the processing of personal data relating to him or her.	Consent must be given in an intelligible and easily accessible form, with the purpose for data processing attached to that consent must be clear and distinguishable from other matters; but silent consent, inactivity and pre-ticked boxes do not constitute consent.
Personal data definition	Any information relating to an identified or identifiable natural person.	This will include unique identifiers including IP address and cookies. This makes cookie use subject to the same consent requirements.
Right to access	The person, whose data is collected, has the right to obtain confirmation of whether personal data is being processed and for what purposes.	Right to access must be provided free of charge unless the request is repetitive, excessive or unfounded.
Right to be forgotten	The right to be forgotten means the right to demand the erasure of data, cease further dissemination of the data, and potentially have third parties halt processing of the data.	The data subject has the right to be forgotten for which he/she no longer consents to data processing or which are no longer necessary to process. It requires controllers to compare the subjects' rights to "the public interest in the availability of the data" when considering such requests.
Breach notification	Security breaches must be reported.	Notification must within 72 hours of first having become aware of the breach. Data processors are also required to notify their customers, the controllers, "without undue delay" after first becoming aware of a data breach.
Privacy by design	Inclusion of data protection from the onset of the designing of systems, rather than an addition. Controllers must implement appropriate technical and organizational measures to meet the GDPR requirements.	Controllers are required to hold and process only data that is necessary for the completion of duties, and limit access to personal data to those doing the processing.
Data portability	Right to transfer data means that the data subject at any time should be allowed to receive, in machine-readable format, the personal data concerning oneself.	Organizations, on request, must be able to deliver a person's data in a suitable format, and have the right to transmit that data to another controller.
Data protection officers	A contractor, new hire or a member of the organization's staff.	All organizations are obliged to have a DPO.

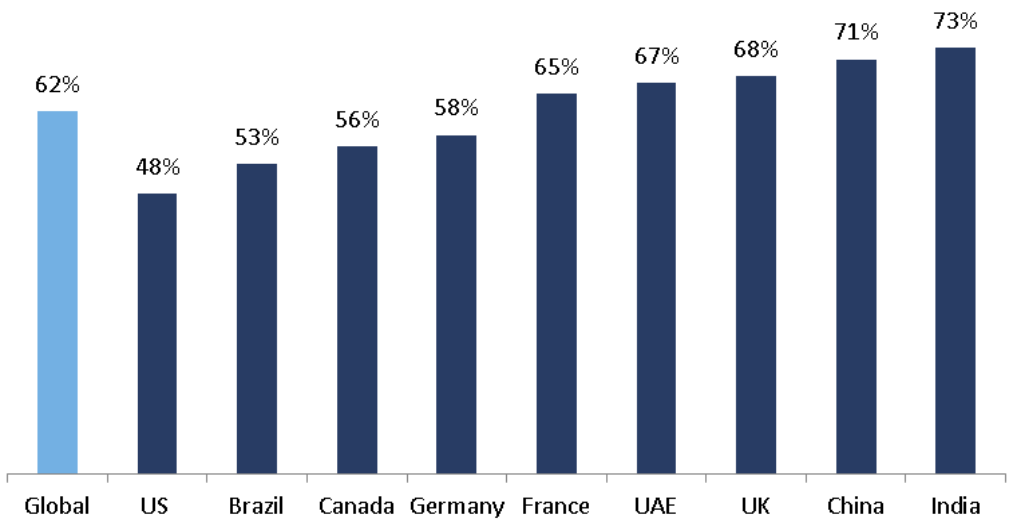
Source: RBC Capital Markets

Given the global reach of GDPR, as all companies doing business with EU citizens must implement it for those citizens, we expect its standards to become global (in developed markets) practice by 2025, replacing significantly looser standards in the US and elsewhere.

In our opinion, GDPR will give consumers higher control of their personal data. A new study by Pegasystems found that 82% of European consumers plan to exercise their new rights to view, limit or erase the information businesses collect about them. Additionally, 90% want direct control over how companies use their data, while 89% want to see what the data companies store on them. However, only 21% know what GDPR is or what it will enable them to do, indicating that widespread consumer action may be delayed until more awareness of these rights reaches the mainstream.

Given the global reach of GDPR, as all companies doing business with EU citizens must implement it for those citizens, we expect its standards to become global (in developed markets) practice by 2025, replacing significantly looser standards in the US and elsewhere. We note, for example, that Facebook has recently stated its intention to apply GDPR to the US as well as the EU. The Edelman survey also pointed out that 62% of users feel government should do more to regulate social media indicating data protection as a global phenomenon.

Exhibit 146: % of consumers who feel government should regulate social media



Source: 2018 Edelman Trust Barometer, RBC Capital Markets

The recent Equifax and Cambridge Analytica data scandals have raised government attention toward the potential negative implications of companies possessing large amounts of consumer data. Over 145 million Americans' personal information was exposed in a data breach at Equifax, one of the nation's major credit reporting agencies. The stock price subsequently fell more than 30%. In the Cambridge Analytica scandal, personally identifiable information of more than 80 million Facebook users was obtained and used to influence the US 2016 elections. Facebook's stock price fell more than 15% on the news. Twitter and Google are also investigating Russian meddling via use of their platform. Governments around the world are increasingly considering ways to protect privacy data, including the rollout of the General Data Protection Regulation (GDPR) in Europe, the US signing the Clarifying Lawful Overseas Use of Data Act, as well as general data censorship among other regions of the world. In China, the government already instituted the Cybersecurity Law of the People's Republic of China last year where provisions of the law restrict the transfer of data out of the country to keep information within easier reach of authorities.

Exhibit 147: Recent regulatory measures implemented

Recent Regulatory Measures		
Date	**Event**	**Overview**
March 2018	United States signed the Clarifying Lawful Overseas Use of Data Act	This allows federal law enforcemnt officials to compel US-based technology companies to provide requested data stored on service regardless of whether the data is stored in the US or on foreign soil
May 2018	European Union introduced the General Data Protection Regulation	This legislation applies to all 28 EU members and shifts control of data to customers and away from technology companies
July 2018	New York City Council Passes Bill to Regulate AirBnB	Airbnb is required to disclose the names and addresses of its hosts to a city-run enforcement agency in an effort to crack down on illegal units
August 2018	New York City Council Approves Bill to limit the number of for-hire vehicles (Uber,Lyft, etc.) allowed on the street	This legislation will stop TLC from issuing new licences for one year, require FHV services to provide data on usage and charges, enact geographic restrictions, require minimum wage for FHV drivers

Source: Wall Street Journal, Singularity Hub, Curbed

Theme V: Escalating Uncertainties—"Unpredictable instability is the new normal"

Director of National Intelligence James Clapper told Congress in 2016, "unpredictable instability is the new normal." Since that time we would say that describes the consumer sector well and looking forward we would expect that to continue.

For consumer companies (especially consumer staples companies) consistency of cash flows, reliable dividends and stable growth are the most important qualities for investors. However, today (and likely more so tomorrow), the world is directly at odds with the consumer industry's ability to deliver on those promises. Currency volatility, climate change, resource scarcity, geopolitical tensions and population imbalances are just some of the pressures weighing on every consumer company's ability to deliver sustainable and profitable growth. In tandem with the disruptive technological change we have discussed broadly in this report, the magnitude of geopolitical instability also seems to be accelerating, often as collateral damage of this technological revolution. Corporations and heads of state alike range from underprepared bystanders to contributors to these exogenous systemic shocks that can have far-ranging impacts. As Director of National Intelligence James Clapper told Congress in 2016, "unpredictable instability is the new normal."

Exhibit 148: Exogenous events and rippling effects

Event	Impact	Ripple Effects
Brazil Trucker Strike	Goods and services unavailable to Brazilians as truck drivers go on strike.	Soybeans, sugar, coffee, and iron ore all affected in commodities market. Companies with global presence miss sales goals. For example, Unilever sales impacted -$177m.
Hurricane Maria	$102B in damages 4,000+ killed (estimate)	Shortage of IV bags as three Baxter manufacturing sites damaged. Baxter impacted -$70m; other healthcare companies guided down earnings for the quarter.
JCPOA Exit (Iran Nuclear Deal)	Oil prices moved higher at Donald Trump's announcement that the US will withdraw from the JCPOA.	Rising fuel costs put pressure on gross margins across sectors.
Equifax Data Breach	Over 145 million Americans' personal information was exposed in a data breach at one of the nation's major credit reporting agencies.	Equifax stock price fell more than 30%. Additional companies stepping up data protection.
Cambridge Analytica Data Scandal	Personal identifiable information of more than 80 million Facebook users was obtained and used to influence the US 2016 elections.	Facebook's stock price fell more than 15% on the news. Twitter and Google also investigating Russian meddling via use of their platform.
Trump Tariff Policy	Initially imposed tariffs on steel (25%) and aluminum (10%), as well as 25% tariffs on $50 billion of Chinese imports covering an estimated 1,300 products and a 10% tariff on several hundred billion dollars more of Chinese imports depending on how/if China responded with retaliatory tariffs. Additionally, the US has threatened to withdraw from or significantly change the current terms of NAFTA.	We believe that as companies are forced to raise prices to protect profit margins from the impact of rising wages and increased tariffs, the US consumer will bear the ultimate cost of such policies.
California Wild Fires	58 dead Over 8,700 homes and 10,000 total structures destroyed.	More than 300,000 consumers displaced, weighing on consumption trends in the world's 5th largest economy (California).

Source: RBC Capital Markets, NOA, FactSet

Risk and Opportunities

With uncertainty rising, we believe consumer companies are open to more risk, but also more opportunity. Throughout this section, we discuss the some of the uncertainties consumers companies will have to deal with in the future and some potential ways these companies can evolve to either mitigate the risk or make it an opportunity all together.

1) Currency Volatility—Uncertainty in a static demand world

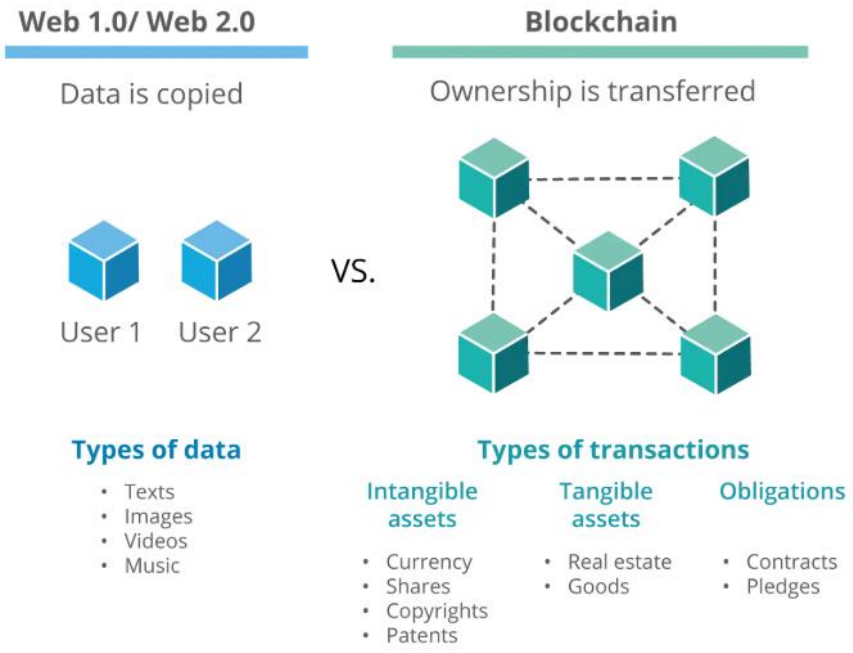
Before we even discuss the intense supply and demand issues related to global climate change, population imbalances, water scarcity and nationalism trends among others—we fully expect currency to be an increasing source of volatility across global consumer company P&Ls, balance sheets and cash flow statements. Interest rates in the United States are rising, Brexit is underway in Europe and emerging markets are at times crippling. All of this will drive increased currency volatility, most likely with US dollar, Canadian dollar, pound and euro, all continuing to strengthen relative to emerging market currencies. This trend at the very onset, before other types of disruption, will plague the sales results and margins of consumer companies.

Could crypto currencies and Blockchain be a solution?

The World Bank is using Blockchain technology to issue a new set of 100 million AUD bonds. Daimler did a similar bond offering using Blockchain technology last year. Blockchain reportedly significantly streamlines the process of bond issuances. The Australian stock exchange is reportedly trying to move completely to Blockchain to clear and settle trades by 2020. This move further validates the added value that Blockchain provides, especially to the capital markets.

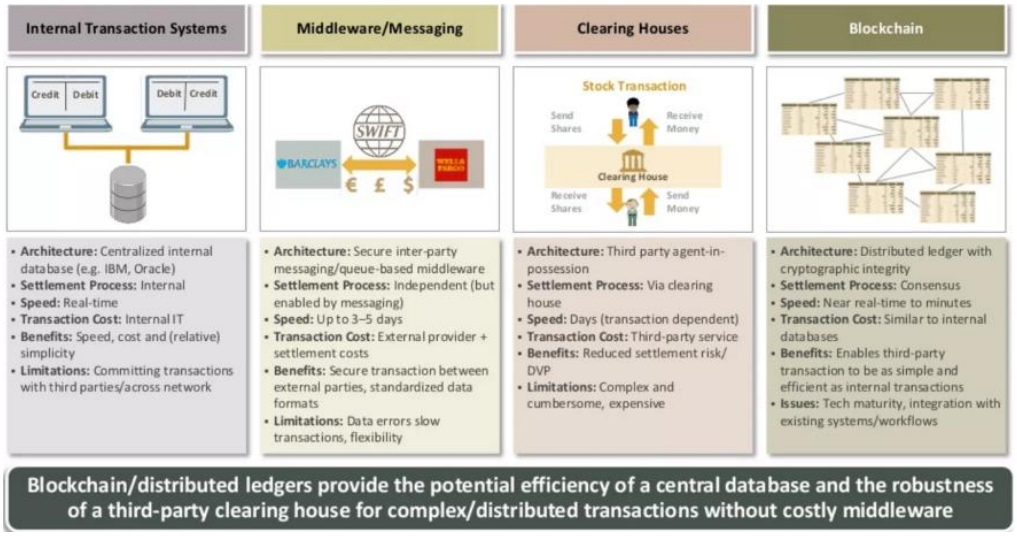
By moving to a distributed consensus ledger, Blockchain carries information of transactions and provide more evidence of variable forms of both intangible and tangible assets. It is naturally made to record transactions, which is one of the key functions of currencies. Yet it carries so much more information and is more secure by design. Decentralization helps create and distribute trust through a collectively agreed-upon consensus protocol, and by isolating the ledge from any government entity or corporation, it avoided the situation of currency risks in times of volatility.

Exhibit 149: Blockchain is the new internet of values



Source: Deloitte

Exhibit 150: Blockchain for financial institutions—differences vs existing architectures

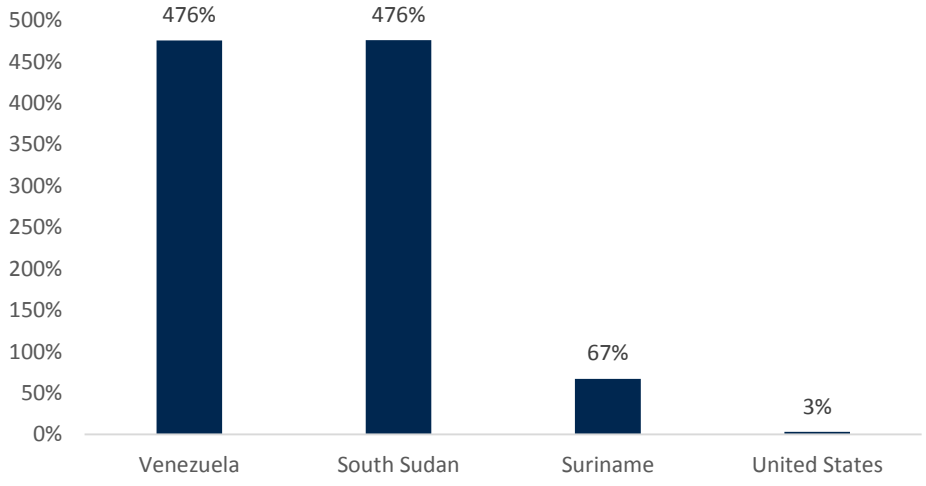


Source: Richtopia, Magister Advisors

No Block in the Chain

Although Blockchain technology is a phenomenon that has only been around for about a decade, it has the ability to alter the structure of society by 2025. Currently, one of the major challenges facing less developed parts of the world, such as Venezuela, South Sudan, and Suriname, is hyperinflation, where the value of money ranges by a wide spectrum. More specifically, Venezuela and South Sudan have both recently faced around 476% inflation, and Suriname has faced 67% inflation. This phenomenon is often caused by the unstable nature of national economies and the government's control of money supply.

Exhibit 151: Recent Inflation Peaks

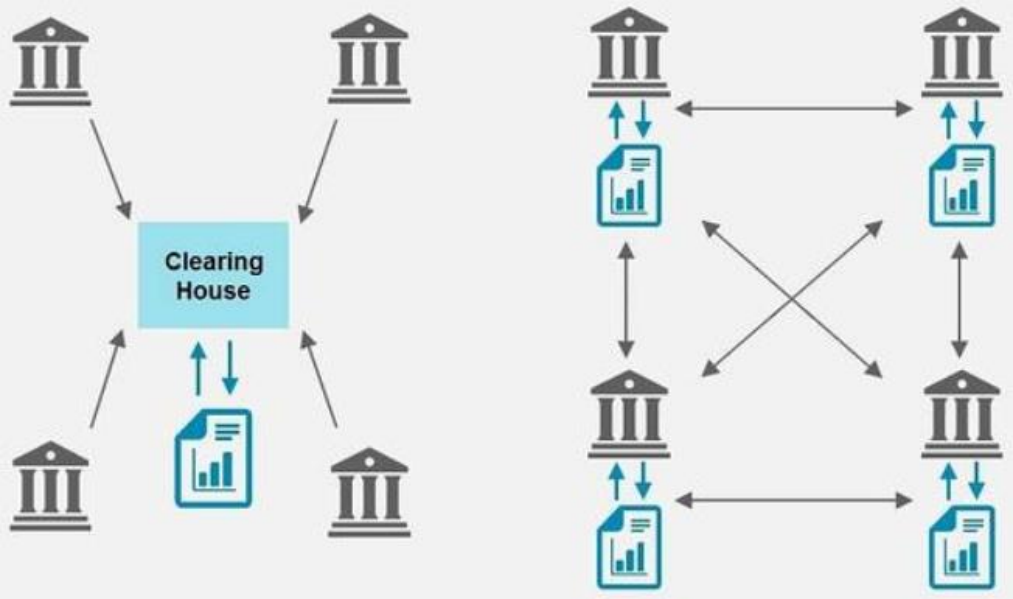


Source: Nomad Capitalist

Global adoption of Blockchain technology may be a key resolution to these challenges, as the decentralized nature of the platform and supporting cryptocurrencies like Bitcoin reduce the need for central authorities such as the government and banks to manage money supply in the economy. As more and more individuals get involved with Blockchain and contribute to the verification of transactions on the ledger, the strength of the decentralized network and

underlying currency improve. Cryptocurrencies like Bitcoin are often compared to fiat currencies like the USD. However, considering the potential of these cryptocurrencies on a global scale, particularly in areas lacking stable fiat currencies, highlight the benefits of decentralized currencies and may be an indicator of the direction the world is headed toward by 2025.

Exhibit 152: What a Distributed Ledger Looks Like



Source: Wall Street Journal

What if *advancements in blockchain technology could mitigate global currency exchange risk?*

2) Climate change, environment, energy and natural resources…oh my!

One of the biggest cross-border challenges has to do with the intertwining implications of climate change, energy and the environment, and their effects on natural resource-based economies and the consumer.

How the world adapts and develops policy rests collectively in the hands of the public, the countries that enforce regulation, and the businesses that innovate to find new, better solutions.

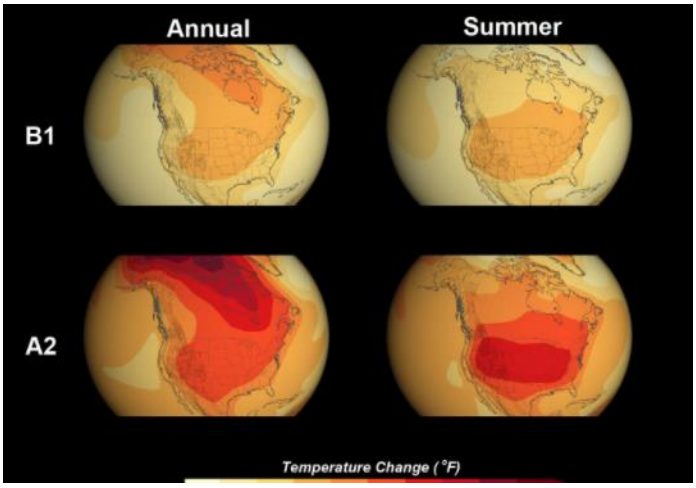
One of the biggest cross-border challenges has to do with the intertwining implications of climate change, energy and the environment, and their effects on natural-resource-based economies and the consumer. These forces may introduce new challenges ranging from energy uncertainty, to fossil fuel resource management, hydro-politics, the need for climate mitigation frameworks, renewable resource development, and adaptations to life in changing climates through innovation and regulation. Innovation and new technologies in particular may help drive efforts to clean up the ocean and improve conservation of resources, but if potential toxic zones do develop, they may widen the gap between the haves and the have-nots. How the world adapts and develops policy rests collectively in the hands of the public, the countries that enforce regulation, and the businesses that innovate to find new, better solutions. While the debate on how to deal with climate change intensifies in certain geographies, the proposition of grappling and dealing with that change becomes an increasingly borderless challenge.

Consider the following:

- It will be 4°C warmer than it was before the Industrial Revolution if our greenhouse gas emissions continue to increase at the rate they have been over the last 50 years.
- There has been an 8-inch global sea level rise in the last century. The rate of increase in the last two decades, however, is nearly double that of the last century.
- The fraction of carbon dioxide just crossed 400 parts per million, and high-end estimates extrapolated from current trends suggest it will hit 1,000 ppm by 2100.
- The National Climate Assessment model runs use assumptions about possible future development patterns and greenhouse gas emission rates. Two future scenarios are shown: B1 and A2.

Exhibit 153: Future climate scenarios

The amount by which atmospheric carbon dioxide increases each year has approximately quadrupled since the 1960s, and in recent years represented the largest annual increase in records going back nearly sixty years.

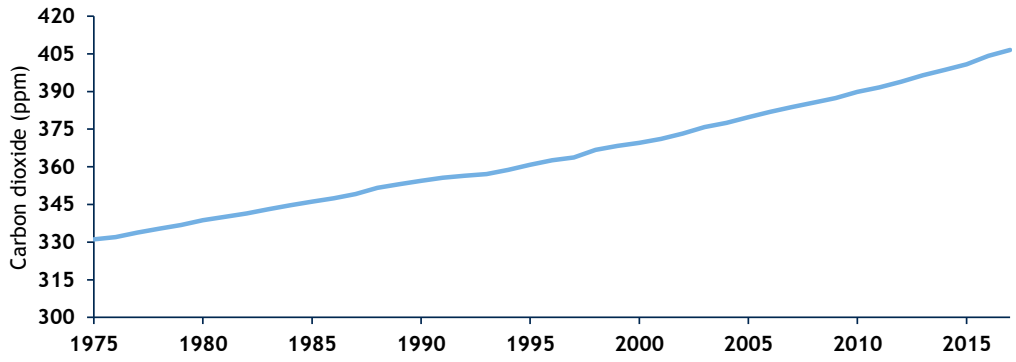


Source: Sterling Rice Group, NASA

We have already seen an alarming rise in the trajectory of global temperatures, and carbon dioxide levels today are higher than at any point in the past 800,000 years. The amount by which atmospheric carbon dioxide increases each year has approximately quadrupled since the 1960s, and in recent years represented the largest annual increase in records going back nearly sixty years.

Exhibit 154: Greenhouse gas concentration

By 2050, it is estimated that there will be more waste plastics in the sea than fish.

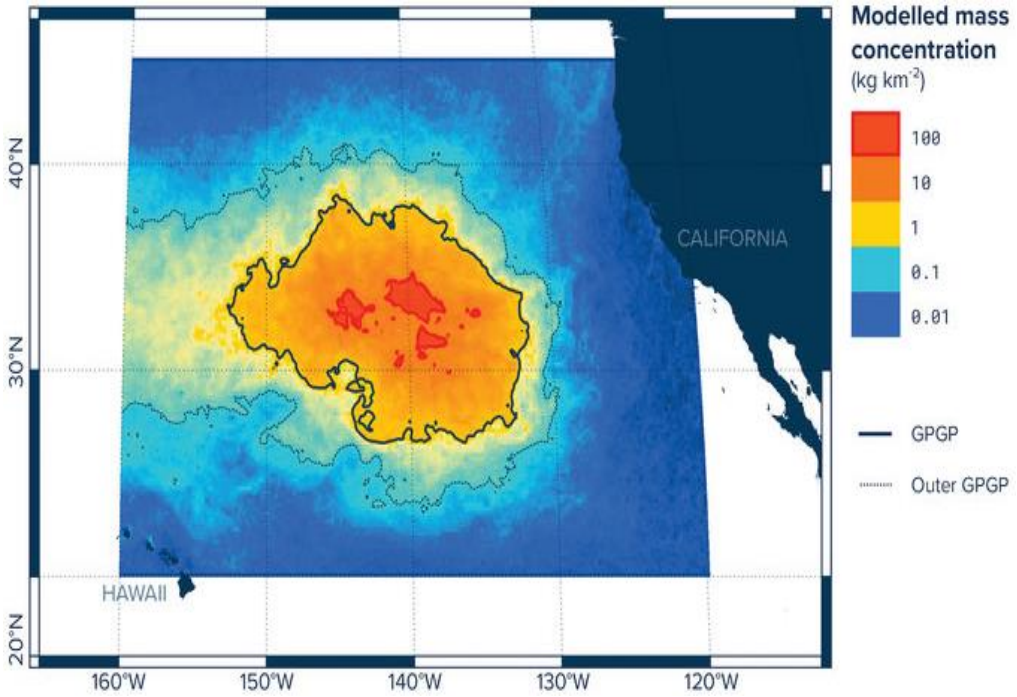


Source: Sterling Rice Group, NASA

We have seen a similar and equally unfortunate rise in the amount of pollution and waste produced globally. Americans today produce on average 130 pounds of trash a month and at this rate, we are on pace to globally produce 11M tons of waste daily by the year 2100. The

impacts are being seen in real-time. One million people die a year in China due to the effects of air pollution, and by 2050, it is estimated that there will be more waste plastics in the sea than fish.

Exhibit 155: The Great Pacific garbage patch—2x larger than Texas



Source: Sterling Rice Group, NASA

Climate change has the potential to slow our economic growth in the coming decades as temperature changes could reduce incomes globally by roughly 23% by 2100. Another study found that a 4.5°C increase in global temperatures could cut the global domestic product by $72 trillion. Hidden within these global economic estimates are the effects on individual companies—and unpredictable weather will only intensify these effects, reducing the availability of raw materials and disrupting supply chains.

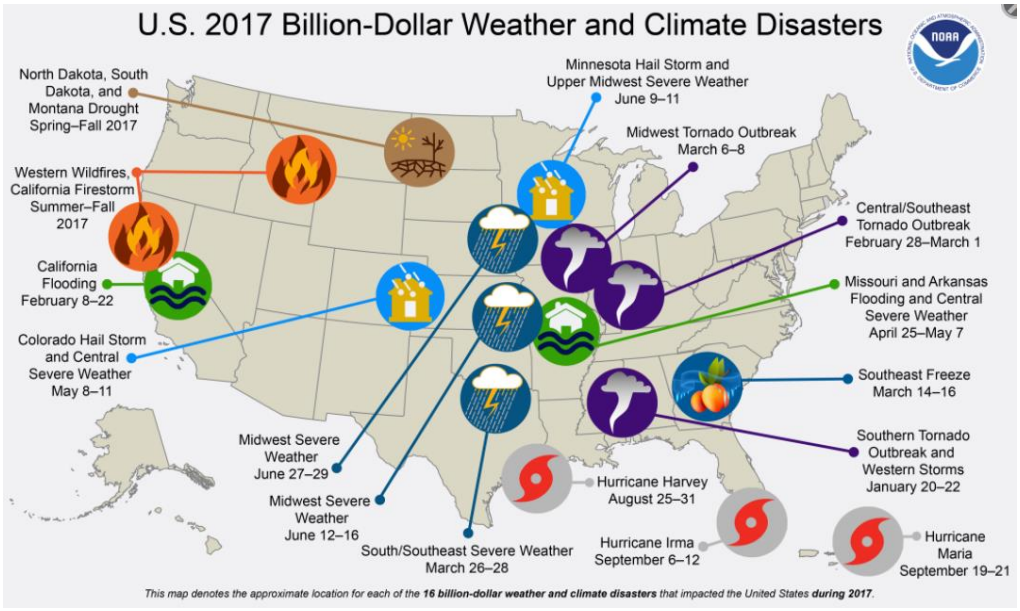
When the 2011 drought hit the Great Plains in the United States, several meat-processing plants were forced to close or relocate their businesses. Today, unpredictable weather patterns continue to threaten those businesses, as 21% of US cattle herds were located in drought-stricken areas in March—up from 9% the previous year.

I thought hurricane season was over

We have seen an increasing frequency and intensity of heatwaves and wildfires in the west, flooding in the east, and droughts in the southwest.

The severe effects of climate change are usually presented as threats that will manifest in the more distant future—measured by the century. However, extreme weather events have already begun to occur and the trend has been one of increasing intensity. We have seen an increasing frequency and intensity of heatwaves and wildfires in the west, flooding in the east, and droughts in the southwest. The consequences of such events could be catastrophic, solutions will be costly, and it seems we are mostly underprepared for the magnitude of change.

Exhibit 156: US weather & climate disasters with $1b+ damages



Source: NOAA

One example of the ways in which our present day lives are ill equipped for a warmer future happened in February 2018 when temperatures rose to over 118°F in Phoenix, Arizona. This resulted in over 50 flights being cancelled or rerouted as the heat exceeded the aircrafts' maximum operating temperature.

A government study found that 13 of the 47 largest US airports have at least one runway within 12 feet of the current sea level.

Infrastructure and travel also face a threat from the oceans. A government study found that 13 of the 47 largest US airports have at least one runway within 12 feet of the current sea level. As evidenced by the airport shutdowns during Hurricane Sandy, storm surges can easily shut down airports, with rippling global effects. The impacts reach beyond the passenger. In a world becoming more dependent on e-commerce, severe weather events throw a wrench into logistics of all kinds.

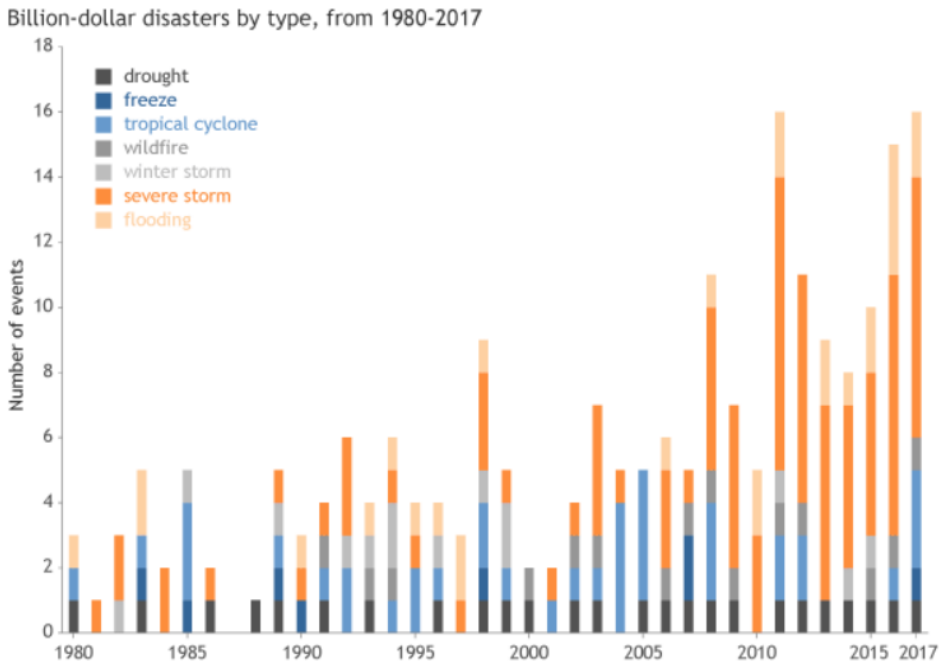
Exhibit 157: Don Muang Airport flooded in Thailand

Source: Getty Images

In 2017, 10 hurricanes formed over 10 weeks, matching a record that was last set in 1893.

The strength and frequency of hurricanes have increased in the past 30 years with an uptick in Category 4 and 5 storms. In 2017, 10 hurricanes formed over 10 weeks, matching a record that was last set in 1893. The total cost of weather and climate disasters in 2017 set a new record in the US, topping $300 billion.

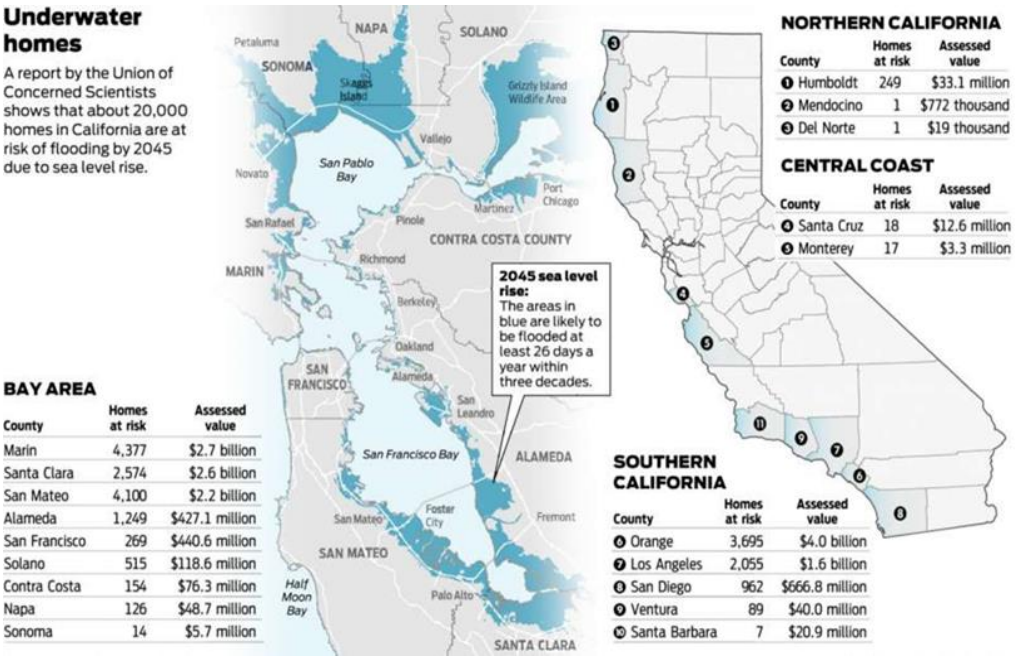
Exhibit 158: 1980–2018 YTD US billion-dollar disaster event frequency (CPI-Adjusted)



Source: https://www.ncdc.noaa.gov/billions/

A recent report on the impact of rising sea levels on real estate prices by the Union of Concerned Scientists finds that across the Continental US, about 311,000 homes are at risk of being inundated with seawater by 2045, or about $135B of assessed property. Florida, New Jersey and Louisiana, with their low-lying seaboards and sprawling coastal development, have the most to lose. However, the report also notes that California has $15B worth of property at risk as well.

Exhibit 159: California homes at risk of flooding



Source: Union of Concerned Scientists

Global warming has opened up new shipping lanes with implications on trade and military planning, new access to minerals, and potentially prompting new territorial disputes.

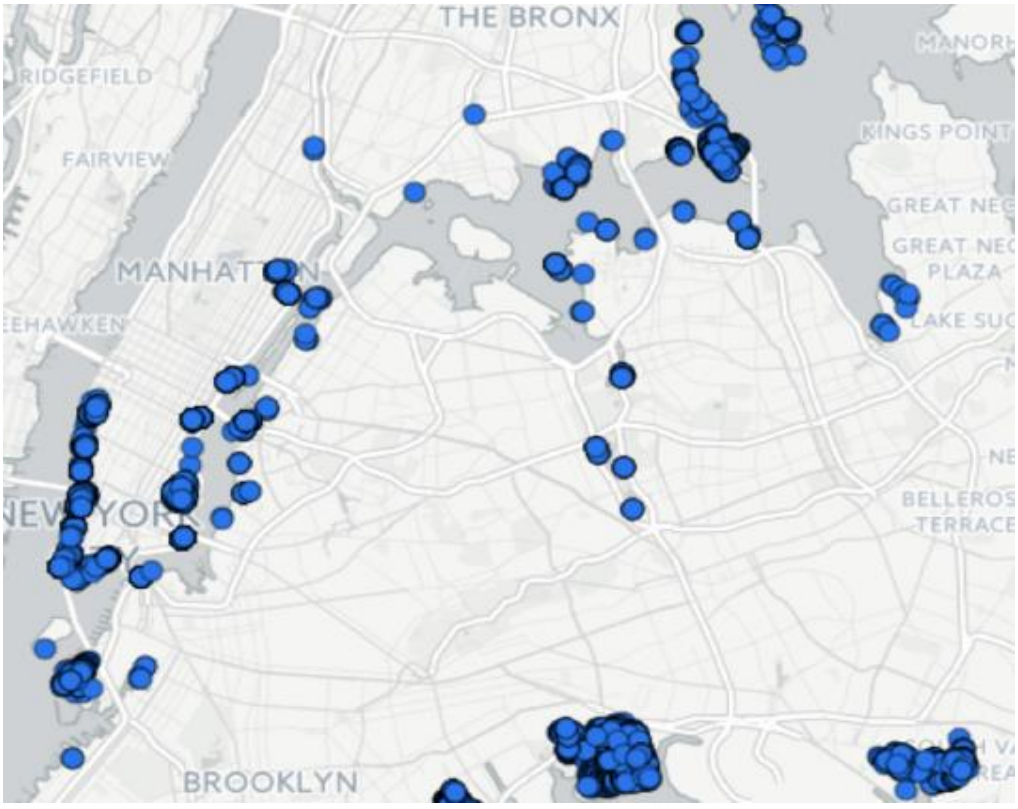
It seems a sad irony that melting ice and rising sea levels have consequently increased the accessibility of the Arctic for development of the natural resources that have arguably contributed to that very climate change. Global warming has opened up new shipping lanes with implications on trade and military planning, new access to minerals, and potentially prompting new territorial disputes. The US Geological Survey estimates that the Artic may contain up to 13% of the world's undiscovered oil and up to 30% of its natural gas. With the ice receding at an 11% rate each decade according the US National Snow and Ice Data Center, huge reserves of manganese, copper, cobalt, zinc, gold, and untouched fisheries have become accessible. Russia, in particular, has moved to capitalize on these opportunities since it planted a Russian flag on the Arctic seabed in 2007. Abandoned Soviet military bases have been reopened in tandem with the establishment of a series of new ones and the bolstering of Russia's fleet of nuclear-fueled icebreakers. However, Russia is not alone in its endeavors. The US, Canada, Denmark, Norway, and Iceland are all actively participating in the Arctic land grab and seeking potential access to its abundant natural resources.

***What if** consumer companies are forced to relocate facilities and offices due to rising water levels?*

Could consumer company offices and plants also be at risk?

Globally, we believe many corporate offices, retail location and production plants could be at risk from rising water levels. Without pointing out any particular companies, we note that our downtown NYC located RBC offices are at risk of flooding by 2050 should current pollution levels be unchecked according to a Zillow/NOAA study.

Exhibit 160: Flood risk a significant risk to consumers and companies alike



Source: Zillow-NOAA

Vertical farming

With increased climate volatility, food production will be forced indoors. Startups such as FreightFarms, AeroFarms, BrightFarms and Edenworks have all engaged in indoor farming solutions.

Exhibit 161: Vertical Farming is the likely way of the future given climate volatility

Source: Stanford Social Innovation Review

What if *food inflation was permanently eliminated due to wider availability of food products, including the ability to grow food in urban environments, limiting shipping and transportation costs.*

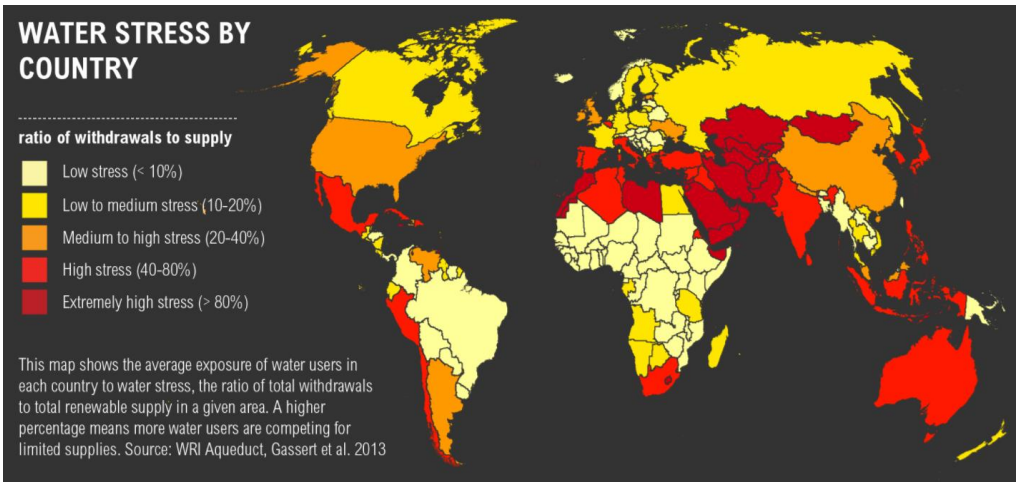
3) Hydro-politics—Is water the new oil?

Hydro-politics could become an important issue for a number of the world's states.

A NIC report highlights that around 50% of the world's 263 international river basins do not have a management agreement.

In a world powered by battery electric vehicles, water stress may become the primary resource challenge. Hydro-politics could become an important issue for a number of the world's states. Dam building, industrial water pollution and potential neglect of water cooperation agreements could threaten geopolitical security. A NIC report highlights that around 50% of the world's 263 international river basins do not have a management agreement. Without clear guidelines on water management and cooperation, it is likely that more regions will be incubated for future conflict. While the researchers do not define drought as a "cause" of conflict, it is considered a factor that creates conditions for more conflict to arise.

Exhibit 162: Water stress by country



Source: WRI Aqueduct, Gassert et al 2013

Water demand globally is expected to increase globally 55% between 2000 and 2050.

Even as weather patterns create supply concerns, demand driven by population growth and a rising middle class is exacerbating the issue. Water demand globally is expected to increase globally 55% between 2000 and 2050.

Consider this:

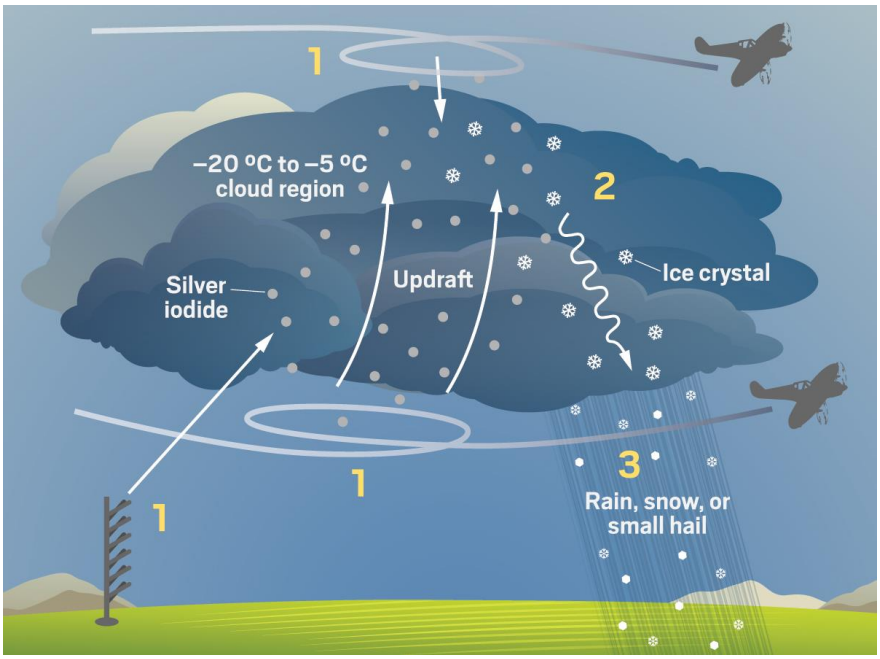
- By 2050 with the growing global population, the year we are estimated to use up all land on the planet suitable for agriculture.
- Agriculture uses 70% of water worldwide.
- 90% of rare earth metals are mined by China, which claims its resources could run dry in the next 20 years.

***What if** water becomes the new oil? Do we see countries become more valuable on the global stage because of their water resources?*

Could cloud seeding be the solution?

North Dakota-based Weather Modification International uses planes to target clouds and draw out more rain from them. Cloud seeding is a process by which planes inject a silver iodide mixture into moisture-packed clouds to get more rainfall from them. The mixture condenses the cloud liquids and makes them fall. On average, the process is causing 8-15% higher precipitation amounts. Although the tech has been around for decades, it has only recently become prominent (driven by a research grant from the National Science Foundation), as a potential counter to droughts.

Exhibit 163: Cloud seeding process



Source: WRI Aqueduct, Gassert et al 2013

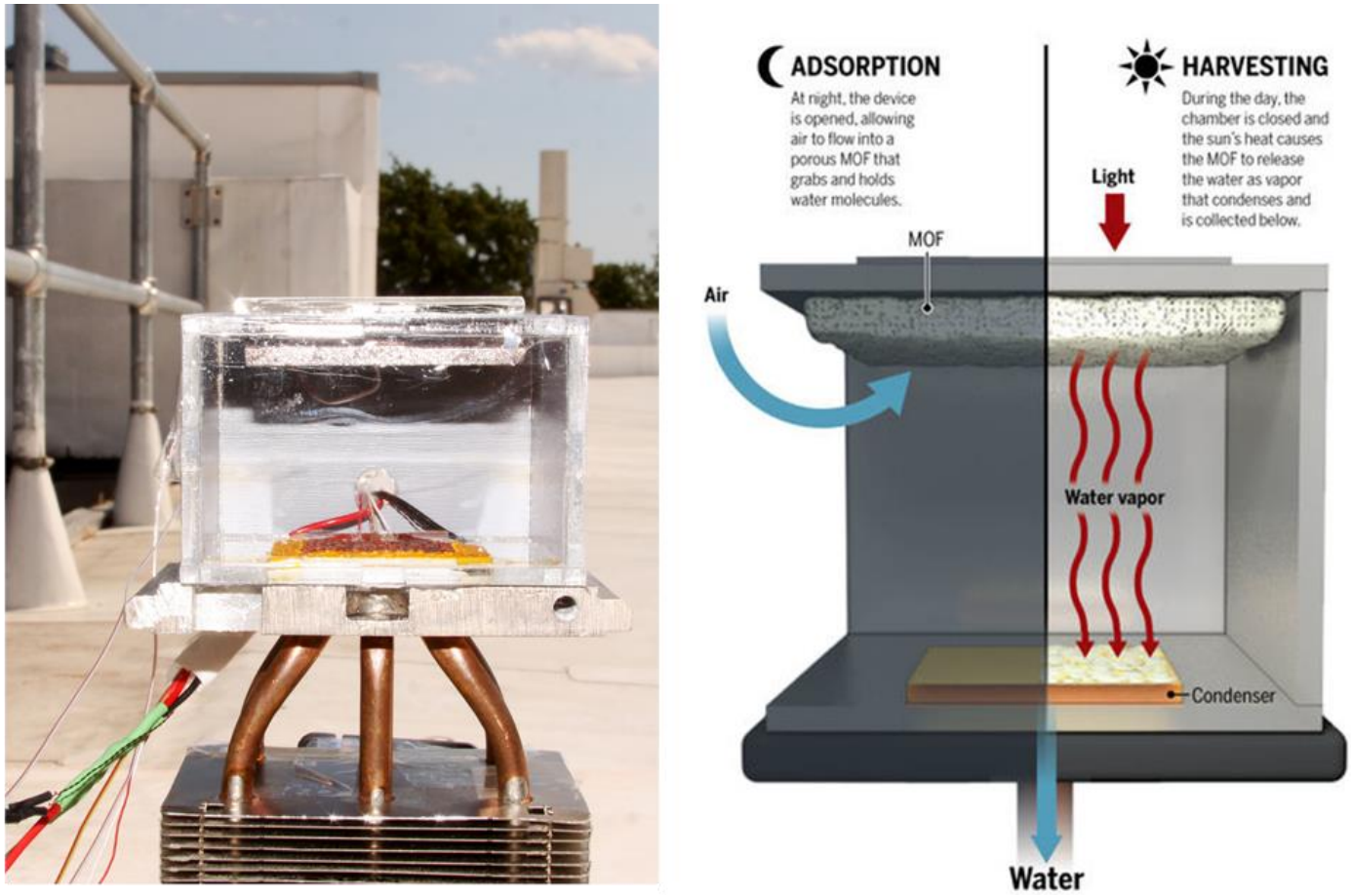
If this goes mainstream and is proven not to be harmful to the environment, this could increase rainfall in targeted areas to partially combat the effects of a drought. This could become especially pertinent as climate change continues to intensify and water shortages become more pressing of an issue.

Water everywhere?

Scientists at MIT and the University of California at Berkeley have discovered a way of obtaining clean, fresh water almost anywhere on Earth, by drawing water directly from moisture in the air even in the driest of locations. Fog harvesting is a popular process of extracting water from the sky in areas that have 100% humidity, but this new development can extract water from the air regardless of humidity levels. The key to the new system lies in

the porous material itself, which is part of a family of compounds known as metal-organic frameworks (MOFs). By tuning the exact chemical composition of the MOF these surfaces can be made hydrophilic, or water attracting. The research team found that when this material is placed between a top surface that is painted black to absorb solar heat, and a lower surface that is kept at the same temperature as the outside air, water is released from the pores as vapor and is naturally driven by the temperature and concentration difference to drip down as liquid and collect on the cooler lower surface. While these initial experiments have proved that the concept can work, the team says there is more work to be done in refining the design and searching for even more effective varieties of MOFs. The present version can collect water up to about 25 percent of its own weight, but with further tuning they think that proportion could be at least doubled. Could this type of technology become a fixture in our homes where we pay monthly for our water—similar to how we consume gas/electricity?

Exhibit 164: Water-harvesting technology



Source: WRI Aque

While advancements are certainly being made in procuring water, suppliers such as P&G are getting out ahead of world's water shortage issues. P&G is launching DS3, a next-generation line of 8 unique travel-friendly cleaning products for the body & home that increase convenience for consumers while significantly reducing the impact on the environment. DS3 is made with a breakthrough technology that eliminates water from the final product, removing 80% weight, 70% space, & 75% emissions. One liquid-free swatch works just as well as heavy, water-based cleaning products.

Exhibit 165: P&G's DS3 innovation

Source: P&G

What if *due to environmental regulations, personal care products that complement water such as shampoo, body wash and toothpaste were no longer offered in plastic tubes and bottles, but rather compact P&G DS3-like packaging?*

4) Nationalism—New world out of order

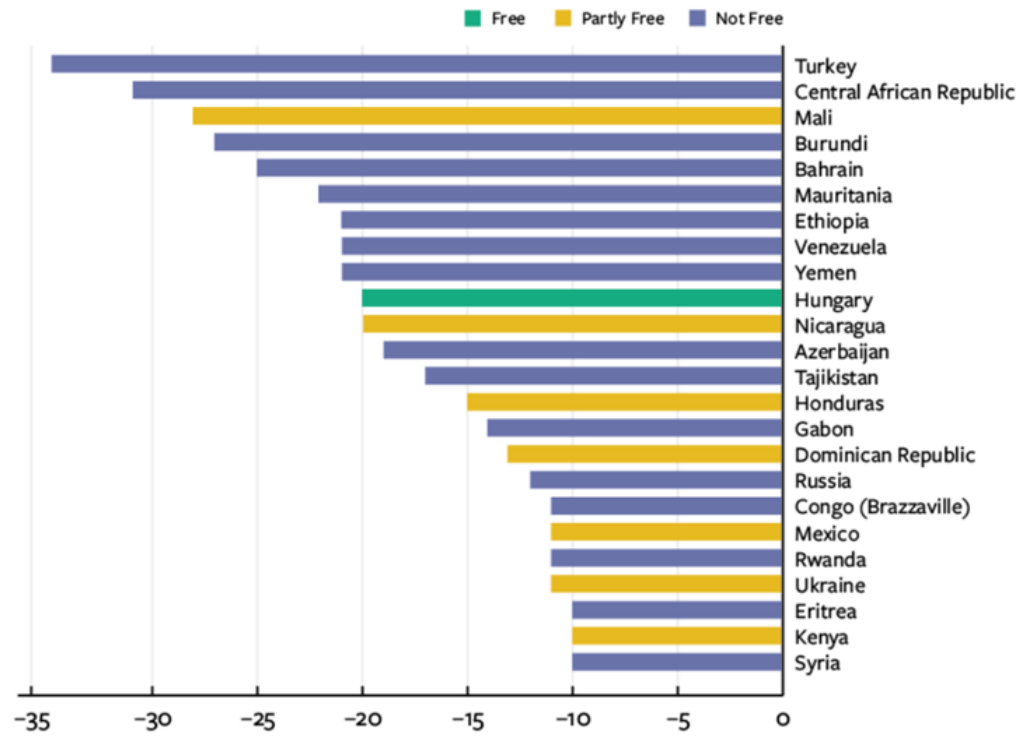
Democracy, in particular, appears to be in retreat and authoritarianism on the ascendancy. In their "Freedom in the World 2018" report, Freedom House finds that 2017 was the 12th consecutive year of decline in global freedom.

Following the fall of the Berlin Wall in 1989 and the conclusion of the Cold War, the Stanford academic Francis Fukuyama posited that we were witnessing "the end point of mankind's ideological evolution and the universalization of western liberal democracy as the final form of human government." This theory is borne out by recent political trends and events that have shocked the global political system. The age of one country as a super power—most recently the US—standing willing and able to exert its authority beyond its borders has seemingly passed. The entire post-WWII rules-based system of global governance—enshrined in a network of international organizations and regulations and enforced by powerful western countries—appears imperiled at the very time when we most need collaborative global solutions to environmental, economic and immigration issues.

Going to extremes

The challenge has come from rising and revanchist states, surging populist and nationalist sentiment amidst a growing disillusionment with globalization and the ideology of open borders and markets, as well as from rapid and widespread technological change. Democracy, in particular, appears to be in retreat and authoritarianism on the ascendancy. In their "Freedom in the World 2018" report, *Freedom House* finds that 2017 was the 12th consecutive year of decline in global freedom. Seventy-one countries registered net declines in political liberties in 2017, with only 35 states posting gains. Amongst the once promising states suffering from this backslide in democratic standards are Turkey, Venezuela, Poland and Tunisia. China and Russia have taken advantage of this trend to export their influence to other countries.

Exhibit 166: Countries with the largest declines in freedom over past decade



Source: Freedom House

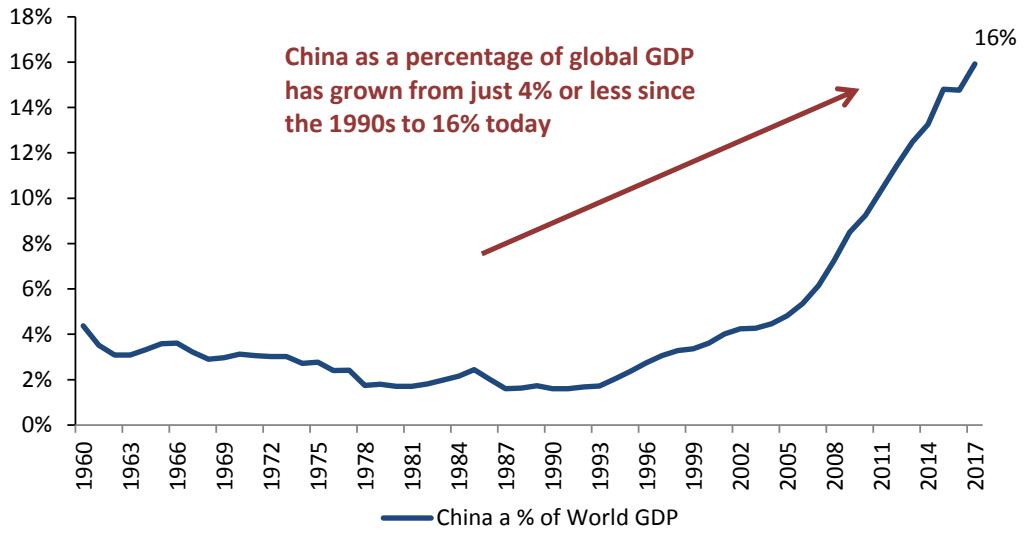
A National Intelligence Council (NIC) Global Trends paper finds that democracies are generally more likely than autocracies to have predictable economic policies and produce steady economic growth, and political liberalization is associated with higher subsequent quality of life.

A National Intelligence Council (NIC) Global Trends paper finds that democracies are generally more likely than autocracies to have predictable economic policies and produce steady economic growth, and political liberalization is associated with higher subsequent quality of life. Moreover, the NIC notes that democracies have seldom gone to war with one another and have generally supported one another during international military conflicts. They attribute this to the tendency of democracies to advocate for the public good. The waning influence of the world's democratic bloc of nations has mirrored their relative economic descent. Established democracies such as the UK and US made up the bulk of GDP in the late nineteenth century and this trend continued well into the second half of the twentieth century as the democratic alliance expanded to include Japan and Germany. For the first time in over a century, the democratic bloc's share of global GDP has fallen below half, and the IMF states it will slump to less than a third in the next decade.

How big will the Chinese cluster be in 10 years' time? Wealth creation and growth in tourism drives luxury revenue growth over time. The Chinese became the number 1 clientele for European luxury brands a few years ago and now present ~35% of global sales (buying locally and abroad) and as much as 50% of certain companies like Swatch Group. With luxury

e-commerce in a much earlier stage of development in China, how much bigger will the Chinese cluster be for European luxury brands? Will this result in an increasingly unbalanced geographical mix and decreasing weight of the traditional local customer base in Western Europe in particular?

Exhibit 167: China GDP as a percent of global GDP has quadrupled over the past 20 years

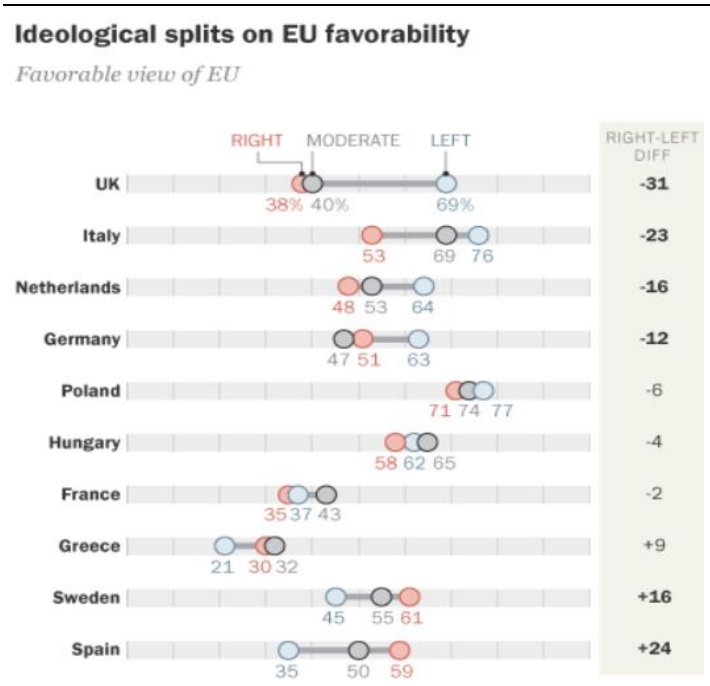


Source: World Bank

In the US, UK, and EU, polls show a widening divide in political attitudes.

What is more disconcerting is that the traditional democratic bloc has become more polarized with regard to their own internal politics. In the US, UK, and EU, polls show a widening divide in political attitudes. Brexit, widely perceived to be a low-probability event, was a manifestation of growing populism and polarized attitudes within the democratic bastion of the European Union.

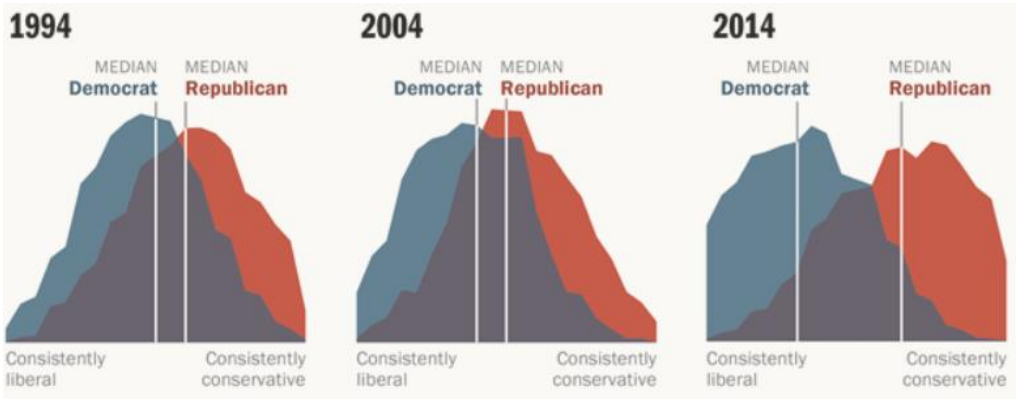
Exhibit 168: Ideological divides on EU



Source: Pew Research Center

Similarly, in the United States, the Trump election was considered a victory for populism and a rejection of the establishment of both parties. Ideological divides are deepening with moderates in decline. Alarmingly, views of the opposing political party have sharply changed with more Americans having an unfavorable view of the other, and seeing the other as a threat to the nation's wellbeing, exhibiting signs of polarization turning into sectarianism.

Exhibit 169: US Ideological divides growing wider



Source: Pew Research Center

P&G reorganization a sign of uncertain times

At the company's November 2018 Analyst Day, P&G announced it would be reorganizing into six different global business units, each with their own CEO and P&L. (This new model compares to a prior model where there was only one centralized P&L and most global business decisions were made by executives out of the company's Cincinnati headquarters.) The company also appointed CFO Jon Moeller to the COO role, responsible for helping lead those businesses forward. We see this new structure as a positive and would expect other

consumer multi-nationals to follow suit. With CFO Moeller's increased responsibilities, he may be able to help each business unit mitigate currency and geopolitical risks, while CEO David Taylor and the Board focus on the company's strategic priorities. Increased responsibility to each business unit head is also critical since it provides increased focus in a world with so many different category and geographic specific uncertainties.

5) Population imbalances and mass migration

Sea rise not only poses a physical threat to land assets, but could displace people.

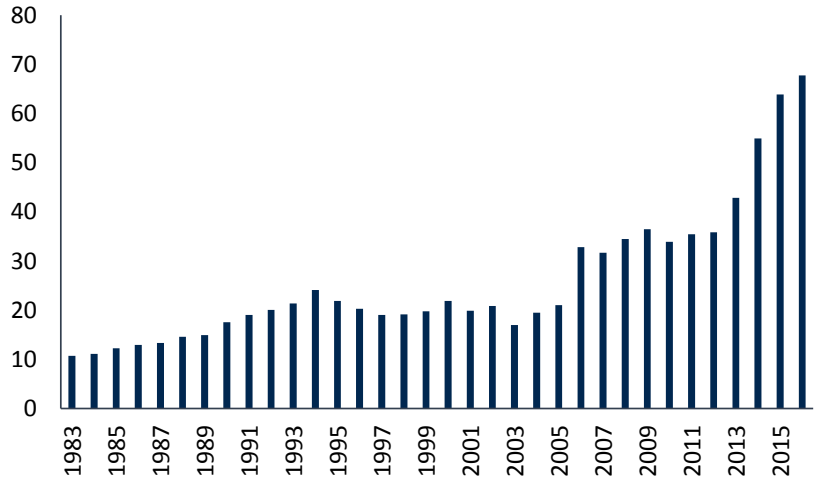
The onslaught of climate change related issues present both a challenge and a potential platform for international discussion and cooperation.

Since 2010, the number of displaced persons has almost doubled from 33.92 million to 67.75 million as of 2016.

As militaries scramble to race for the Arctic amidst rising sea levels, the rate of ice melt and sea level rise poses significant problems for coastal communities in particular. Sea rise not only poses a physical threat to land assets, but also could displace people. In a November 2017 report by the Environmental Justice Foundation, climate change was cited as potentially causing the largest refugee crisis in human history. Unpredictable weather patterns and disasters such as floods, wild fires, droughts, tsunamis, hurricanes, and other weather events, coupled with surrounding geopolitical and even public health concerns, are also likely to be factors in causing mass migration of people. The NIC report shows that "human and animal health will increasingly be interconnected" and that "unaddressed deficiencies in national and global health systems for disease control will make infectious disease outbreaks more difficult to detect and manage, increasing the potential for epidemics to break out far beyond their points of origin." The onslaught of climate-change-related issues present both a challenge and a potential platform for international discussion and cooperation.

The level of mass migration and displacement has dramatically increased in the past few years, a trend we do not expect to resolve in the near future, as both are highly driven by severe weather events or conflict. Since 2010, the number of displaced persons has almost doubled from 33.92 million to 67.75 million as of 2016.

Exhibit 170: Number of displaced persons, globally (in millions)

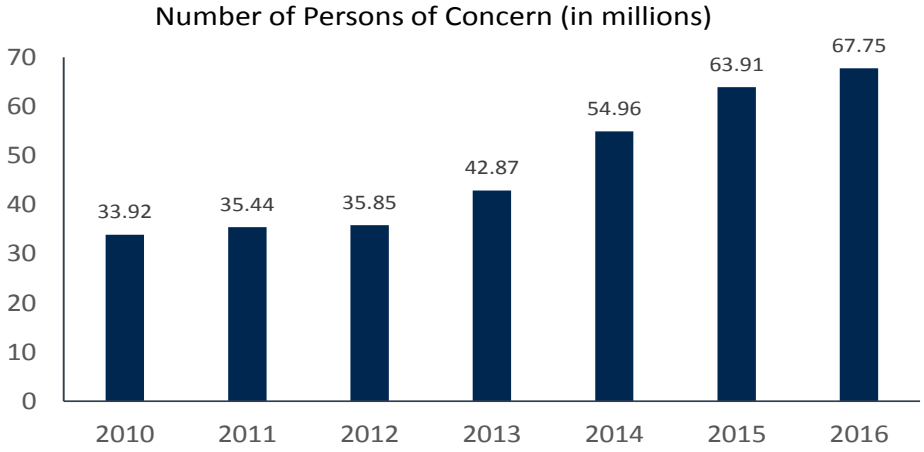


Source: United Nations High Commissioner for Refugees

***What if** the US closes its borders/enforces more stringent immigration policies? What impact does that have on the employment base in the US, especially for many lower-end jobs where it is already difficult to recruit workers? Do such policies accelerate US and global wage pressures, creating a massive tailwind to inflationary pressures? Could increasingly disenfranchised/hopeless people being pushed out of "Western" societies increase social unrest and increase the probability of civil war across the globe?*

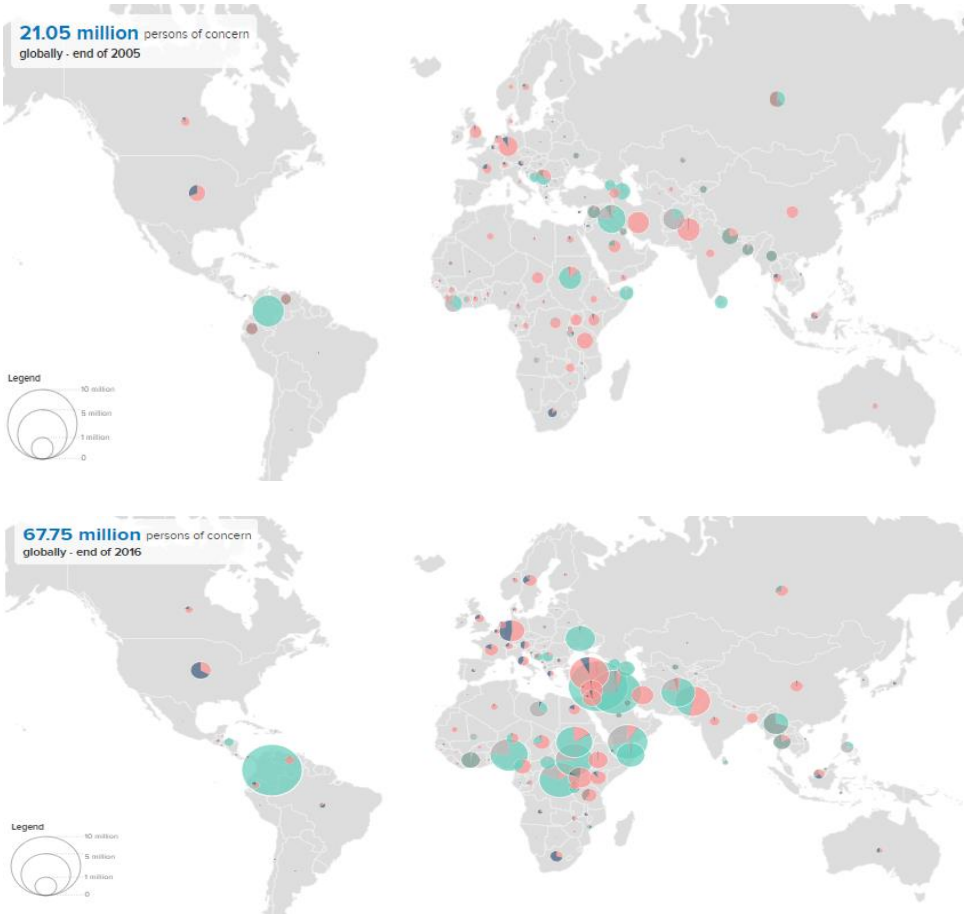
The Pentagon also recognizes climate change as a "conflict magnifier." Resource shortages can set the stage for or exacerbate conflicts. In Syria, prior to the protests and the resulting civil war, the country faced its worse drought in 900 years, which killed off scores of crops and livestock. Failed farmers moved en masse to the cities, creating and heightening economic pressures and resource shortages. Similar climate events in the US have also caused internal displacement, such as after Hurricanes Katrina and Maria. In the aftermath of Hurricane Katrina, attitudes towards the growing number of evacuees became increasingly negative in both Louisiana and neighboring Texas.

Exhibit 171: Persons of concern, globally (in millions)



Source: United Nations Commissioner for Refugees

Exhibit 172: Persons of concern, globally 2005 vs. 2016



Source: United Nations Commissioner for Refugees

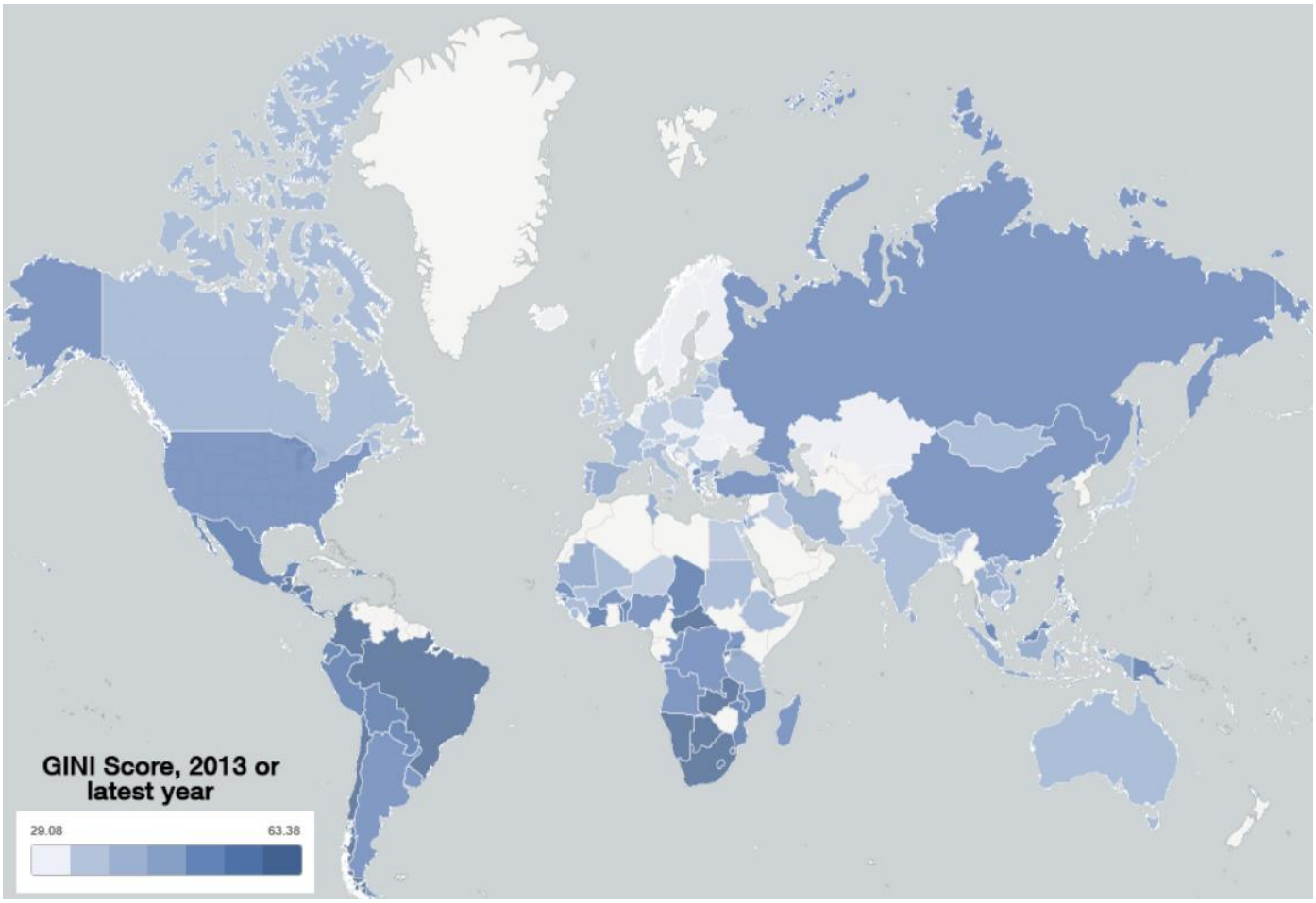
What if *rising nationalism and the resulting growth of military expenditures forces significant cuts to social programs, exacerbating today's economic divide between the "haves" and "have-nots"?*

What if *the nascent rise of protectionism/nationalism forces companies to reevaluate their geographic manufacturing footprints and retrench in their home countries?*

Power to the people: Uprisings and unrest

The growing footprint of autocratic regimes and illiberal democracies looks unlikely to reverse as long as income inequality remains so pervasive. There is a burgeoning consensus in political science literature about the incompatibility of extreme inequality with democracy. Experts studied income inequality in the US, France, Germany, the UK, and Switzerland and found that improvements in income inequality in the second half of the twentieth century made it so that by 1970 the wealthiest ten percent of the population in all five countries had fallen to a range of 25 to 35 percent of total income. However, the trend since 1980 has been a complete reversal, moving back towards deepening inequality. Today in the US, the top ten percent in terms of wealth take home almost half of the national income. Even in the heart of the liberal democratic world, support for democracy appears tepid.

Exhibit 173: Inequality around the world (darker indicates higher inequality)



Source: World Economic Forum, World Bank

Dissatisfaction with democratic institutions and populist movements in the US, UK, and Catalonia have been fueled not only by the present divide between haves and have-nots but a sense that this gap will only widen as middle class jobs are lost to technology advances and innovation.

Consider this:

- Twenty percent of CEOs' activities hold the potential to be automated using current technologies.
- $2 trillion in annual US wages could be affected by automation, putting even highly compensated occupations on the chopping block.
- 1.7 million robots are already in use around the world—largely in industrial settings.

The ascent of authoritarianism over the past few decades mirrors the climb in inequality, and leaders of political thought believe that the recovery of democracy hinges on the ability of wealthy states to address escalating inequality.

Two-thirds of Americans over 65 claim that it is imperative for them to live in a democracy, but less than one-third of those under the age of 35 agree. In Europe, between 1995 and 2017, the number of French, Germans, and Italian citizens in favor of military rule more than tripled (*Foreign Affairs*). The ascent of authoritarianism over the past few decades mirrors the climb in inequality, and leaders of political thought believe that the recovery of democracy hinges on the ability of wealthy states to address escalating inequality.

Common themes amongst uprisings have been inequality, corruption, unemployment, inflation, and weakened institutions.

Whose streets? Our streets

When inequality manifests itself as political backlash, the outcomes and results are uncertain, ranging from surprising political evolution to worst-case scenarios of civil wars and genocide. In addition, the events and consequences, small and large, can ripple globally. Common themes amongst uprisings have been inequality, corruption, unemployment, inflation, and weakened institutions.

A recent example of this is a massive strike of Brazilian truckers who brought the country's economy to a halt in a protest of rising fuel prices. The anger towards the government was exacerbated by corruption and kickback scandals at the state oil company, Petrobras. Blocking the roadways and refusing to make hauls emptied the shelves of markets, closed schools and businesses, and began to impact global commodities such as soybeans and sugar where Brazil is one of the world's leading exporters. The ensuing chaos had pockets of the country calling for a return to military rule. Truckers in China and Argentina are considering or starting similar strikes.

Exhibit 174: Population growth could lead to resource scarcity in the emerging world, including fuel

Source: World Economic Forum, World Bank

Iran also saw a wave of protests in 2018 fueled by anger over rising food costs, high inflation, and corruption. Swarms of Iranians across the spectrum took to the streets and even government buildings, disappointed by the lack of improvements they expected from the JCPOA (Iran nuclear deal). Some chanted "be afraid, be afraid; we're all in this together," an augmented version of the popular 1979 revolution protest chant "don't be afraid, don't be afraid; we're all in this together." Iran's waves of protests over the past 10 years and likely in the future have been driven by its young population, which struggles with high unemployment.

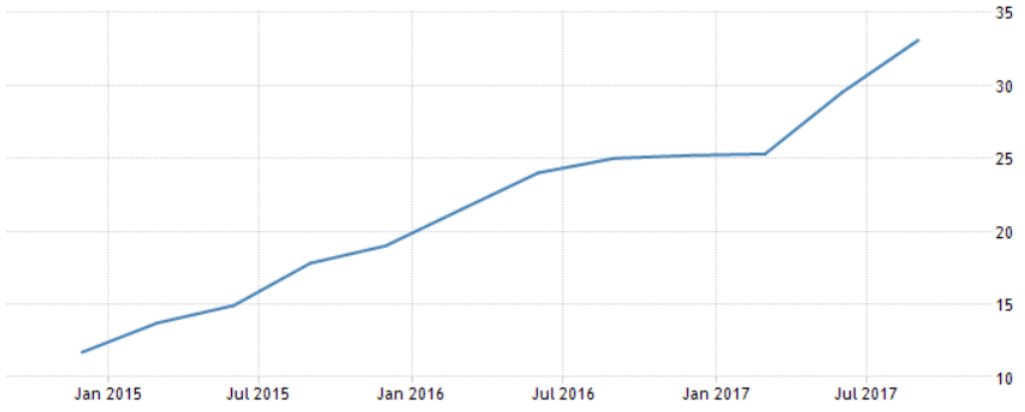
Exhibit 175: Iran's youth unemployment rate remains elevated

Source: Statistical Center of Iran

We believe countries facing the combination of youth unemployment, growing populations, and resource scarcity are the most vulnerable to uprisings and prolonged unrest.

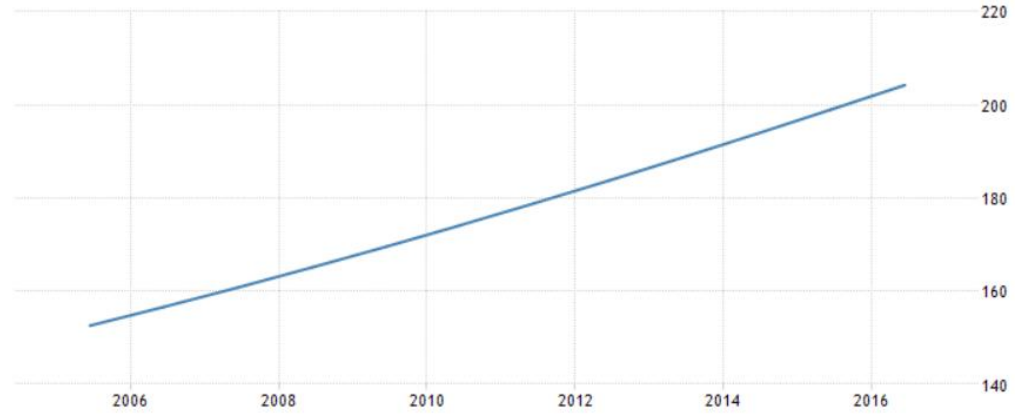
Despite the differences in these regions and populations, they are all fueled by anger towards the government and establishment institutions that the populace sees as corrupt and thriving while they themselves struggle economically. They are also enabled by technology; the Brazilian trucker strike was mostly organized through WhatsApp (owned by Facebook) and the most recent Iranian protests were organized through a similar messaging app called Telegram. We believe countries facing the combination of youth unemployment, growing populations, and resource scarcity are the most vulnerable to uprisings and prolonged unrest. Nigeria in particular is facing a population boom that will make it the third most populous country behind China and India, while facing tremendous unemployment and resource scarcity, making conflict and mass migration almost inevitable.

Exhibit 176: Nigeria's youth unemployment rates are rising



Source: National Bureau of Statistics, Nigeria

Exhibit 177: Nigeria's population density rising as part of population boom



Source: Trading Economics

These waves of backlashes, uprisings, and movements seem unlikely to dissipate and their outcomes are highly uncertain. We can now see that they are not confined by time and geography in the sense of the Arab Spring. Nationalism and dissatisfaction with "the system" are on the rise globally—East and West, in developed and in emerging nations.

What if *the use of alternative energy fuels causes lower oil prices, creating civil unrest in economies that rely primarily on hydrocarbon revenues (Venezuela, Saudi Arabia, Russia, etc.)?*

What if *violent protests were not limited to developed markets but began to take place more frequently in developed markets (think Paris this past month)?*

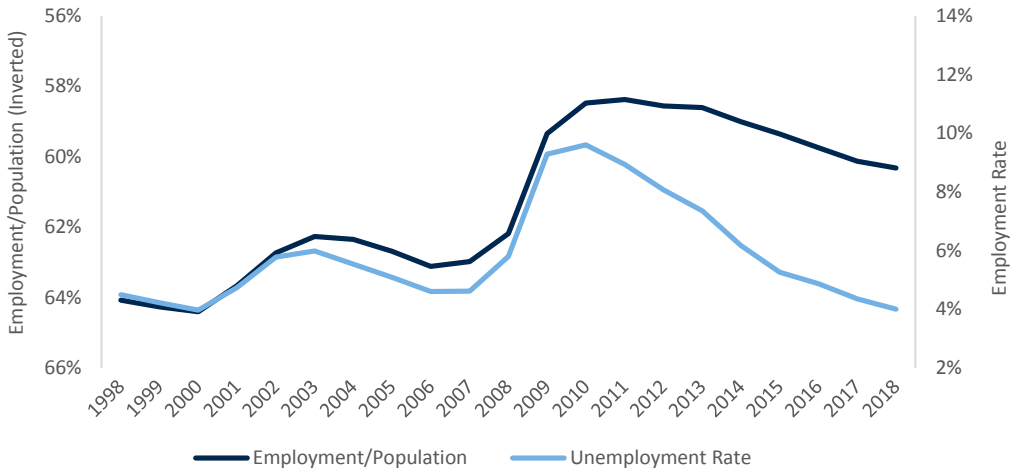
Economic implications of rising nationalism

Besides the obvious security concerns, there are easy-to-identify reasons why the markets have sold off as economic nationalism has risen.

Besides the obvious security concerns, there are easy-to-identify reasons why the markets have sold off as economic nationalism has risen. The imposition of duties has the effect of slowing overall trade activity and can be a major source of consumer inflation over time, as costs/tariffs are eventually passed along to the end user. Further, in the United States, immigration limitations are exacerbating already-sizable labor shortages in most sectors and many companies have or will be forced to raise prices to protect profit margins.

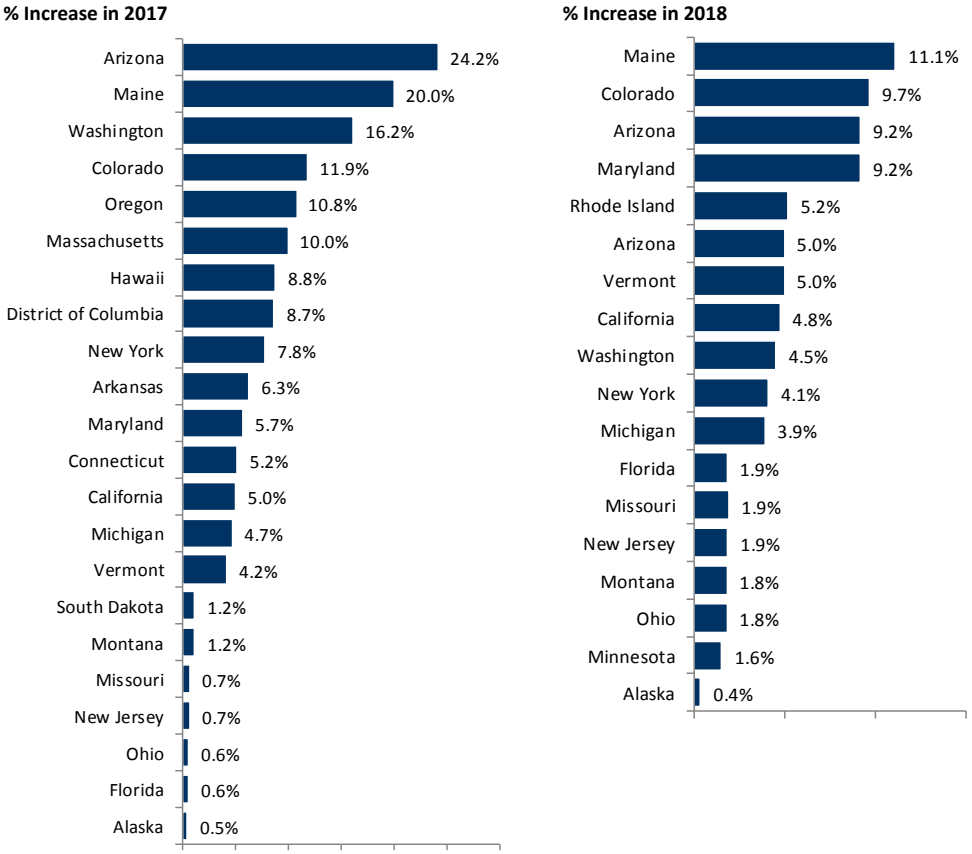
Wages already on the rise… In the US, we are already at virtually full employment, with the unemployment rate at 4.1%. Businesses have been forced to raise wages to recruit new staff and to keep existing employees in their seats. Businesses of almost every ilk have talked about the challenges and the difficulties in recruiting new employees, both skilled and un-skilled. We have seen it manifest in a wide variety of industries, from retailers and restaurants to farming and manufacturing to the ongoing trucker shortage in the US. With more businesses competing for people in an increasingly tight labor market, related wages and costs have continued to rise for a broad range of businesses in addition to regulatory mandates to increase lower-end wages.

Exhibit 178: Employment to population ratio vs. the unemployment rate



Source: RBC Capital Markets, BLS

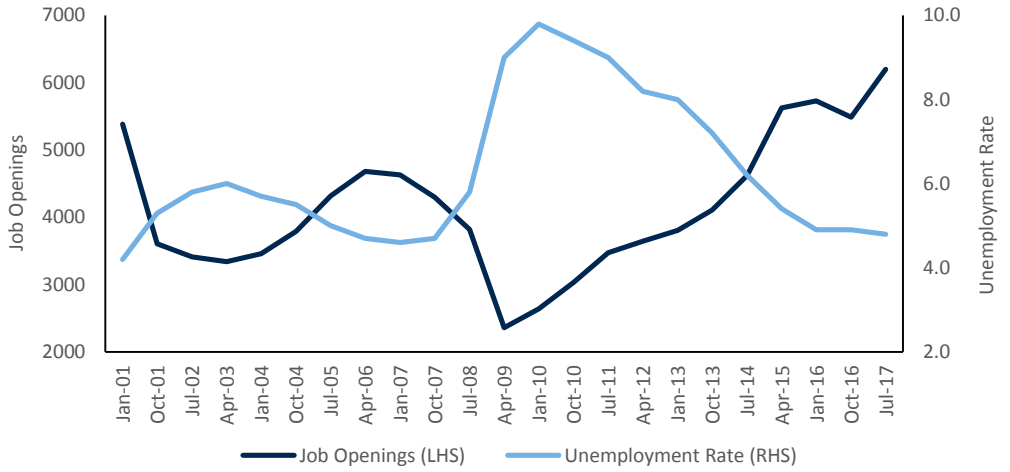
Exhibit 179: % minimum wage increases by state



Source: RBC Capital Markets, National Conference of State Legislatures

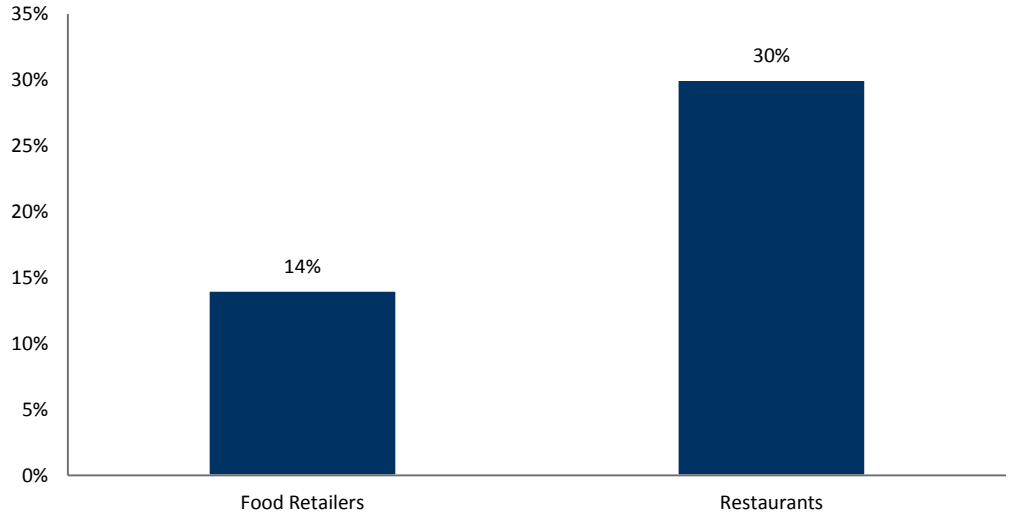
Immigration limits exacerbate the labor shortage: The labor challenge has gotten even more acute with the threat of further immigration limitations. As seen in the chart below borrowed from RBC Economist Tom Porcelli, job openings continue to increase as employment continues to tighten, and these labor shortages drive costs up across the labor spectrum for companies**.**

Exhibit 180: Job openings vs. the unemployment rate



Source: US Bureau of Labor Statistics

Exhibit 181: Labor cost as % of revenue (average over the past 7 years)



Source: Baker Tilly Restaurants Benchmarks, Nation's Restaurant News, National Grocers Association, and RBC Capital Markets

The good news—middle class overall is on the rise

Despite global tensions and increasing bifurcation between the haves and have nots, the global middle class driven by primarily by China and India is growing. By 2020, the middle class as we define it today will become the majority of world's population. Middle class spending power to reach ~1/3 of global economy by 2030.

Exhibit 182: Growth of global middle class

Source: Brookings

Exhibit 183: Growth of global middle class

Source: Brookings

It is clear that uncertainty is escalating as we think about the challenges of climate change, resource scarcity, and national and economic security. These are borderless challenges where geographical boundaries are less important, requiring unique technologies and global solutions. There is an opportunity for multinational cooperation based on mutual shared interests, reinvigorating moribund international institutions in the process. However, we are fighting the headwinds of a more conflict-ridden world, in which multiple actors exercise veto power through disruptive, asymmetrical action, and one in which some of these key cross-border problems go unaddressed and potentially even metastasize. Hope is not a strategy.

Theme VI: The Agility Imperative

The Agility Imperative is based on the increasing need for companies to be flexible and able to quickly adapt to disruption created by societal change forces. An asset base and existing brand equity will no longer be enough to carry companies through changing times, or to sustain dominance and relevance in a category. In fact, it may lead to their extinction. No company regardless the size of the sector they compete in is immune from disruption. And we may be approaching a breaking point for many companies. The longer a company defers tough decisions (which will likely disrupt the top line or cause earnings pressure), the less relevant these companies could be to their customers, employees, and investors.

Unfortunately, many companies do not seem prepared for the pace of disruption that exists today. According to a KPMG survey of CEOs, almost six out of 10 business leaders are concerned that their organizations do not have the sensory capabilities and innovative processes to respond to rapid disruption. According to an Accenture study, 52% of corporate employees surveyed said they had pursued what they thought to be an innovative or entrepreneurial idea but only 20% said they believed that management was supportive of such new ideas. According to a recent survey by CA Technologies, 73% of business leaders desire "agility" but only 9% believe their comp anies are on the path to attain it. Nearly 85% of respondents represent Fortune 1000 companies with sales above $1.5 billion.

What if *Fortune 500 consumer staples companies "the bastions of stability" began to go bankrupt similar to leading retail counterparts in recent years – Sears, Toys R' Us, Circuit City, Borders and others.*

What if *consumer suppliers and retailers alike are required to make investments similar to Best Buy to ensure survival? Best Buy sacrificed $1.3bln in gross profit over a three-year period before evolving its business model so that it could compete with Amazon.*

A "short-term" crisis of conscience

Disruption is inevitable as a result of numerous agents of change.

Causes of a failure to innovate and quickly adjust include: 1) scale and organizational hierarchies; 2) aversion to risk; and 3) the need to report results on a quarterly basis.

It is not hard to believe that somewhere in the greater Bay area, there is some entrepreneur thinking about technologies impacting virtually every business segment.

Just consider a fraction of the many provocative "What If" scenarios lining the pages of this report. Yet despite the accelerating change and disruption already present (i.e., automation and AI, emboldened start-ups thanks to rapidly lowering barriers to entry, extreme weather events, geopolitical turmoil), many companies struggle to embrace disruptive change forces.

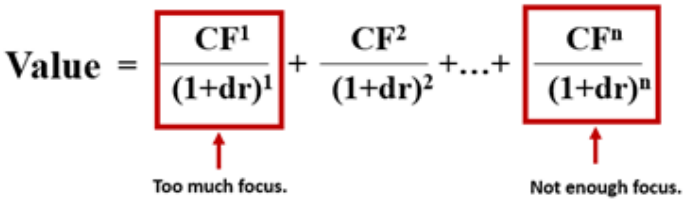
The reasons for this failure to self-disrupt are numerous and seem to include organizational hierarchies, aversion to risk, and the need to report results to shareholders on a quarterly basis. In a recent Duke University survey, executives were asked how they would consider reacting if the quarter was ending and it looked as though the company might come in below the desired earnings target. Approximately 80% of respondents suggested they might decrease discretionary spending (R&D, advertising, maintenance, etc.) and over half said they would delay the start of a project. Are these decisions accretive to long-term survival? We think not.

Criticism of short-termism is nothing new, but bigger fish are growing more vocal lately. Warren Buffet and J.P. Morgan CEO Jamie Dimon recently wrote an op-ed in the Wall Street Journal (link/06/6/2018) criticizing the perceived increase in short-term thinking among corporate management teams. One of the biggest contributors to short-termism, in their view, is the providing of quarterly earnings guidance to investors. Their view can be summed up in the following quote:

"In our experience, quarterly earnings guidance often leads to an unhealthy focus on short-term profits at the expense of long-term strategy, growth and sustainability."—Buffet and Dimon

Buffet and Dimon go on to explain how the pressure to deliver on quarterly earnings expectations leads to value-destructive behaviors on the part of management, such as delaying investments in people or technology. They go on to posit how this short-term dynamic is a contributor to the decline of public equity issuance, which in turn boxes out small retail investors, retirees or pensioners from participating in long-term economic growth via public equities.

Exhibit 184: Within an era of accelerating disruption and change, companies are over-emphasizing the short term at the risk of long-term success



Source: RBC Capital Markets

We agree with the spirit of Buffett and Dimon's "call to action," and agree that the pervasion of short term is anathema to long-term profitable growth. But reality is also a bit more nuanced. An argument can be made that CEOs who provide quarterly guidance are simply doing so because shareholders demand such transparency. Shareholders are the ultimate decision makers—not boards of directors or management teams. If our line of thought is a fair one, then consider why such guidance might be valued by those shareholders. For one, in a world of accelerating change, investors may be losing confidence that even the smartest and most competent management teams can successfully navigate a faster-approaching future. Instead, investors are increasingly confident that the world may change more in the next 3–6 months than it has in the last 3–6 years. They want to be assured of what management sees and expects not only over the horizon, but also before it. We live in a society in which—for better or for worse—consumers are checking their smartphones every 20 minutes (46 times per day according to a recent Deloitte study). And these consumers and investors are the same people.

Companies should be courageous and transparent in the communication of long-term and short-term expectations.

In our view, companies would be wise not to alienate certain classes of investors that may have varying risk tolerances and investment horizons. If a company has shared a laudable long-term vision with investors, then why not also signal short-term expectations? Are companies scopophobic—fearful of being watched? If short-term minded investors sell stock on a quarterly expectation missed, then is that not a buying opportunity for the long-term minded? America is also aging fast. How will retirees and pensioners feel if management traded dividend stability for investments in a future they may never see?

We believe "winner-take-all" is creeping into many business segments—particularly as technology provides a path to rapid scalability, reinforces feedback loops and promotes mindshare.

***What if** consumer staples companies are required to cut the billions of dollars they pay out in dividends annually to reinvest in their business? Will valuations contract and the income of the aging baby boomer population diminish?*

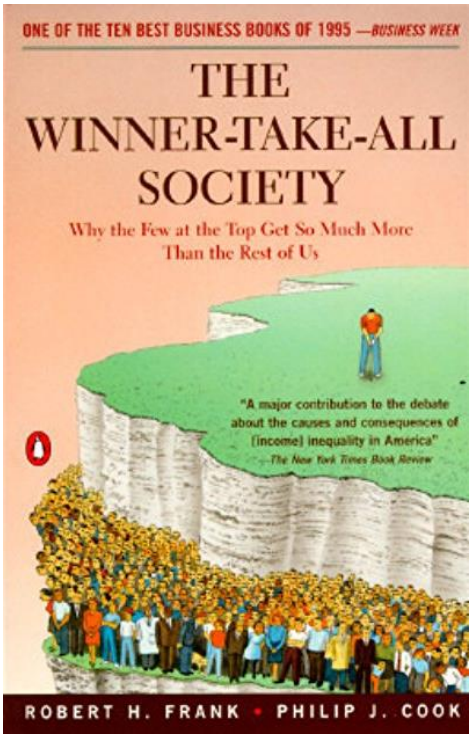
Many CEOs of large consumer companies have spent the better part of their professional careers in a company. By the time they have reached the "C-suite" they are reaching the twilight of a long and lucrative career. The first instinct may be to "not screw things up," with many personal loyalties and legacy thinking further constraining bold choices and lateral thinking. Mixed together these leadership biases with an accelerating rate of change and you

have a typical starting point for many leadership teams. However, the picture is getting scarier for those companies that do not embrace change and grab the leadership position.

In 1995, economists Robert Frank and Philip Cook wrote the socio-economics classic "The Winner-Take-All Society." The book describes how despite often very small relative performance deltas, a victor's spoils are often far higher than those of second place, third place, and so on. In other words, someone only marginally better than the next person is disproportionally rewarded, and that this trend may be increasing. Consider two top lieutenants being groomed to be the next CEO of a large corporation. One's skills or capabilities may inch out the others by 0.01%, but he or she will earn 100% of the financial and social rewards of becoming the "next CEO." When we look at the widening income and wealth gap in the US, for example, this 20-year-old text looks ever more prescient. Some early critics of Frank and Cook's research suggested that the "winner-take-all" effect was largely confined to the sports and entertainment industries. For example, only five players can start for an NBA basketball team, and those players are the only ones with Nike and Gatorade endorsements. But as we discuss below, we believe "winner-take-all" is creeping into other segments of business and society—particularly as technology provides a path to rapid scalability, reinforces feedback loops and promotes mindshare.

Exhibit 185: The Winner-Take-All Society

Frank and Cook may have been ahead of their time in saying fewer at the top will get so much more than the rest of us.



Source: Penguin Books

Feedback loops and network effects are accelerating

Feedback loops and network effects are two of the biggest contributors to the "winner-take-all" effect. A feedback loop occurs within a system when the reaction to a stimulus affects future reactions in either positive or negative ways. For example, the more skilled a person becomes at, say, golf the more the person will enjoy golf. The more enjoyment, the more playing, which makes the person even better, and so on. Similarly, the more people seen running out of a building in panic will influence how many more people will be running out of the building in panic. In the consumer world, a previous experience that was positive

suggests that future experiences will also be positive. A network effect is a similar phenomenon whereby the perceived value of a system is increased as the number of participants rises. Think of the value of Facebook (plus Instagram and WhatsApp) and Uber. These companies stand among the world's most valuable because of the size of their user networks—not necessarily their assets or profits.

Be the best, move first, and dare to self-cannibalize

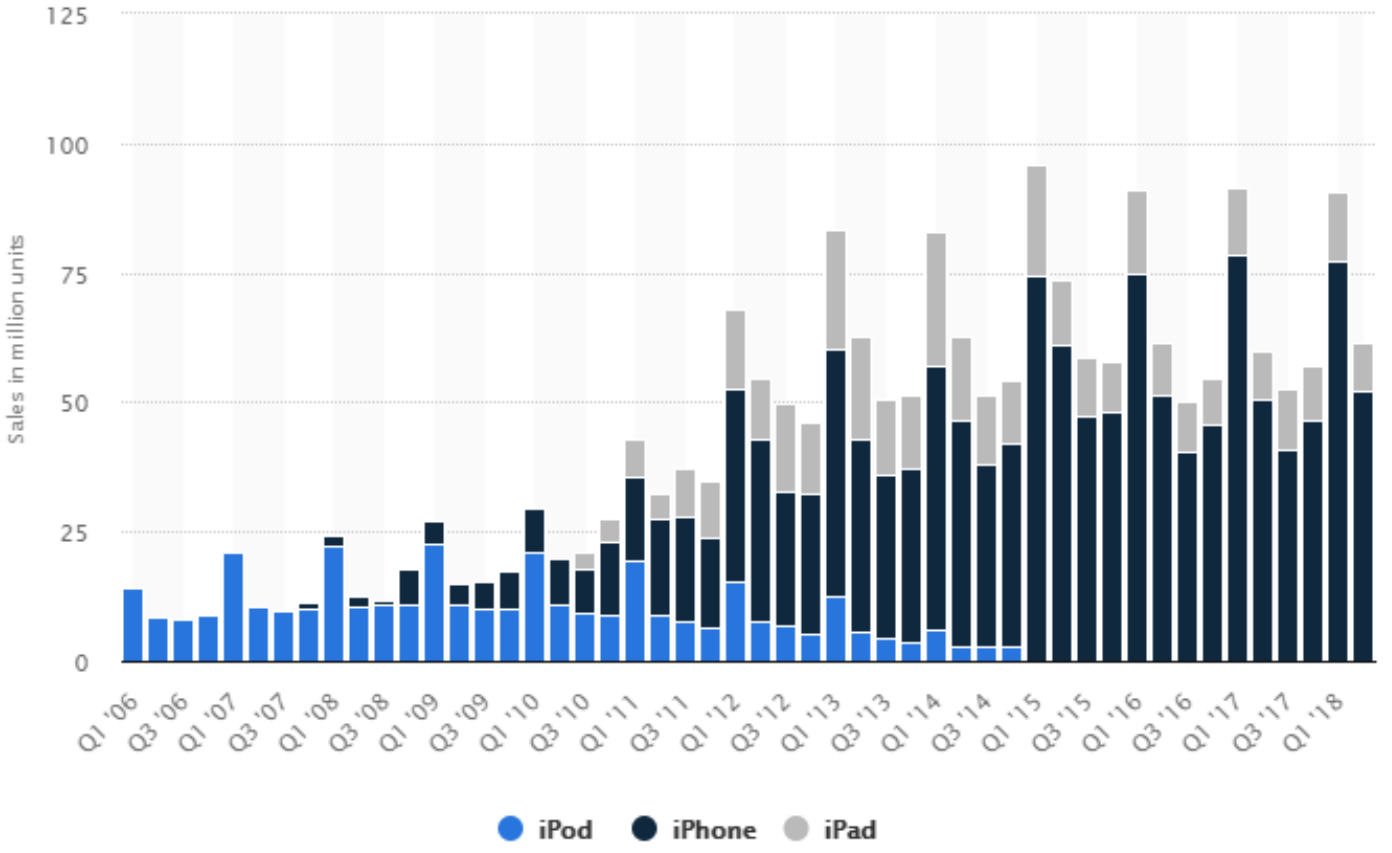
For companies in legacy technologies or leadership positions the price of future leadership may be the courage of self-cannibalization.

Feedback loops and network effects are forcing companies to fight to be **the best** in their categories, or at least strive to be. And in categories on the precipice of ubiquity (i.e., AI, self-driving vehicles, robotics), the pressure to be the best—the first and fastest mover—is even greater. For companies in legacy technologies or leadership positions the price of future leadership may be the courage of self-cannibalization.

Companies that try to stall innovation for fear of cannibalization will eventually fail. We point to the case of Kodak, which first invented the digital camera in the 1970s but out of fear of cannibalizing its own film business, pushed the idea in the closet. Contrast this to Apple and the iPod, which launched in 2001, selling for $400, and becoming Apple's most iconic product at the time. However, the iPod business was cannibalized by the iPhone, launched in 2007. The need for a separate, standalone music player essentially disappeared once its functions were integrated into a phone. Apple discontinued the iPod classic in 2014 and the iPhone went on to become the bestselling tech product year after year.

The exhibit shows the rapid market share gains of Apple's iPhone in the smartphone market beginning in 2010.

Exhibit 186: Apple unit sales by product (millions)



Source: Company Filings, Statista, RBC Capital Markets

"The best" has become far more accessible

Are consumer reviews on Amazon becoming the new "brand"?

In the consumer world, the battle to be the best is becoming even more important in an age of instant consumer reviews, 24/7 news cycles, accelerating user-generated content, and the rising democratization of influence (i.e., social media influencers). Fifty years ago, outside of traditional advertising, consumers mostly had only their own prior experience, recommendations from close friends and office colleagues, and the occasional newspaper or magazine review to help influence what products they should buy or what places they should visit.

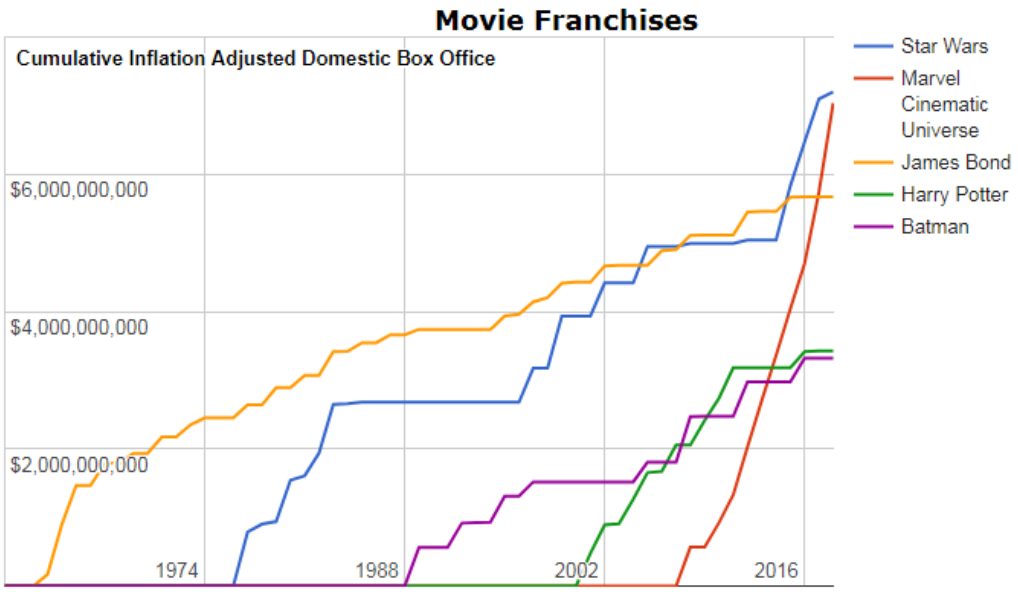
Today, anyone with access to the Internet (88% of Americans, 47% of humanity) can quickly find out "who's the best?" with a Google search (e.g., "best car insurance in California," "best SUV for growing families," or "best chicken wings in Buffalo, NY"). Sometimes these search results will include aggregators that rank products and services based on qualitative user feedback or star-based ratings. Other results might simply be subjective "top-10" lists on a popular blog or news page. Or in a world in which consumers, especially Millennial consumers, increasingly distrust large institutions and instead rely on social media influencers or their own individual networks, word of mouth is making a massive comeback, accelerated by ubiquitous communication technology. In any of these cases, what is increasingly said to be the best may begin to display a flywheel of success too difficult for competitors to dislodge or penetrate.

James Bond's suit is flashy, but Tony Stark's can fly

Are sites like Rotten Tomatoes making Marvel the fastest-growing superhero movie franchise of all time?

Perhaps an even better example than the iPhone is the rapid rise of Disney's Marvel Cinematic Universe (MCU). In just ten years, beginning with the seminal Iron Man film, the MCU has meteorically risen into the top-five all-time movie franchises by US box office revenue. The MCU now sits just a tad below Star Wars and well above James Bond with over $7B in inflation-adjusted US box office receipts and is far above the competition in global box office receipts of almost $17B. Surely, a major contributor to Marvel's accelerating success (e.g., Avengers: Infinity War released April 27 surpassed $2B global box office mark) is its consistently superior reviews on sites like Rotten Tomatoes versus competing studios' superhero lineups. Consistent quality scores combined in part with the viral nature of media and information mean that future Marvel films will likely be the "most anticipated of all time." And the MCU has achieved this "favored franchise" status in a fraction of the lifespan of Luke Skywalker and James Bond. Marvel appears to be a winner taking the whole of the box office.

Exhibit 187: Top US movie franchise box office sales



Source: the-numbers.com

Learning from Amazon: A prime example

When analyzing the success of Amazon's retail marketplace business, it may be easy to attribute the significant growth of its e-commerce platform to price. Although price is a motivating driver behind many consumer purchases on Amazon, the company also attempts to deliver a superior customer experience. In fact, the company lists Customer Obsession as one of its 14 leadership principles. Specifically, Amazon calls for its leaders to:

> *"Start with the customer and work backwards. Work vigorously to earn and keep customer trust. Although leaders pay attention to competitors, they obsess over customers".*

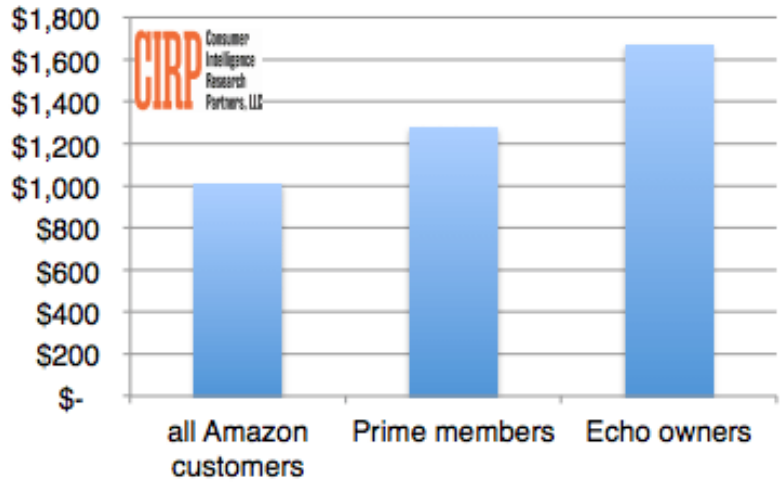
Ultimately, we think this type of leadership mindset led to the creation of programs that greatly enhanced the overall customer experience and thus establishing a loyal customer base. Amazon's better understanding of consumer preferences led to the company creation of Amazon Prime, a $119/year subscription program that provides members with free two-day shipping, streaming of movies and TV with Prime Video, Music streaming, savings at Whole Foods among other benefits. Today the service boasts over 100 million members. We believe free two-day shipping is a key hallmark of this service as Amazon's better understanding of customers (impulsiveness and age of instant gratification).

Exhibit 188: Amazon Prime members now total more than 100 million

Source: Company reports and Consumer Intelligence Research Partners

According to Consumer Intelligence Research Partners, Amazon Prime members also spend considerably (20%+) more on Amazon than non-users. This is understandable given since consumers that pay for the service will likely try to maximize the utility of the subscription by shifting purchases toward Amazon.

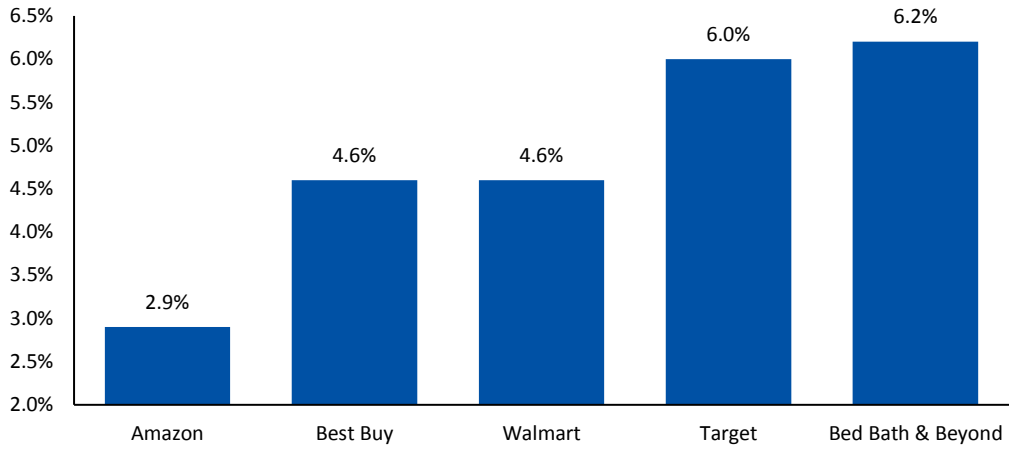
Exhibit 189: Amazon Prime members spend more on Amazon than non-members



Source: Consumer Intelligence Research Partners

We also note that Amazon's sales began to accelerate after 2005 post the launch of Prime. Free shipping is practically a baseline expectation for consumers now but, in 2005, free two-day shipping was a big idea for what began as an online bookstore. From a profitability perspective, Amazon does not look as attractive relative to some of its retail/e-commerce peers. Amazon has a 2.9% estimated EBIT margin compared to 4.6% at Best Buy, 4.6% at Walmart, 6.0% at Target, and 6.2% at Bed Bath and Beyond. Competitive product price points and the continuous reinvestment in its business are some of the factors that weigh down on Amazon's margins. These have been some of the sacrifices Amazon has made to expand market share over the long run, generating value for shareholders in the process.

Exhibit 190: 2018 estimated EBIT margin



Source: FactSet

Exhibit 191: Amazon annual sales

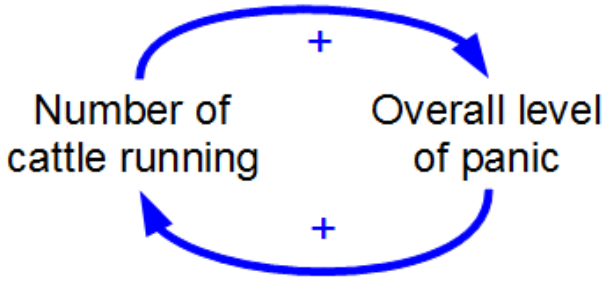
Source: FactSet

Amazon Reviews: Jeff Bezos shared the origin story of book reviews at the Bush Presidential Center's Forum on Leadership Conference at SMU in 2017. The company decided in 1995 to allow consumers to post reviews of books on the site, much to the chagrin of book publishers that thought Amazon could boost its sales if it only allowed positive reviews. Only 23 years later, this seems preposterous. But what it has led to is an environment in which access to value and rating information, democratized across real world consumers, has never been more freely and readily available. In addition, we believe this will accelerate in ways highly impactful to companies across all industries.

Accelerating asymmetries of punishment

Investors already understand negative feedback loops. When a company fails to execute against plan or targets, earnings go down and they develop a track record of poor execution. This reduces their forward earnings multiple—often trading at a discount to competition. This devalues the company's equity with which to finance further investments or acquisitions, potentially leading to either cutting corners or second-rate assets, which further heightens execution risk. However, in a world of accelerating change, we believe negative feedback loops can accelerate the downside. Take Chipotle…

Exhibit 192: Negative feedback loop



Source: Metadesigners

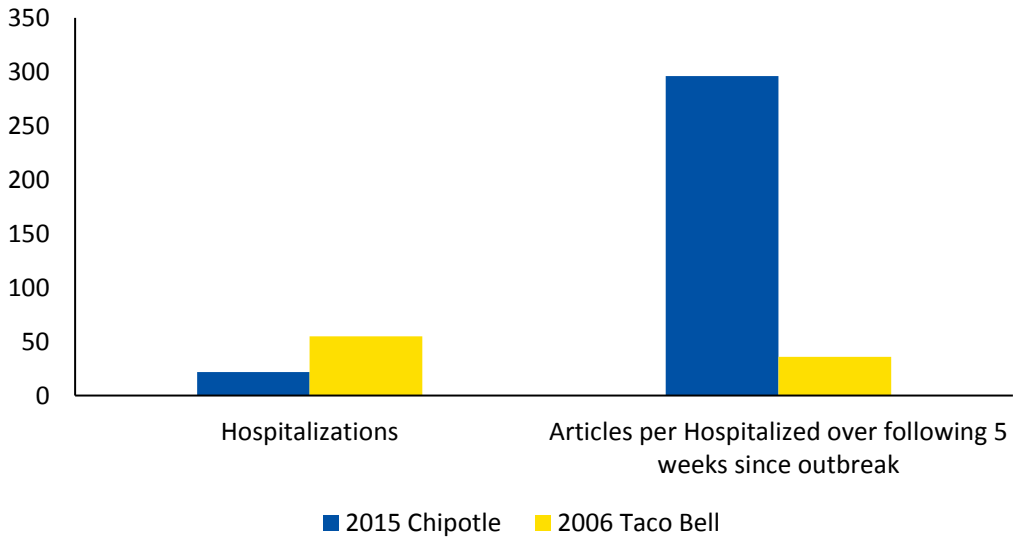
Bad news travels fast, so move faster

Bad news travels faster in today's information age… The most agile companies will get in front of negative news and create their own positive news.

In early November 2015, reports surfaced that several people became ill with an E.coli strain traced to several Chipotle locations. The health scare appeared to be short-lived and localized at first, but more sick customers made the headlines in the ensuing weeks. While an even more deadly strain broke out at Costco in late November, Chipotle's E.coli media mentions dwarfed those of the club store. Chipotle customers ran for the exits and the CDC did not issue an official "all clear" until February 2016. Perhaps Costco is an unfair comparison since it is not a restaurant—its E.coli strain was traced to a pre-packaged chicken salad SKU. A better comparison is the 2006 Taco Bell E.coli scare, which led to more than double the hospitalizations than during Chipotle's—55 patients versus 22. But only ten years ago, social media was in its infancy and viral news was far less infectious than it is today. For every Chipotle-related E.coli patient, the modern media published almost 300 unique articles versus less than 40 per patient related to the 2006 Taco Bell scare.

Despite the "all clear," deep discounts, new suppliers, changes in the cooking process, and employee sanitation training, Chipotle's stock price dropped from $732 before the incident to $462 two years later. And, at their worst in Q1 2016, same-store sales declined 29.7%. In Q3 2017, Chipotle introduced queso to its menu for the first time in a bid to regain its footing, but quality scores missed the mark. While the company acknowledged it could improve the queso recipe, we have to wonder if its recent execution issues with respect to biosafety have caught it in a negative feedback loop among consumers. In a twist of irony, Taco Bell president Brian Niccol was recently hired to take the lead at Chipotle, and we are intrigued by whether he can reverse the negative feedback loop.

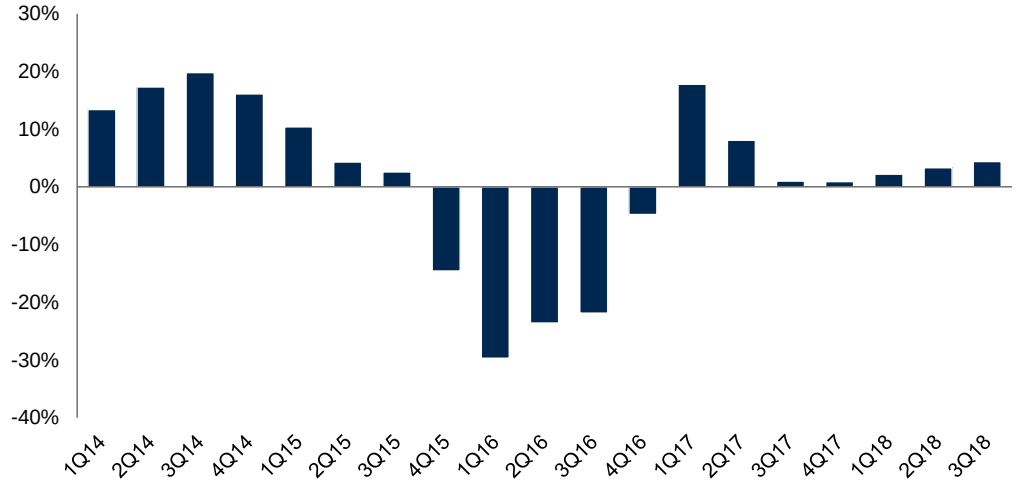
Exhibit 193: Number of articles including company name and "E.coli" since initial outbreak



Source: RBC Capital Markets; outbreakdatabase.com

Exhibit 194: Chipotle same-store sales growth

Chipotle managed to lose its brand momentum because it could not replace the negative news cycle with positive news.



Source: Company reports

Domo arigato, Mr. Roboto

In the case of Chipotle and Taco Bell—as in all similar health scares—human beings are the ones reacting and deciding to go elsewhere. What if AI assistants run our day-to-day consumption decisions in the future? Imagine AI assistants (e.g., Alexa, Google Home) of the future are loaded with and maintain our preferences, such as our favorite burrito place or favorite pizza place. In a future in which consumers may never physically interact with restaurants—thanks to autonomous vehicles and faster delivery networks—consumers may never even need to know about E.coli outbreaks. But our AI assistants will know instantaneously, and will reroute orders to competitors. They may even drop the compromised brand from our preferences all together, at least for a period of time. And if everyone consumes restaurant food this way in the future, imagine a post-outbreak scenario in the future where traffic declines 100%!

It may be easier and easier to buy the best-rated or cheapest products—leading to accelerating market share shifts.

Alexa, why wouldn't I want the very best?

Few people bother navigating to the second or third page on Amazon, for example, which makes "being the best" increasingly more important by the day. And nobody searches for "second-best coffee shop in Townsville." We can already envision a future in which products on the first page of Amazon or restaurants on the first page of Yelp or GrubHub take all market share. But even in these cases today, a human is making the ultimate decision about what he or she buys or consumes. What if robots or personal assistant algorithms decide for us? What if Amazon fulfillment centers—fed by personal preference and prior shopping data collected from millions of Alexa devices—know exactly what we want and ships or delivers it to us without prompting? Imagine a future hypothetical algorithm that reads as follows:

[When weight on pantry shelf < 1oz, reorder cookies, where price = LOWEST]

OR

[When weight on pantry shelf < 1oz, reorder cookies, where rating = HIGHEST]

What happens when human emotion, biases, distractions, and impulses are removed from future shopping decisions? In a future where consumers may increasingly come to view certain categories as commodities or become ever more disloyal to brands, they may elect to automate purchase decisions based on simple algorithms, such as best value or best quality. In a world like this, service providers and product manufacturers unable to satisfy at least one of these two algorithms may find themselves out of place and out of time.

The Best Buy Blueprint—Seeing Agility and Tough Decisions in Action

The very survival—let alone recent success—of Best Buy speaks directly to its agile implementation of a new business model in the face of an existential threat. In late 2012, with a stock price down ~65% from 2010, a new management team immediately initiated price matching against disruptive and rapidly encroaching competitor Amazon. (We reiterate that the management change here was an important driver of the company's new strategy and vision.) This had to mean new price investments and the acceptance of lower gross margins. Between 2010 and 2012 (before the price matching strategy), gross margins had already declined 110 basis points and gross profit dollars declined $500M. From 2012 to 2013 (after price matching) gross margins hemorrhaged an additional 150 basis points with gross dollars down another $785M (cumulative 260 basis points in an already low-margin category, and $1.3B).

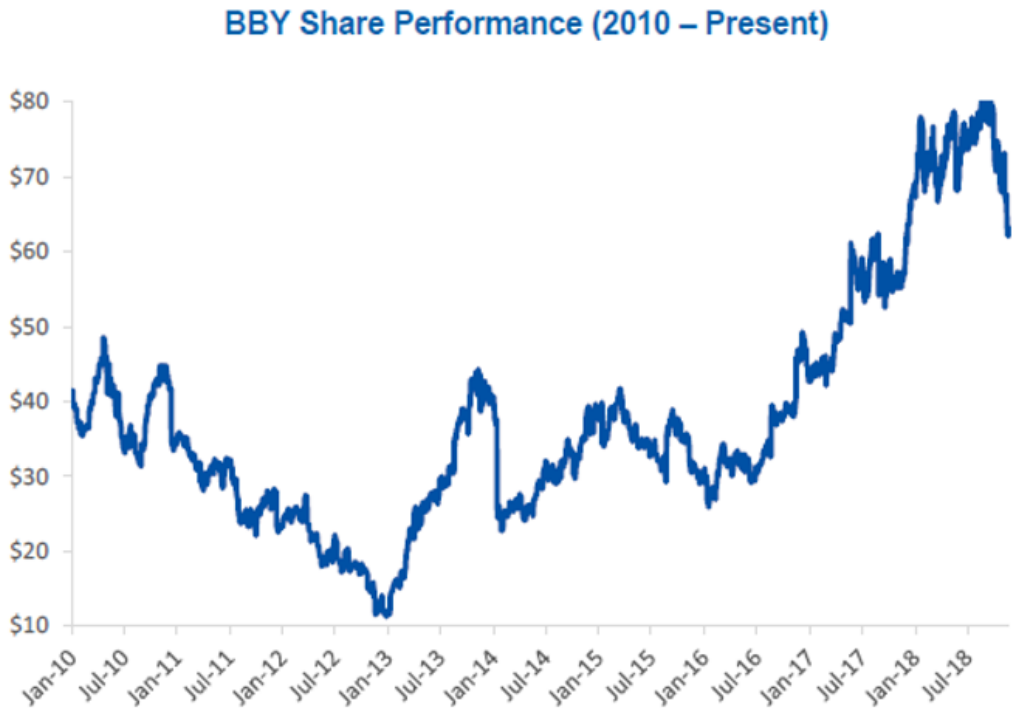
Exhibit 195: Best Buy USA P&L

	CY10	CY11	CY12	CY13	CY14	CY15	CY16	CY17	CY18E	CY19E
Sales	$ 37,245.0	$ 37,007.0	$ 36,853.0	$ 35,831.0	$ 36,055.0	$ 36,365.0	$ 36,248.0	$ 38,662.0	$ 39,088.1	$ 39,196.3
Gross Profit $	**9,301.0**	**9,035.0**	**8,794.6**	**8,010.0**	**8,080.0**	**8,396.0**	**8,467.0**	**9,065.0**	**9,079.0**	**9,103.5**
SG&A $	7,205.0	7,252.0	7,405.8	6,887.0	6,608.0	6,884.0	6,833.0	7,209.0	7,243.7	7,245.9
EBIT $	$ 2,096.0	$ 1,783.0	$ 1,388.8	$ 1,123.0	$ 1,472.0	$ 1,512.0	$ 1,634.0	$ 1,856.0	$ 1,835.3	$ 1,857.7
Margin Analysis										
Gross Profit	**25.0%**	**24.4%**	**23.9%**	**22.4%**	**22.4%**	**23.1%**	**23.4%**	**23.4%**	**23.2%**	**23.2%**
SG&A	19.3%	19.6%	20.1%	19.2%	18.3%	18.9%	18.9%	18.6%	18.5%	18.5%
EBIT	**5.6%**	**4.8%**	**3.8%**	**3.1%**	**4.1%**	**4.2%**	**4.5%**	**4.8%**	**4.7%**	**4.7%**
YOY % Change										
Gross Profit		**-2.9%**	**-2.7%**	**-8.9%**	**0.9%**	**3.9%**	**0.8%**	**7.1%**	**0.2%**	**0.3%**
EBIT		-14.9%	-22.1%	-19.1%	31.1%	2.7%	8.1%	13.6%	-1.1%	1.2%

Source: Company press releases and RBC Capital Markets

Fast forward to today, Best Buy's stock price is up over 400% since lows in 2012 despite absolute profit dollars and margins still below that of 2010. Certainly, the company's rapid margin recovery from 2013—partly driven by an improved store environment and omnichannel capabilities—was a major stock driver. But the bigger reason was that investors gave Best Buy its terminal value back. Best Buy's long-term survival was suddenly believable again. In a traditional DCF analysis, a company's terminal value (10+ years from today) can often dictate more than 50% of a stock's value. Best Buy's stock chart illustrates beautifully what happens when investors doubt your long-term survival one day but believe it the next. Best Buy was agile at the best possible time—seeing a likely future and acting fast. For electronics and appliance manufacturers like LG and Samsung, for example, the monopsony of Amazon is bad for business. These customers are invested in the "everybody else" surviving so as to maintain a diverse customer base. Best Buy knew it had to become the best of the "everybody else"—a topic we explored in depth in our original **Imagine 2025 report (6/26/2018).** Meanwhile, US electronics retailers like Circuit City and hhgregg are no longer with us. Sometimes being agile does not mean becoming the next Amazon. It means reacting to Amazon quickly enough to survive and tell the story.

Exhibit 196: Best Buy share performance



Source: FactSet

The Four Paths to Becoming Agile

In our original Imagine 2025 report, we defined four "agility mandates" to help companies become agile in the face of accelerating change forces. First, **make people believe.** The brain drain towards the best companies is accelerating, as the global labor force is increasingly open to all. This underscores the need to create compelling and inspiring cultures and incentives. For example, Netflix is refreshingly clear about its mission—to entertain the world—and it pays top dollar to attract only the highest performers. Second, **consider a new business model**. As we describe in the Best Buy case study below, the best future business model may require investment (e.g. a near-term EPS sacrifice) or otherwise seem like a risky bet. Third, **seek allies**. Food and restaurant companies are in the convenient meals and snacks business—not the transportation businesses. But over the next 5-10 years these two sectors may augment eating patterns more than any particular type of food. Delivery aggregators like UberEats, GrubHub and DoorDash all strive to be the dominant delivery platform, but will not get there without the right foodservice allies. Lastly, **lighten up**. Ownership of physical assets has become less important, and we believe this trend will continue. Airbnb is currently valued at $31 billion, and Marriott, the largest hotel chain in the US, has a $40 billion valuation.

Over the next few pages, we provide some more detail on the four paths to becoming more agile.

1) Make people believe

In screening a company for a case study on corporate culture, by what metric should an analyst rely? Employee satisfaction scores? Social or environmental impact? How about stock price performance? In this section, we take a deeper look into the culture at Netflix, the #1 best-performing stock in the Russell 3000 over the last ten years (+11,172% vs. Russell 3000 +138%). The company has built and maintained a unique corporate culture that it believes enables it to outperform the competition by a wide margin, and more importantly, remain agile in the face of accelerating change.

Iconoclasts of corporate culture

Netflix compares itself to a professional sports team, but without roster limits. To that end, it strives to have only the absolutely highest performing people. And its bold, nontraditional corporate values are clearly and succinctly laid out in its "Culture Deck" (a +120-page slide deck publically available online), which according to Facebook COO Sheryl Sandberg in a GQ article in 2013 "may well be the most important document ever to come out of the Valley". All of the principles in the document relate to what Netflix believes is necessary in order to only hire and retain the best people. Rather than rank employees against each other, Netflix simply works to ensure that ALL of its employees are in the 10% of the global labor pool in the skills and behaviors it values. The company admits that working at Netflix is not for everyone. As it says, "adequate performance gets a generous severance package."

Exhibit 197: NFLX stock price

Source: Google Finance

The greenest pasture has no sacred cows

There are very few sacred cows at Netflix. It criticizes traditional corporate "nice sounding" mission statements and instead believes the truest corporate values are displayed by which employees are rewarded, promoted, or terminated. It does not believe in "hard work" either. Hours are not tracked, nor is a physical office presence valued. It does however value superior performance, which even if achieved with little effort, earns ever more increasing responsibility and top-of-market compensation. There is no policy for vacation, dress code, entertainment, or expensing beyond "Act in Netflix's Best Interest." In other words, high-performing adults do not need to be instructed how to behave or spend their time.

The company believes in granting its people the freedom and responsibility to be creative—to attack problems and respond to market forces dynamically. This often means limited to no bureaucracy or approval processes. Netflix is refreshingly clear about its mission—to entertain the world—and exceptionally blunt about what they are not—surgeons or nuclear engineers. This means that errors in their business are unlikely to have life or death consequences. While it is tempting to create rules to prevent errors, Netflix believes that in its business, spending to prevent errors is in fact no cheaper than fixing them afterwards. This reminds us of our conversation with Hostess Brands executive chairman Dean Metropoulos at the 2017 RBC Consumer Conference, at which he discussed the culture he worked to create at the company.

> *"…it's all about an intense results-oriented mindset; if something doesn't work, you bob and weave, **be agile**, test it out, move to the next idea. But it has to be highly disciplined, and you have to be held accountable. Your people have to be accountable for execution, and to me it is that culture that wins. And behind that you really have to do some fun things with the brand. And this doesn't have to be traditional."*

Netflix is working to fight the ailments of big companies by trying to maintain the density of high-performance employees while minimizing complexity growth.

To stay agile, increase the high-performance people ratio faster than complexity

Netflix believes that most companies curtail freedom as they grow. As companies grow larger, processes and bureaucracies are often put in place to manage the natural growth in complexity. However, these rules limit employee freedom and autonomy to make quick decisions and to be agile. The growth in routine, process-oriented work also reduces the ratio of high performers to average to low performers within the company. Netflix believes the best way to build a coveted workplace is to populate it with "stunning" high-performing employees, so this diminishing ratio forms a negative feedback loop in which high-performing employees leave the company in droves for greener pastures. Netflix aims to have the greenest pasture all of the time. It accomplishes this by INCREASING the high-performance employee ratio FASTER than the growth in complexity. The focus on hiring and retaining only high-performing people is critical. As the company explains, high performers are 2x better in routine tasks but 10x better at creation and invention. Companies that fail to elevate this ratio "generally grind painfully into irrelevance" as new technologies or competition overwhelms employees who are only adept in deferring to process.

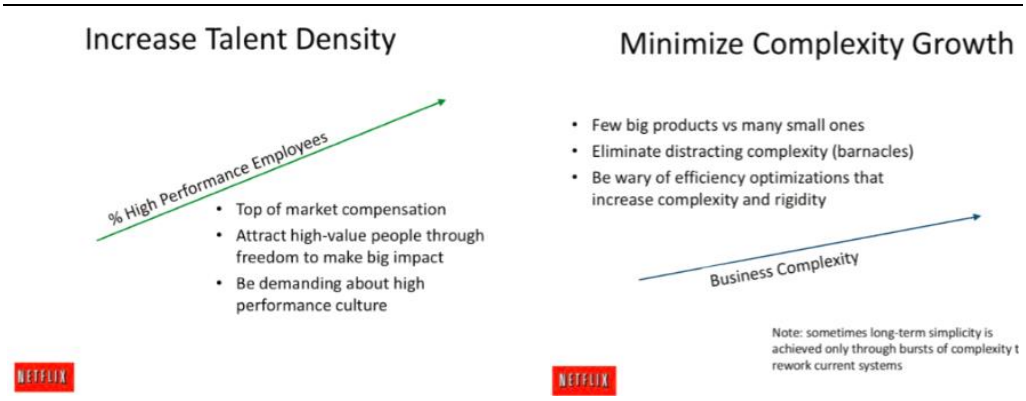
A winner-takes-all… HR department?

Are organizations not simply collections of individual people leveraging certain assets—both tangible and intangible—in pursuit of a common goal? In a post-*Citizens United v FEC* world, it is easy to sometimes think of companies as living entities with their own competencies or motives. But the best and most agile companies know that they are only as strong and successful as the sum of their parts. This further fuels a positive feedback loop insofar as being identified or perceived as a leader can increase the odds of remaining so. Popular press is legion opining on the "brain drain" of the world's most talented people in the direction of Silicon Valley and away from the favored industries of yesteryear. But are the categories (i.e., Internet, mobile, self-driving cars) making Silicon Valley attractive? Or is it the culture that has seemingly gone hand in hand, attracting only high performers? In our view, this "winner-take-all" brain drain may be accelerating as the global labor force is increasingly open to all companies across the world thanks to accelerating global interconnectivity.

What if consumer companies will not be able to attract the talent required to compete with tech and healthcare companies as the competitive landscape converges?

It is difficult to argue that corporate culture and corporate agility do not go hand in hand. In many respects, they are equivalent. Is Netflix's culture and those like it the best culture? Is Netflix the most agile company? Well, only 18 years ago this company operated in the shadow of Blockbuster (now bankrupt) and began its journey by mailing physical DVDs to consumers reliant on the US Postal Service. Today, Netflix's streaming service takes up 35% of evening broadband usage in the US, is bigger than 94-year-old Disney (as of 06/18), has won 44 Emmy awards and Academy Awards, and is the #1 top-performing company in the stock market over the past decade.

Exhibit 198: Netflix culture deck



Source: Netflix Culture: Freedom & Responsibility; slides 56-57

The oak and the reeds

One of Aesop's better-known fables is that of the oak and the reeds.

> *A very large Oak was uprooted by the wind and thrown across a stream. It fell among some Reeds, which it thus addressed: "I wonder how you, who are so light and weak, are not entirely crushed by these strong winds." They replied, "You fight and contend with the wind, and consequently you are destroyed; while we on the contrary bend before the least breath of air, and therefore remain unbroken, and escape." [Townsend edition]*

The moral of the story is, of course, that to succeed and thrive under pressure, one must bend, not break. Like the reeds, we believe the companies most likely to succeed and thrive in the future are those with lean overhead structures and efficient, meritocratic corporate cultures. In other words, principles and priorities that enable companies to be agile in the face of accelerating change. The change forces we lay out in this report are the winds in Aesop's fable.

2) Consider a new business model/organizational structure…

The right business model can create a path to market leadership and corporate agility.

One way to adapt and win is by embracing a new business model. The right business model can create a path to success and also encourage agility. At times, the best future business model may require investment (e.g., a near-term earnings sacrifice) or otherwise seem like a risk.

Blockbuster should have self-disrupted when it had the chance

In 2000, Netflix founder Reed Hastings famously approached Blockbuster with an offer to partner in a new subscription DVD rental model. Blockbuster rejected that offer and was bankrupt in 2010. Of course, Netflix has continued to be an outstanding example of agility and self-disruption—subsequently augmenting its DVD subscription service with digital streaming of entertainment and even its own entertainment production.

For companies in legacy technologies or leadership positions the price of future leadership may be the courage of self-cannibalization.

Apple shows how a bundled offering can ultimately drive loyalty

Apple was not the first to bring digital music players to market when it introduced the iPod in 2003. Diamond Multimedia introduced the Rio in 1998. Another firm, Best Data, introduced the Cabo 64 in 2000. Like the iPod, both products performed well, were portable and also stylish. That said, Apple's product had an advantage over previous devices—a bundled value to the consumer. Similar to Gillette's blades-and-razor model, Apple provided iTunes music at low cost (and low margin to Apple) to lock in the sale of the higher-margin iPod. Ultimately, this iTunes relationship was a gateway to greater Apple "ecosystem" sales in the future.

Altria leans into the future despite past and present controversy

This past May, new CEO Howard Willard announced: 1) the establishment of two divisions—core tobacco and innovative tobacco products; 2) the creation of a Chief Growth Officer function to accelerate speed to market for innovative products and technologies; and 3) the aligning of product development efforts more directly to the core and innovative tobacco product businesses. Altria's new Chief Growth Officer function will identify and pursue Altria's strategic and innovative growth priorities across the tobacco landscape. This function will identify marketplace and adult tobacco consumer insights and translate them into strategies for product development, consumer engagement, future of commerce and business development. This group will also be responsible for innovative product development and enhancing the company's capabilities by building and acquiring the competencies, technologies and talent to achieve Altria's aspiration of being the US leader in authorized, non-combustible, reduced-risk products.

When McDonald's stopped responding to the consumer, it adjusted its business model for agility

Recently, McDonald's has been altering its business model to enable more rapid decision making, encourage the right behavior from its franchisees and ultimately deliver an improved consumer experience. In 2015, when Steve Easterbrook took over as CEO, McDonald's and its franchisees enjoyed leading market share in virtually all of its major markets around the world with annual investment of $10 billion—including capital expenditures, SG&A and global marketing (including franchisee share). Yet, McDonald's was losing share in many of its major markets including its US home market. The company knew it had to improve execution and the collective return on the collective investment of franchisees and the company. Since that time, McDonald's has taken several steps to refocus the organization on the consumer, and make the company more nimble in its decision-making. These steps have included:

- Refranchising restaurants and licensing entire markets (such as China) to strong operators that are also willing to reinvest in digital capabilities, unit growth, food improvements and restaurant renovation. By moving from ~82% franchised restaurants to ~95% franchised, the company was selling over two-thirds of its owned restaurants, which has allowed the company to focus on brand management while rewarding the best franchisee partners with increasing scale (and franchisee level overhead leverage). We believe the refranchising process will not only allow better corporate focus, it will enable lower oversight expense and drive customer satisfaction higher through better franchisee operations.
- The company is flattening its management structure to bring senior leaders closer to the regions and—ultimately—real consumer-facing issues. For example, the company created the International Lead segment—a collection of five similar markets (UK, Australia, France, Canada, and Germany) in size and consumer dynamics. This has allowed division president, Doug Goare, to have only five direct reports versus over 30 countries in the Europe segment he managed previously. Ultimately, this has pulled Doug closer to consumer and operational issues and better enabled him to share best practices across these developed markets.
- The company has also dramatically reduced its US overhead while making other changes to enable a better ear to the consumer. These included: 1) a move of the headquarters to downtown Chicago (closer to younger tech and marketing talent); 2) a streamlining of US regional overhead (decreasing the number of US divisions by over half); and 3) reduced the number of franchisees committees (to further enable quick decisions).

Digital shelves may be a way food retail can become more Amazon-like

Responding to digital threats by incorporating some of the benefits of the e-commerce business model.

To brick-and-mortar retail, the threat of online continues to grow with the aspirations of Amazon and others. The percentage of consumer-packaged goods (e.g., food, beverage and household products) that is sold online is still only 4%, but those sales are growing at a double-digit rate. Already, Amazon has the advantage of its Prime membership (100 million strong and growing 10.6% annually) with increasing convenience of delivery (already same day in over 25% [2016 estimate] or 8,000 cities of the US and two-hour delivery in 50 cities). Amazon is using artificial intelligence and personalized marketing to optimize price and profitability on brands—and to grow its own retailer brand offerings. Amazon's retail ecosystem also benefits from third-party reviews and testimonies that provide much of the credibility once afforded to brands. Amazon has already purchased one food retailer (Whole Foods) and could continue its push into the CPG segment. How can a supermarket chain (e.g., Kroger) or broadline player (e.g., Walmart) respond?

In 2018, Kroger is rolling out digital shelving in ~150 stores, after piloting in a handful of locations (beginning in 2015). EDGE shelves (Enhanced Display for Grocery Environment) allows Kroger to adjust prices and promotions far quicker than the traditional manual tagging. More interestingly, it processes data from customers' smartphones around to the shelf. Therefore, if the customers have the Kroger app on their phone, as they walk down the aisle, things on their shopping list or sales prices would light up on the EDGE shelf, making it more seamless and personalized. With customers' convenience in mind, Kroger is investing for the future and evolving the grocery shopping experience. The digital tagging also allows Kroger to implement different pricing architecture to help determine in-store and in-market elasticities/cross elasticities. This takes them down a path of being more efficient on pricing actions than competitors are.

Exhibit 199: Kroger EDGE shelves

Kroger's cloud-based digital shelve signage replaces paper tags, and has the ability to display nutrition information as shoppers get closer.

Source: Microsoft/Transform

The Luxury Sector Evolving Models for Product Cycles

Today, luxury consumer brands are less tied to the traditional fashion calendar and increasingly focused on frequent collection drops throughout the year to drive store traffic and respond to rising consumer demand for newness. The old days of an 18-month new product cycle does not work anymore. Earlier in 2018, we visited Gucci Art Lab in Florence, which specializes in leather and shoes and should allow Gucci to introduce novelties faster while allowing better control over product development, sampling and material development. Internalizing production has been a multi-year trend for several Italian leading brands (e.g. Prada, Gucci) and should continue in coming years: this gives them greater control over timing and frequency of product novelties, crucial to win younger consumers. At the end of the day, luxury brands must improve their ability to process customer data to better connect to the end consumer and accelerate decision making. Leveraging CRM gives brands better knowledge and understanding of customers to service them in a more personalized way—and ultimately drive higher revenues.

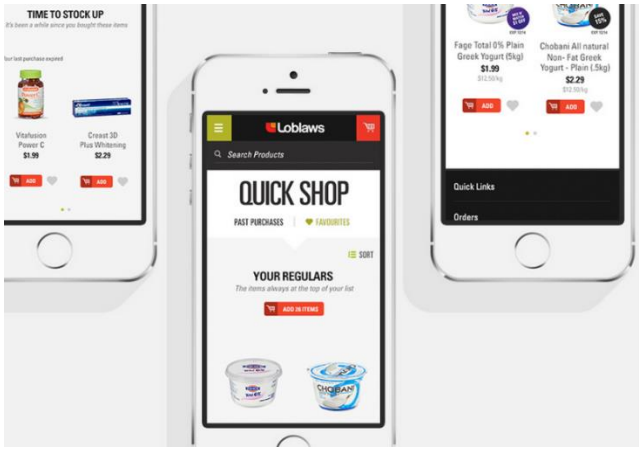
Gaining traction with good ol' Canadian Agility

Evolving technology and consumer behavior are the driving forces behind changing business models. Tailoring the offering, remaining nimble and reactive to changing technologies/trends and leveraging existing competitive advantages in distribution and retail footprint are key considerations for traditional retailers making the leap to omnichannel retailing. Because the market is evolving so rapidly, to be successful and economically viable, the omnichannel proposition has to operate within a framework that is adaptable. For Canadian Tire, this has meant establishing in-house Digital Innovation Labs to develop "new in-store and online technologies at a faster pace" to support the company's omnichannel mission. With this initiative, CTC now has the ability to adapt quickly to changing technologies and evolving consumer habits by developing new apps in-house at a fraction of the cost and time required to outsource the work. As online retail moves from strictly e-commerce to the digitization-of-all-things-commerce, retailers at the leading edge of digitization and software development will have a clear competitive advantage.

Exhibit 200: Canadian Tire's WOW Guide (left) and Loblaw's quick shop (right)

Canadian Tire's Wow guide is an excellent example of how to marry old-world attachments (the flyer) with new-world technologies to drive sales

Loblaw's Quick Shop function enables customers to base shopping lists off previous shopping patterns, tailor choices



Source: Loblaw, Canadian Tire

Canadian Tire retail's WOW Guide is the best of both worlds—it maintains the beloved flyer/catalogue model but at the same time moves squarely into the digital space. Since its inception, the guide has improved traffic and transactions both in-store and online. The hover and discover app used in conjunction with the catalogue allows the display of incremental digital content like videos, style and trends advice and how-to instructional

content. By contrast, FGL Sports is more fully embracing digital as it caters to a younger, more tech-oriented demographic. During the 2016 Summer Olympics, Sport Chek largely substituted its typical TV spot strategy with digital content on mobile, Facebook and Google. CTR's participation in the Facebook council of partners ensures that it remains abreast of evolving initiatives, and within the Canadian Tire family of retail brands, Sport Chek serves as a very effective, real-world lab with key learnings shared with both Canadian Tire Retail and Mark's on a timely basis.

Best-in-class speed to market is a differentiator in Beauty

The ability of MAV Beauty Brands to bring products to market in a timely manner and to respond quickly to market trends and retailer feedback is a meaningful competitive advantage, in our opinion, relative to its larger CPG peer group. A few examples of MAV's ability to react quickly to evolving consumer tastes and retailer requests include: 1) re-formulating select *Marc Anthony* branded products to exclude ingredients consumers were increasingly avoiding (e.g., a number of *Marc Anthony* products are now sulfate-free/silicone-free/paraben-free etc.); and 2) delivering four new *Renpure* body wash SKUs to a major US mass retailer in time for the January 2018 shelf reset within 2-3 months of receiving the initial request. We believe the ability to react quickly to changing consumer preferences and customer feedback will be essential to maintaining MAV's growth trajectory and that, going forward, management will need to ensure this "entrepreneurial" mindset remains a key element of MAV's culture as the company scales in both North America and internationally.

Calling in the Paw Patrol

Another example is Spin Master, which has established a reputation for bringing innovative products to market quickly. This innovation is evident in some of the company's biggest platforms including *Paw Patrol* (created in-house) and *Hatchimals* (created in-house). The company relies on its internal resources and also reviews ~3,000 new product ideas from third-party inventors every year. One interesting driver of this innovation is that even in situations where an idea has been generated in-house and is close to completion, the company in some cases leverages third-party inventors to assist with specific elements/components to bring the product to the finish line. An example is their success with the *Zoomer* platform, which was introduced in 2013. The *Zoomer* Dog originally evolved from a voice-activated and sight-responsive truck, which was presented by a third-party inventor in 2012. Since then, the company has introduced a number of new "fullsized" *Zoomer* animals in the subsequent years. The broader *Zoomer* platform gained strong traction early on and accounted for ~20% Spin Master's sales in 2014.

Does European retail have the answers?

In Europe, we are already seeing a polarization in performance, leaving a handful of winners and a trail of losers in the retail sector. Here, the biggest shift in retail in recent years has been the channel shift from offline to online. We also see this in UK grocery, which commands roughly 10% of supermarket takeaway versus only ~2% in the US. For example, Next was an early mover in providing home-delivery services given its mail-order catalogue heritage. As a result, Next has reaped the benefits of its leading supply-chain infrastructure in driving online sales. The retailer is also investing in better mobile functionality, improved registration and checkout and intelligent recommendations. Similarly, Inditex was one of the early adaptors of Retail Frequency Identification Technology (RFID), using the latest technology to track the location of garments. This has helped Zara with its inventory control and frees up staff time to maximize sales. In addition, Inditex is now investing in integrating its inventory so that it is able to offer customers in-store fulfilment of online orders. And Zara is now online in 49 markets, while Inditex is committed to offering online sales across all of its brand concepts globally by 2020.

Whilst having cutting-edge back-end investments provides an edge, this must be combined with strong customer-facing initiatives too. In our view, the second transformation in retail from store-based retailers will increasingly be focused on how they can adapt their store portfolios so they can ultimately bring foot traffic back into stores. We believe one way for retailers to do so will be to offer personalized experiences or offer convenience for shoppers who are on a tight schedule. Recent company presentations have all been focused on addressing the experiential issue. We are seeing more and more stores looking to provide experiences for consumers, and we believe this trend will only continue to grow.

3) Seek Allies

In no way is the future coming at us faster than in the connection of retail and restaurants to home. Digital and delivery convenience is ramping, direct consumer data sharing is increasing and category shifting is accelerating. Already, the Millennial generation is showing itself to be homebodies. Increasingly, they are working, eating, shopping and being entertained at home. Our increasingly "smart" homes and the services that are wired into them are enabling this shift in behavior. It is not hard to imagine the day when most services and products will be available instantly or delivered to us within an hour of telling our smart device in our own voice. How will that change the shopping behavior of middle- or upper-income shoppers? How will it change the nature of marketing and promotions and impulse purchases? Food and restaurant companies are in the convenient meals and snacks business—not the medical diagnostics or transportation businesses. But this is no excuse to remain ignorant to the change forces affecting these sectors and their impact on consumption patterns and behaviors. Partnerships and alliances will fill this capabilities gap.

Consumers today do not just want one e-commerce model, some people prefer click-and collect and some prefer at-home delivery. Over the past two years, most food retailers have not only built out order online and curbside pickup capability, but also partner with a third-party (many instances several third-parties) for home delivery. Instacart is one of the most popular third-party grocery-delivery vendors today. According to Supermarket News, Instacart now partners with 300 retailers in the US and Canada, delivering from 15,000 stores across 4,000 cities, reaching 70% of US and 50% Canadian households.

Exhibit 201: Instacart allies

Instacart provides delivery service for some of the largest food retailers in the country.

Source: Instacart

Companies like Instacart are innovating but are not revolutionary. They add two forms of labor (picker and delivery) to conventional grocery shopping. In this way, it is not unlike bringing back the milkman of yesteryear. It a huge cost burden that either makes it economically unviable, or requires a price premium that limits consumer adoption. To its credit, Kroger is most aggressively pursuing ways to offer e-commerce options without the additional labor components (in-store pick-up, self-driving cars, automated warehouses). The newest players in the e-commerce delivery arena are autonomous vehicles. The Last-Mile delivery cost has been notoriously high and an addressable market constraint; food retailers are actively working on solutions to this problem. Walmart has tested an employee-based delivery model, where the store associates would fulfill delivery tasks after their shift has ended (we understand this program may have ended). Earlier this year, Kroger and Nuro, a technology startup company, teamed up to pilot same-day delivery orders by fully autonomous vehicles, and it is "the first application and deployment of Nuro's hardware and software." Unlike Waymo, Nuro's vehicles are smaller and only meant to carry products. They travel at a lower speed and were designed for urban and residential streets. This program is currently being tested in the Scottsdale, AZ market. If successful, this would be a way to bring convenience to customers at a lower cost for retailers.

Exhibit 202: Nuro's autonomous vehicle delivers Kroger online orders

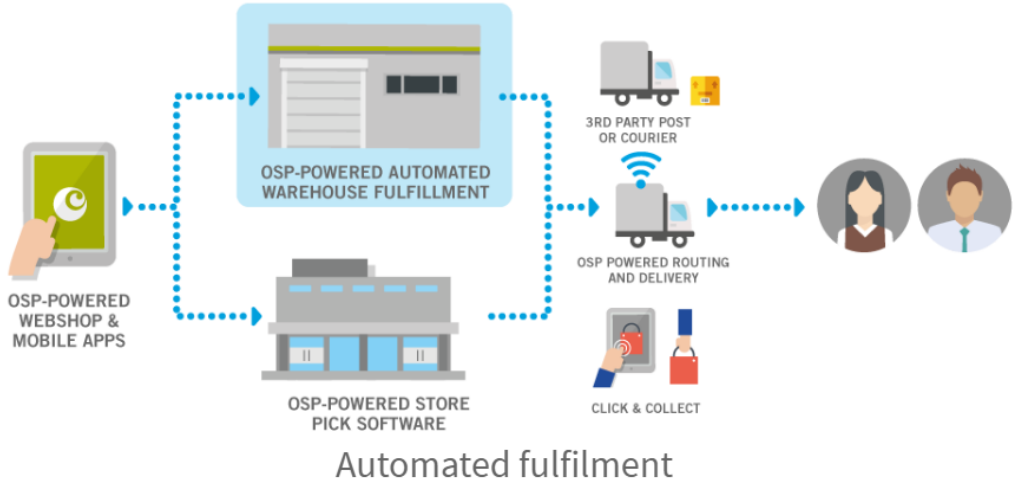
Food retailers are testing delivery by self-driving vehicles in an effort to lower the Last Mile delivery costs.

Source: Company press release

Kroger goes one step further than most of its competitors in e-commerce and automation with its new (exclusive in the US) partnership with Ocado (through direct investment), a UK-based company that is today's largest pure-play e-commerce grocery retailer in the world. This partnership gives Kroger exclusive access of Ocado's technology, including "online ordering, automated fulfillment and home delivery capabilities," allowing Kroger to fulfill its online grocery orders much more efficiently. The companies have already been working and making progress in identifying the first three new, automated warehouse facilities in 2018 and expect to identify up to 20 over the first three years of the partnership.

Exhibit 203: Ocado's smart platform

Ocado's newest warehouse is powered by 1,000 robots and is the most advanced automated facility for grocery e-commerce.



Source: Ocado

The rise of restaurant aggregators

As new versions of convenience are created (like digital order foodservice delivery), will old categories and channels begin to respond…or fall into atrophy?

Americans are eating more meals at home. Consumers are also moving to cities and commuting less by car. While heads of household do not want to cook, they want to serve their families high-quality ingredients. The standards for the US restaurant consumer are rising both in the demand for better-quality food, but also for a multi-dimensional experience when that consumer eats out at a restaurant. Given the importance of US food and restaurant spending (each equal to about 7% of US household expenditures) and the

synergies of this spending with convenience, we find it imperative that restaurants accelerate their partnerships with aggregators, especially those with their own delivery capabilities or partnerships. Foodservice delivery aggregators like UberEats, GrubHub and DoorDash are all striving to be one of the few dominant delivery systems—in addition to the US pizza chains. The increasing scale and potential consolidation of these delivery networks could create a virtuous cycle of reduced cost and increasing market share. Can you envision how the winner-take-all future will apply in this scenario?

Ultimately, the rise of aggregators will put pressure on mid-sized chains with average food, an average in-restaurant experience and average restaurant density/convenience. We should consider America's increasing urbanization, stay-at-home lifestyles, needs for ingredient quality, and desire for an iPhone photo-worthy dine-out experience. If we do, it is not hard to imagine those chains with sub-par execution and scale fading away as delivery specialists gain share and American families prepare more high-quality meals at home.

4) Lighten up

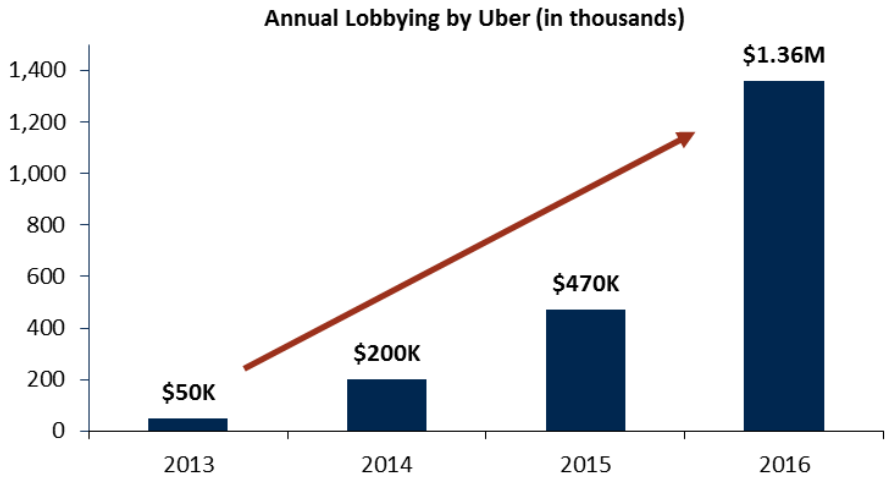
Ownership of physical assets has become less important and we believe this trend will continue. Asset-light models thrive in the ever-increasing digital world and the shared and gig economies. In the case of logistics, and mature versus disruptive companies, we can compare FedEx and Uber. In terms of overhead, FedEx has more than 600 airplanes, and more than 45,000 vehicles, whereas Uber does not own any of its vehicles. FedEx also employs over 300,000 people, whereas Uber has about 6,000. Yet, these two companies have similar valuations and market cap of $60–70 billion.

Airbnb is an example of an asset-light model in the travel-lodging sector, owning none of the properties it rents out, compared to Marriott. Airbnb tapped into the sharing economy, the open-mindedness and fluidity of the younger generations, and coupled it with an asset-light model to succeed. Airbnb is currently valued at $30 billion, and Marriott, the largest hotel chain in the US, has a $49 billion valuation.

Even in the traditional retail economy, ownership of brick-and-mortar stores has held back some major retailers, bogged down by empty stores. Companies that have changed to accept these new realities have survived, including Abercrombie & Fitch, which seemed on the brink of collapse, but made a surprising comeback after closing fleets of physical stores, and investing in omnichannel, with digital sales now driving 20% of its sales.

The risk for these companies however is venturing into uncharted regulatory territory. Both Airbnb and Uber have spent millions and ramped up their lobbying efforts, with Uber having to leave Austin altogether. Airbnb spent more than $8 million in lobbying against a ballot measure in San Francisco that would harm its short-term rental business, and it won. So while the regulation risk is there, when it is due to the absence of legislation, the disruptors have a leg-up in lobbying for rules to be made in their favor, as is the case for the Self-Driving Coalition For Safer Streets, which boasts the likes of Uber, Lyft, Google, as well as Ford and Volvo.

Exhibit 204: Uber has ramped up its annual spend on lobbying



Source: Center for Responsive Politics

The world of online grocery has reached a fever pitch as retailers race to be the first at the front door of the customer. Amazon acquired Whole Foods in summer 2017; Target acquired Shipt in December 2017. Amazon's, Target's, and Instacart's grocery delivery approaches rely on humans to pick items from existing stores. But one alliance that stands out from the pack is Kroger and Britain-based online-only grocer, Ocado—though Kroger did not buy Ocado.

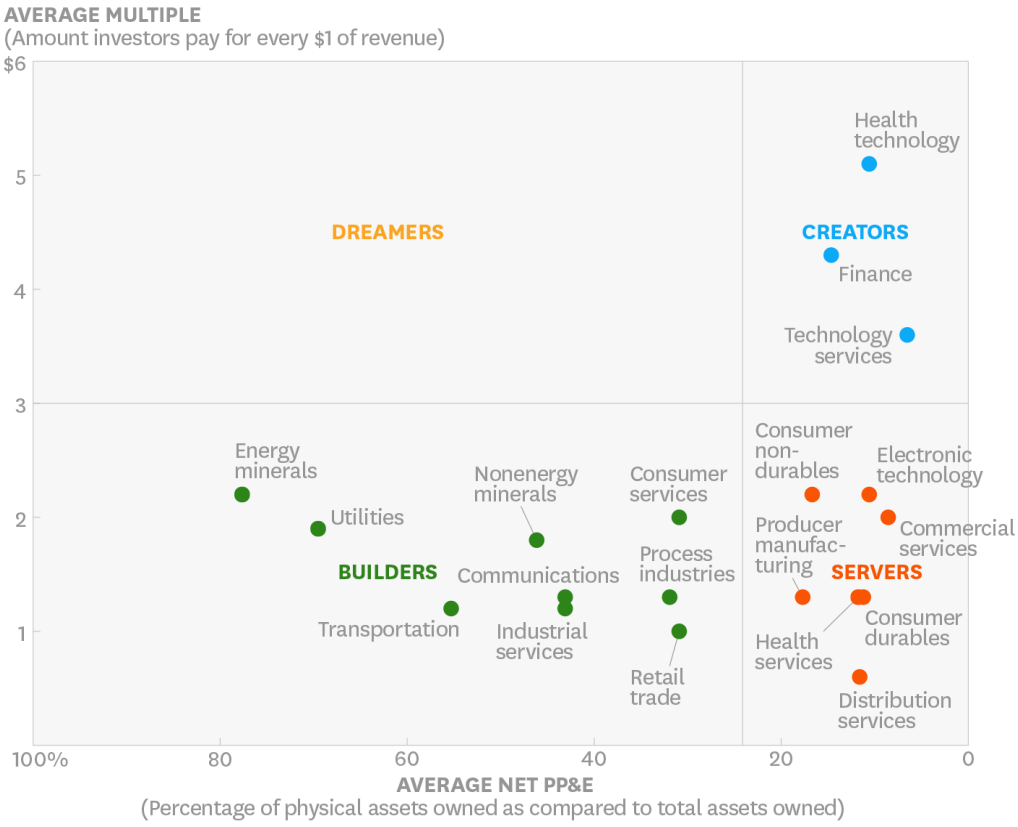
Agile companies will consider alliances and acquisitions to leapfrog the competition.

Ocado, which has no physical stores, runs automated warehouses that do the work of picking the items for online orders, utilizing the cloud, artificial intelligence, robotics, and machine learning. Aside from groceries, including some own-brand/private label items, it also provides its platform as a product itself to other grocers, selling its technological advantage to competitors. It did this first in 2013 for rival British grocer Morrisons, from handling automation, to logistics and distribution. Some distribution centers filled orders for both Ocado and Morrisons orders. This is not too dissimilar from the idea of selling excess capacity. Kroger has now inked a deal with Ocado for 20 automated fulfillment centers in the United States.

Exhibit 205: Asset-light companies are valued higher by investors

How Investors Value Industries Based on Physical Assets

Companies with fewer physical assets (Net PP&E) are valued more highly.



Source: Harvard Business Review

Migration towards asset-light business models and getting more out of smaller physical footprints

Over the past century, the value of industrial manufacturers was traditionally tied to the scale of their physical assets and footprint—whether it be the number of brick-and-mortar distribution branches, manufacturing facilities, installed base, fleet of vehicles, etc. But in the past decade, there has been a paradigm shift as the "digital" has arguably overtaken the "physical" in their long-term strategic value. With the advent of Software as a Service and data analytics, OEM manufacturers and capital equipment customers alike have learned to produce more with less, streamlining their tangible asset load while leveraging the resources they retain more efficiently and with greater utilization. The benefits of an asset-light footprint are easy to define. Capital equipment and inventory depreciate over time and are costly to relocate or replace when demand trends or geographic needs suddenly change. In addition, entrenched networks of physical assets often prevent companies from adapting to changing business needs in a rapid and agile manner. As a result, within the industrials, there has been a growing preference among both investors and management teams for asset-light business models that can generate attractive cash flows with relatively low capex and working-capital needs.

Roper Technologies: A case study

Roper Technologies' business model is both asset light, which drives free cash flow to fuel its M&A machine, and is decentralized, which enables faster decision-making.

One of the best "asset-light" examples is Roper Technologies, which reached a negative working capital milestone in 1Q17 thanks to its prescient and early embrace of SaaS and asset-light businesses. Over the past decade, Roper has charted a unique path within the Multi-Industry sector by focusing on acquiring niche software and network-based businesses that are outside of the typical purview of industrial companies, such as healthcare GPOs, ERP software providers, and business management software for legal and professional services firms. The result is a company that manages among the sector's highest operating margins and a negative working capital balance, meaning that it generates rather than consumes cash as it operates. This asset-light nature allows Roper to continuously fuel its M&A engine, effectively becoming a high-quality compounder, and allows it to run a decentralized organizational structure where critical decision making occurs among individual business units, as there is little internal jockeying for capital investments.

Services versus goods—what we can learn from the industrials space

We believe the combination of faster pace of change will force more companies to look at providing a portfolio of services versus just selling goods. For instance, within the industrials, a typical strategy for OE manufacturers is to price the initial equipment sale as a "loss-leader" and then capture the actual returns from the profitable stream of aftermarket consumables, parts, maintenance, and servicing. As an example, over the course of their economic life, GE's aircraft engines will generate aftermarket revenues totaling ~8x the initial purchase price of the OE installation. Similarly, Flowserve's pump installations generate aftermarket revenues that are ~9x the initial purchase price. More importantly, to varying degrees, these aftermarket revenues always carry higher margins than the initial OE sale, cementing their importance to the companies' bottom lines.

As companies' software offerings for data analytics and predictive maintenance become more sophisticated, we expect that their service/aftermarket capabilities will become a more integral pillar of their value proposition. For instance, though Evoqua already generates ~$0.22 of annual service/aftermarket revenues for each $1.00 spent on capital projects, it is working to enhance its service capabilities with its new Water One software suite, improving its win rate for service contracts and its ability to push for premium pricing.

For industrial conglomerates, agility can come in the form of portfolio additions or subtractions

Although there are plenty of pure-play companies in the industrial space today, there are still a cadre of multi-industry conglomerates operating across dozens of end markets. Given rapid secular changes and evolutions can be hard to predict, it is no surprise management teams actively cultivate their portfolio of businesses through M&A and divestitures. M&A spending has averaged ~30% of total Multi-Industry capital-allocation activities over the last 10 years (M&A, capex, dividends, and repurchases). We expect this trend to continue. To stay agile in the industrial space, it is important for managements to foresee emerging trends and find new or complementary business targets to leverage their current set of offerings. There has been an increasing focus for industrials to acquire software companies to deliver customers more than just equipment and offer things like predictive analytics and other valuable data insights. Portfolio additions and subtractions are important for multi-industry industrials to stay at the forefront of their markets and to make investment in secular growth trends.

Using M&A as a proxy for R&D spending

Companies can use M&A as a means for accelerated research and development spending.

Companies can use M&A as a means for accelerated research and development spending. Acquiring a business to quickly increase offerings gives a company the ability to have a broader or higher-tech portfolio for its customers. This can save the firm both money and years of research and development efforts. An example of this is Xylem acquiring Sensus for $1.7 billion. Sensus is a leading provider of differentiated communication systems, metering

technologies, and data analytics solutions that enable the intelligent usage and conservation of water, gas, and electric resources for utility operations. In addition, Sensus maintains a differentiated Software as a Service platform known as FlexNet, which is an advanced, scalable solution for remote monitoring and diagnostics of water utility equipment. The deal vaulted Xylem into smart water networks, data analytics, and new SaaS opportunities, keeping it at the forefront of water technology offerings.

Keeping business lines smaller, more decentralized, and more entrepreneurial

To stay nimble in a competitive landscape, companies can concentrate on a more decentralized operating model where smaller and more entrepreneurial business lines focus on their respective core strengths. Smaller and leaner operations have a better ability to quickly adapt to new threats and emerging trends. Roper, for example, truly embraces the Multi-Industry model by structuring its enterprise as +40 distinct businesses each headed by a different operating company president and running independent P&Ls. There is no unifying ERP system, and each business is given enough autonomy to operate with a discrete strategy. The result is the company looks more like +40 separate micro-caps bound loosely together by a common ideology and operating culture. This has led to entrepreneurial-like businesses that are quick to react to any given change.

Automation will accelerate rewards

With fixed assets becoming more of a liability than a competitive advantage in the future, we believe companies will have to make significant capex investments to alter their supply chains and manufacturing operations to become more automated. However, the key will be to install automation that can be upgraded as technology evolves without having to do it all over again.

What does this all mean for the consumer?

First, collaborative consumption (otherwise known as the shared economy) and direct-to-consumer manufacturers are emerging headwinds to loyalty and profitability of traditional retailers. Today's consumers (and in particular the millennial cohort) aspire to a certain lifestyle against limited means, driving a growing trend of products being "rented out" to consumers. Manufacturers are also disrupting traditional retail by engaging in online retail, offering, in certain cases, one-of-a-kind product customizations.

Secondly, we are likely to see companies respond rapidly whether properly thought-out or not. For example, we will see major attempts to improve value propositions across all consumer subsectors. Spawning of outright new business models are also likely. Could we see virtual reality shopping becoming mainstream? Will lab-grown meats gain significant share? We will also see a rise in collaboration between adversaries to protect incumbents. We also expect increased consolidation (vertical & horizontal) across all industries from disruptors challenging incumbents.

The bottom line is that consumer retailers and manufacturers alike need to become agile to avoid disintermediation and disruption. Trends rise and fall faster thanks to social media and lower barriers to entry in consumer (i.e. co-packers, inexpensive digital marketing). On the one hand, traditional retailers with inflexible structures will have to figure out how to become more flexible in order to survive, but similarly, today's high-cost leading-edge e-commerce solutions could also find themselves quickly obsolete as tomorrow's technologies emerge. Companies may want to embrace innovation and change, but will not if they are not agile enough.

Sector-Specific Perspective

US Household Personal Care, Beverages and Tobacco

The most important outcomes that are likely to impact HPC/Beverages/Tobacco

From Mass to Bespoke: As we highlight on page 64, to win in 2025 CPG players will have to make a radical value chain transition from mass to bespoke. We envision marketing in personalized text message form, anticipatory ordering of products based on usage data, beverage products that are engineered to individual consumer-specific genetic makeup and taste preferences as well as beauty products engineered to consumer-specific skin profiles and pigment. At first, this will lead to sku proliferation (mass customization), later direct to consumer will be the only way to supply consumers with products at the bespoke level they demand — including 3D printing (as discussed on pages 77-79) where consumers will be able to make products of all types directly in home or at a specific retail location bespoke to their needs. In the event of 3-D printing, CPG companies will own formula-related IP that would be sold to consumers versus traditional hard goods.

AI + Biotech convergence: With the convergence of AI and biotech (including gut health monitoring technology, as discussed on page 73) consumers will be able to manage their health at a level never ever imagined. This dynamic could lead consumers to be increasing more judicious on the decisions they make regarding what they consume. On the flipside, the rise of proactive medicine may give consumers permission to be more indulgent. Does it become OK to consume alcohol, smoke cigarettes and drink sugary beverages all the time? While some of these categories may be out of favor today, we certainly do not see them going away looking out to 2025 and beyond. Further, if we have a world with lower levels of illness (due to better health monitoring and advances in medicine), will consumers have as much demand for PG/CHD/CLX OTC medicines, disinfectant wipes, vitamins, condoms and pregnancy kits? There may also be less demand for bleach among other cleaning products if illness is on the decline.

AR/VR – Never leaving home again: While consumers may be more indulgent, we wonder if they will ever leave home again given the advancements in AR/VR technology. If consumers are constantly engaged in their own VR world (as we discuss on pages 32-42), there will be less on-premise alcohol consumption, consumers may shave even less frequently than they already are today (a negative for PG and EPC), more discretionary items such as those of NWL and SPB may become less relevant to consumers. Advertising will be completely transformed to be included in a VR, Sims-like world, where brand equity would ultimately be determined.

Cloud leveled playing field: Cloud technology (as we discuss on pages 90-109) is an absolute must for CPG companies large and small to compete looking out to 2025. The cloud effectively brings the talent and capabilities of leading tech firms to consumer companies that are willing to embrace it. The cloud also generates progressive cost savings in the years following transition. Importantly, the cloud is destroying barriers to entry as small players can also access leading back-end technology while using the services of those such as Shopify to bring products directly to consumer, just as easy as P&G or Coca-Cola could.

Extreme weather volatility: With climate change accelerating (page 140) it will become increasingly difficult to predict weather trends (so do not bother) and increasingly more important for players to react accordingly. This applies to all weather-sensitive businesses from beverage companies to Energizer batteries and auto care, Spectrum Home and Garden, Clorox's charcoal, Newell's Outdoor Recreation segments to react quickly in uncertain times. The key would be for these companies to continue to develop best-in-class, direct-to-consumer capabilities or partners along with inventory management technology to deliver these products to the consumers who require them in times of need, while being able to

scale back on production and inventory in the regions where excess inventory is not required. The cloud and artificial intelligence will be critical to deliver on this strategy.

Global population and currency value shifts: As we discuss on page 155 population is shifting throughout the world and the geographic mix of the companies we follow is not reflective of the future population mix. Should global consumer companies be reinvesting more in India, Nigeria and Latin America, rather than the US, Japan and Europe? The answer is complex. Gaining access to these large populations will be important for the future, but could weigh on near-term value creation given currency volatility, rapid inflation and general geopolitical instability. We believe the companies under our coverage will need to innovate around go-to-market structures and organizational designs in order to balance the near-term risk with the long-term reward in many of these markets.

AI—will we still need caffeine? AI will minimize the amount of grunt work from manufacturing, driving trucks or cars anywhere, back office, really most jobs that may require a caffeine boost. These caffeine-related jobs will either evolve or go away. In the future, caffeine will help keep consumers awake to think and become more creative. CBD may become the ultimate complement for caffeine, helping consumers relax. In fact, we could foresee a scenario where CBD and other relaxing agents become MORE popular than caffeine/stimulants as consumers continue to feel the stress/anxiety of technology-related stimuli (work, social media, etc).

Talent Disadvantage: We wonder with the level of innovation and change required to win by 2025, if the CPG companies we follow will be at an inherent disadvantage given talent disparity relative to start-ups (the best people never work for you, they work for themselves, will never be more true) as well as to the CPG's space more healthcare-capable competitors such as J&J, GlaxoSmithKline and Pfizer among others.

Best and worst positioned companies for 2025 (as we see major outcomes today)

STZ, MNST, EL, KO: These companies have proven their willingness to sacrifice near-term results to invest for future growth. Whether through refranchising their bottling operations, partnering with a glass manufacturer, taking stakes in the cannabis industry, investing in their consumer insights engine, 'skating to where the puck is going' with e-commerce, or knowing when to grow categories organically vs. through M&A, these companies continue to see the bigger picture in an ever-changing retail environment.

PEP, KMB, AVP: The best analogy we can think of to describe these companies is "hamster on a wheel." The world is changing, and so is the way we consume goods. The reality is most companies we cover are being disrupted by the rise of online and smaller upstarts because they lack the courage or the conviction to take the near-term EPS hit to invest in areas that could ultimately lead to a competitive advantage. CPG companies need to spend up for creating in-house digital capabilities (at present many digital capabilities are being outsourced), invest in their R&D pipelines (as that is the best way to reassert relatively attractive value equations versus upstarts), reinvest in the product quality and step up digital and traditional marketing efforts. While we think most companies within our coverage universe fall into this category, we think these in particular have some very tough choices ahead.

PG: Following the company's November 2018 Analyst Day, we acknowledge P&G is in transition, making the necessary changes to win in a 2025 world. The company is transitioning from more of an operating company to holding company structure with 8 different business units and P&Ls. This new structure should increase agility (without sacrificing total company scale) by enabling more local decision making as it relates to both categories and geographies. We are also impressed with the direction of P&G's R&D efforts. The company is launching what we believe to be very disruptive innovation (such as DS3–see

pages 150-151 for more details) and is also monetizing its R&D efforts with non-competitive companies.

Strategic decisions that could alter the playing field by 2025

The audacity to invest for the day after tomorrow: As we highlight on page 14, when asked what decisions executives would make when they are about to miss a quarter, 80% of execs in a recent Duke study indicated they would slash discretionary spending, including IT/R&D. To win in 2025, this is completely unacceptable. Companies must be willing to sacrifice near-term earnings and spend across innovation, IT capabilities, marketing and talent, among other items, to win in the future. Specific-strategic changes may include doing away with guidance, particularly quarterly guidance. Another opportunity could be to provide +10-year incentive plans for CEOs. Even if the CEO were to leave the organization, they would be entitled to options looking out 10 years from each year at the helm of the company. Acquisitions, including minority stakes that are near-term EPS dilutive may be critical as they set the company up for future earnings growth.

Get more focused: With the series of challenges and changes looking out to 2025 as we highlight in this report, consumer companies will be required to be best in class, and it is difficult to be best in class at everything. One example is The Coca-Cola Company recognized this and divested its bottling assets (the distribution and in-store execution side of the business) to become more asset light and focus on what it did best – marketing and innovation. Acquisitions should directly complement a company's legacy categories and geographies. Should a target acquisition not be a direct complement, the acquirer should only acquire a minority stake (just as we have seen Constellation do with Canopy Growth, a long-term strategic investment we support). This minority stake approach ties in directly with our Collective Action theme, where companies must form alliances, in some cases with their close competitors, to win.

US Packaged Food

Four important outcomes that are likely to impact Food Processors

A move to our 10,000-year-old diet: Over 10,000 years ago, homo sapiens were roaming hunter gatherers with heterogeneous diets. While our genetic make-up is based on that varied diet of fresh ingredients, the agrarian age—largely defined as the spread of wheat farming around the world—started to change our diets. This change in our diet and exercise has accelerated since the end of World War II and processed food has made our carbohydrate-rich diets even more accessible. Since 2010, there has been a move back to fresh ingredients as Millennials have begun their household formation. Over time, US food companies will need to figure out how they will participate in this shift to the right ingredients (e.g. vegetables, fruits, meats, and dairy) or risk losing profitable volume as the ultimate convenience food becomes delivered family meal solutions (see below) and personalized diets (see below) and not the "pantry storage food" that they mass manufacture.

Diet is the ultimate personalization: In this report, we touch on the imminent shift from "Mass to Bespoke". In no way is this more powerful and clear, than in our diets. Already, we can test our genetic make-up and develop a superior personalized diet that can make us—in theory—feel better and be healthier. Today, there are services such as Arivale, Vitagene and Habit that are beginning to offer personalized diet solutions. Over time, we suspect that the cost of a DNA test to determine our perfect diet will come down (from the hundreds and even thousands of dollars) and that consumers will be able to develop ideal meal solutions through ever more convenient digital-ordering services.

From home inventory to meals in one-hour or less: The holy grail of US eating has always been the easy at-home meal. Over the last two decades about two-thirds of restaurant growth has been from meals brought back to the home, making even "away from home"

really an at-home meal provider. About 14% of US household spending goes toward food with roughly half of that going to at-home food ingredients and the other half going to US foodservice (e.g. restaurants). This pool of spending is too big for Amazon and the restaurant delivery aggregators (e.g. Uber Eats) to ignore, and US consumers will increasingly shop, work and be entertained at home. The lines between delivered ingredients and foodservice will likely blur. We can imagine Amazon-Whole Foods serving home meal solutions—mixing foodservice and home cooking to allow a blend of superior convenience, value and nutrition than today's versions of convenience. Food companies need to figure out how they are going to be part of the world of one-hour-or-less convenience—particularly if that means a more robust data relationship between delivery companies and the consumer.

Those with data get the spoils: For decades, the largest food companies have teamed up with data providers like Nielsen and IRI to provide category and consumer insights to retailers. By the year 2025, it is possible that the leading retailers will have more consumer-level data than the manufacturers—ultimately making them smarter packaged food buyers, more efficient with promotion activity and more opportunistic with retailer brand efforts. Packaged food companies will need to create or collaborate with retailers in creating a new level of insights—from the consumer to the point of purchase. Those food companies with higher competencies and/or direct-to-consumer efforts will be in a strong position to gain share and to bolster trends of acquired assets. While many legacy packaged food categories could shrink, we can also imagine a new generation of data-forward acquirers maintaining and growing earnings power through M&A.

Best and worst positioned companies for 2025

We see three major criteria as determining the best and worse positioned companies in food: 1) domestic category exposure, 2) emerging market exposure, and 3) analytical capabilities (or other intellectual property that can help build a more direct relationship to the consumer).

By our definition, the **"right" categories** are those that we believe will have the ability to grow in the year 2025. We believe these mega-categories are 1) snacks, 2) beverages, 3) meal enhancers (spices, sauces, condiments) and 4) frozen food. In addition, we believe companies with high exposure to **emerging markets** will continue to grow relatively quickly as Blockchain and mobile technology allow better access to information and documentation of land and wealth. Lastly, we keep our mind open to the potential for US food companies to develop **superior execution abilities** in what will be a period of accelerating US food retail consolidation and a shift to online shopping. A US food company that has developed superior analytical abilities to better maximize return on massive trade spending budgets (roughly 25% of net revenue), or is developing better direct-to-consumer sales channels, will be relatively well positioned to offset increasing consumer data access (and power) that is shifting to Amazon and Walmart, and a loss in impulse buying (a particular issue for companies with high profit mix from the convenience-channel).

With the above as criteria, the best-positioned companies in our US food coverage are **Keurig Dr. Pepper (KDP), Conagra** and **Mondelez**. In the case of KDP, we see the company's blend of at-home, away-from-home, hot, and cold as a solid starting point in pursuing further bolt-on M&A and logical channel and packaging adjacencies. It is particularly interesting to us that KDP has high exposure to natural caffeine and superior insights capabilities—particularly with at-home appliances and a strong e-commerce division. For Conagra, we view the frozen category as a relative survivor as a "less negative" method of preservation—especially as consumers customize diets and broadly pursue more vegetables and protein.

While Mondelez may suffer from dying impulse channels in the US, it has brands (e.g. Oreo) that will be difficult for Walmart or Amazon to substitute with retailer brands. In addition, it

should benefit from a strengthening middle class in emerging markets as Blockchain potentially fills in for weak banking sectors abroad. Beyond our coverage, we would point out that McCormick has a relatively strong category and geographic exposure to long-term growth categories.

Clearly, most of the US food space would be viewed as being on the wrong side of many of the aforementioned mega-trends. And even the best insights companies with proud growth cultures will likely struggle with some of these trends. For example, General Mills generates relatively high margins from a significant grain-based portfolio (e.g. cereal) and Hershey has high profit exposure to impulse brick-and-mortar occasions (e.g. US convenience stores and supermarket check-out counters). For most of the space, we believe the future will bring difficult decisions that will likely bring food companies down one of two paths: 1) dilutive "repositioning" M&A (divestitures and acquisitions) like we have seen lately (e.g. General Mills buys Blue Buffalo); or 2) accretive consolidation-type M&A (e.g. if Kraft Heinz were to buy Campbell Soup).

Three strategic developments that could alter the playing field by 2025

Mega-consolidation: For many US food companies the answer to many of today's most daunting challenges is consolidation. If many processed food categories are set to contract as US convenience moves to fresh and delivered food, and as major retailers create a more direct consumer relationship, the odds of declining sales and profits grow. It is no secret that major retailers like Walmart are rationalizing their assortments in order to lower operating costs and extract higher promotion spending from remaining suppliers, and ultimately enable higher e-commerce (e.g. click & collect) investments. Food retailers with inferior e-commerce, loyalty programs, bloated center-store capacity and declining foot traffic are poised to shrink square footage. Why not get in front of this by consolidating and rationalizing business while building superior digital capabilities and even quasi-foodservice solutions (see below)?

From ingredients and processed meals to fresh family meals made easy: If companies like Campbell Soup and Kraft Heinz have deep recipe databases and proprietary ingredients, how can these companies move from processed pantry food convenience to fresh meal solutions? As we have seen with deals like Yum Brands' equity stake in GrubHub and Amazon's acquisition of Whole Foods, the brick-and-mortar and brand players are finding the need to join forces with digital order & delivery experts. It may be "last call" for the biggest US food companies to establish direct-to-consumer efforts and to launch home-food solutions that provide some of the freshness and convenience of delivery restaurant meals—but with lower expense than foodservice. Could "Campbell Soup Kitchen" or "Kraft Kitchen" become a strategic partner to Uber Eats and perhaps provide a network of independent restaurants (e.g. virtual commissaries) with the know-how to create batch meals for families? Could one of these meal-oriented packaged food giants sell Wall Street on the necessary investment needed to start such a digital-delivery bridge to US households?

Amazon buys other large supermarket chains: Many food-retailing analysts believe that Amazon lacks the capabilities and/or infrastructure to become the supermarket to the US as much as it has become a retailer in other categories. If that is the case, then Amazon has three choices: 1) pull back or divest Whole Foods; 2) maintain a marginal position in a huge category that requires convenience and has synergies with other delivery businesses; or 3) double down through additional acquisitions in food retailing. While we do not know if Amazon will acquire one or more additional supermarket chains, we do know that this would be a massive development that would accelerate many of the realities pitched in this report. The more Amazon gets into food, the closer it gets to 1-hour-or-less delivery—a level of convenience that could beget additional market share and pricing power for Amazon in many categories.

The creation of a growth incubator company: We wonder if there could be the creation of a growth incubator super food or beverage company that focuses exclusively on helping small companies achieve scale. This company would level the playing field in terms of merchandising, supply chain, manufacturing and digital marketing while preserving the independence and entrepreneurial spirit of an upstart company. Already, we can see that growth is getting an outsized contribution from smaller companies. According to a Nielsen study, the bottom-most 20,000 small consumer packaged goods players are driving 50% of industry growth. However, we have found that few brands and companies are truly becoming the next Kind bar or Chobani yogurt. While this is perhaps evidence of a fickle consumer, we believe this may also result from relative ignorance about how to scale a business.

US Food and Restaurants

Four important outcomes that are likely to impact Restaurants

From the drive-thru to delivered meals in one hour or less: Over the last two decades about two-thirds of restaurant growth has been from meals brought back to the home, and today roughly half of restaurant dinner orders are consumed at home. Drive-thru traffic trends have stalled (roughly flat over the last five years), while delivery orders are rising—being fueled by digital ordering. About 14% of US household spending goes toward food with roughly half of that going to at-home food ingredients and the other half going to US foodservice (e.g. restaurants). This pool of spending is too big for Amazon and the restaurant delivery aggregators (e.g. Uber Eats) to ignore, and US consumers will increasingly shop, work and seek entertainment at home. Drive-thru trends are already flat today, and it is not hard to envision declining traditional drive-thru usage as more meals are delivered back home.

AI and the replacement of (bad) human service: Would we really miss the "human touch" in many fast-food occasions today? According to surveys, the service in one out of four McDonald's is considered unpleasant. As digital ordering and voice-recognition technology improve, the downside of automating the customer-facing aspects of fast-food diminishes. And the upside grows as labor becomes more expensive, language barriers grow, and the consumer becomes increasingly accustomed to digital ordering. We can imagine a world in which the consistency and transparency of an AI experience will have higher customer satisfaction scores than all but the more service-oriented cultures (e.g. Starbucks and Chick-fil-A). Those chains with superior technology will likely gain share from regional chains with an inferior digital interface. Down the road, AI ordering could consist of a consumer getting into a car that recognizes the passenger (no key needed) and the passenger tells the autonomous car to take him or her to work and to pick up the usual order at Dunkin' along the way. In the meantime, we could imagine brands building centralized centers to take drive-thru orders to augment rising wage pressures in high-cost areas.

Those with data get the spoils: The restaurant space is relatively new to the idea of being a middleman in the consumer chain. With the rise of delivery and third-party aggregators, restaurants are finding themselves as a supplier to someone other than the end user for the first time. Exclusive partnerships and data-sharing agreements with delivery aggregators are reserved only for the largest chains, so small-to-mid-sized chains may face issues in developing the same level of insights that larger chains are able to produce. Whether the insights consist of the ability to better select centralized locations for new units that are focused on digital/delivery, create personalized advertisements, or optimize menu pricing (i.e. vary in-store and delivery prices like McDonald's currently does), large chains with access to data will surely have the upper hand. Additionally, data from third-party delivery services could also allow restaurants to come up with more effective menu innovations. In gathering food consumption trends as they are occurring from all of the restaurants in the area, these data sources should be able to show real-time shifts in eating patterns and provide insight on what foods to introduce (or avoid) based on consumer taste preferences.

Depending on data-sharing agreements, companies like Yum! Brands (which has an equity stake in GrubHub) could benefit greatly from these insights, but also one may wonder if we will see the third-parties sell the data to all restaurants in a similar manner to how Nielsen and IRI currently operate in the packaged food space.

Diet is the ultimate personalization: In this report, we touch on the imminent shift from "Mass to Bespoke". In no way is this more powerful and clear than in our diets. Already, we can test our genetic make-up and develop a superior personalized diet that can make us—in theory—feel better and be healthier. Today, there are services such as Arivale, Vitagene and Habit that are beginning to offer personalized diet solutions. Over time, we suspect that the cost of a DNA test to determine our perfect diet will come down (from the hundreds and even thousands of dollars) and that consumers will be able to develop ideal meal solutions through ever more convenient digital-ordering services. While the consumer once was satisfied with "fresh" and now seems to want "clean ingredients", the future will belong to those chains that can help deliver food qualities to a consumer that is increasingly self-aware (or that will reward the chain for architecting meals to fit their DNA make-up).

Best and worst positioned companies for 2025

Several large chains will win or at least survive: Those chains—including McDonald's, Taco Bell, and Chipotle—that are developing strong digital infrastructure, ubiquitous footprints and strong delivery partnerships could have the consumer data to harvest future insights and personalized marketing. These mega-chains have the scale today to demand partner-level data sharing and even ordering that can originate on the chain's website. In addition, these chains have bolstered their brand image from a negative skew to increasingly positive through asset investments, effective marketing, and quality upgrades. Given the brand equity that has been established with consumers, these brands are best positioned for the world in 2025 and beyond.

Chains with average food, declining worker quality and under-investment in digital/delivery are at risk of market share loss from four major threats: 1) large chains with "first page" delivery app placement, close proximity to homes and ability to harvest digital insights; 2) higher preference smaller chains that achieve excellent "star ratings" on the delivery aggregator sites could leapfrog these average chains with the help of GrubHub or Uber Eats; 3) the pop-up of "virtual restaurant brands" from the independent restaurant sector, with the help of delivery app players (see below); and 4) Amazon will remain a huge potential threat to restaurants since it may engage in its own (Whole Foods branded?) home meal solutions and use this to drive its convenience goals (e.g. one-hour delivery speeds, or even less).

Smaller or lesser-preferred chains in fast food are at risk: We see regional chains with "average" levels of food appeal and under-investment in digital capabilities as among the worst-positioned chains. These could include chains now in the private area such as Bojangles and Sonic, or public companies like Jack in the Box. Restaurant Brands' Burger King has been slow to develop its digital capabilities and will need to improve in this area to keep up with McDonald's, Taco Bell and—to a less degree—Wendy's. In 2018 we have observed a heightened level of small-cap M&A. Given the competitive pressures impacting these companies, there is an accelerating need to reposition for the new world of fast food with strategic brand partnerships across portfolios.

Casual dining will need to be more than family meals: Many of the aforementioned change forces leave much of the casual dining world on the defensive—particularly those chains that over-index to families. The greatest of these risks is the potential for increased access and lower cost for family meals delivered to the home. To fight this potential headwind, chains will need to develop: 1) experiential benefits of going to the restaurant or bar area; 2) launch

compelling delivery and catering options; and 3) remove friction points to the in-restaurant service model (e.g. reservations, fast bill pay, etc.).

Three strategic developments that could alter the playing field by 2025

Amazon buys other large supermarket chains: While we do not know if Amazon will acquire one or more additional supermarket chains, we do know that this could be a massive development that would accelerate many of the realities pitched in this report. The more Amazon gets into food, the closer it gets to 1-hour-or-less delivery—a level of convenience that could beget additional market share and pricing power for Amazon in many categories.

Uber Eats uses unused kitchen capacity to take on the chains: We have already seen delivery specialists like Uber Eats using its data to identify market opportunities (e.g. low supply of fried chicken for delivery in downtown Chicago) and set up kitchen capacity under virtual banners to satisfy this demand. Si's Chicken is a fried chicken banner that exists only on Uber Eats Chicago website/app, and it is manufactured out of the back of a local Italian restaurant that has unused fryers in the kitchen. Could Uber Eats come to leverage independent restaurant kitchen and commissary capacity in the same way that Uber has employed independent drivers and free car-seat capacity?

Food companies push into the world of home and foodservice consulting: If companies like Campbell Soup and Kraft Heinz have deep recipe databases and proprietary ingredients, how can these companies move from processed pantry food convenience to fresh meal solutions? US food companies with recipe know-how and strong supply chains could partner with delivery providers and independent restaurants to create foodservice meals or near-complete family meal solutions. We wonder if "Campbell Soup Kitchen" or "Kraft Kitchen" could leverage a network of independent restaurants (e.g. virtual commissaries) to essentially give a delivery specialist a consistent, scalable retailer brand—one that could undercut the price points of traditional restaurants.

US Food Retail and Distributors

Most important outcomes that are likely to impact US Food Retailers and Distributors

AI and Machine Learning: Food Retailing's notoriously razor-thin profit margins force operators to constantly search for efficiency opportunities. We believe more and more retailers will have to incorporate AI and machine learning into their stores and management systems to reduce shrink/spoilage, better assign labor hours, reduce out-of-stocks, and better understand true cross-elasticity of their own assortment AND against competitor stores. Kroger has already implemented electronic temperature-monitoring tools in its stores to keep track of all its frozen and refrigerated cases throughout the day. This cut down the labor required to perform this task manually and saved over $25m for the company. Further, the sensors would alert the engineering teams of cases that are consistently having higher- or lower-than-ideal temperatures, prompting them to address/eliminate potential system issues. The ultimate benefit is enhancing the quality of food offered in stores. Sprouts is also rolling out a Fresh Item Management tool that predicts product demand based on two years of customer transaction data, determines the appropriate shelf inventory level and schedules labor accordingly. This better aligns in-store personnel level with demand and improves in-stock levels while cutting down costs. From here, we expect machine learning to help achieve maximum pricing efficiency. Physical retailers can run millions of price elasticity tests in real-time to capture the ideal amount of consumer expenditure available.

From "Mass" to "Me": Consumers are increasingly demanding personalization and convenience in all aspect of their lives, driven by digitalization and urbanization. As consumers have different dietary preferences and restrictions and different definitions of convenience, mass marketing/advertising and a physical store-only offering is extremely

ineffective. To deepen the customer relationships, food retailers need to reshape grocery shopping into a customized rather than commoditized experience (for assortment and shopping style). By investing in consumer analytics, food retailers create a personal connection with customers and can offer more-effective marketing (tailored offering/targeted promos). This also gives them more negotiation power against suppliers/CPG companies. The traditional weekly flyer offering the same deals to every customer will be a relic of the past. Each shopper will have different deals on different items on different days, all optimized to best get individual shoppers into their system. Additionally, how consumers shop will be personalized. Some will want in-store options, some will want at-store pick-up, some will want delivery, and some will want secondary location pick-up. Successful retailers will have to offer all variations of convenience. To date, none have offered the extra convenience without adding labor. The extra labor limits profitability and/or addressable market size. Amazon's delivery options (Prime Now) add two forms of labor: picking and delivering. This is not forward tech and is simply a return of the milkman.

Power of Insight Shifting to Retailers: As we explored in the "Kroger case study" on page 22, we believe loyalty cards provide a treasure trove of otherwise unavailable data that can indirectly improve marketing, assortment, store layout, hours, productivity, and profitability. Kroger is far ahead in the consumer analytics beginning with its dunnhumby JV 15 years ago. Today, Kroger has a very rich and powerful customer database that drives marketing spend efficiency and puts Kroger in an advantageous position for promo dollar negotiation/allocation relative to suppliers and competitors. Manufacturers, unless they have a direct-to-consumer business, have little to know insight on who their consumers are or what else they are buying. As personalization increases, the balance of power shifts away from manufacturers and toward retailers. We believe relative margins of the two tiers will shift accordingly.

Power to the People – Total Transparency: Consumers are armed with more information and demand transparency from stores/brands they intend to patronize; the food industry is no exception. Consumers want to know the source of their food; they want sustainably grown/produced food; and they want to buy from socially responsible companies. The Whole Foods' #Orangegate incident demonstrated the power of social media, consumers will be closely and constantly scrutinizing retailers and holding them accountable for their actions. In an effort to improve transparency, Blockchain technology makes it possible to trace food items along the entire, otherwise very fragmented and opaque, supply chain. Ultimately, this technology could: 1) reduce waste; 2) eliminate inefficiencies in transportation logistics; and 3) help identify sources of food-borne illnesses, all while giving consumers the transparency they crave. In the summer of 2017, IBM announced a collaboration with major players in the global food-supply chain to tackle the food safety issue utilizing Blockchain technology. Companies include: Walmart, Kroger, dole, Driscolls' Tyson, Nestle, and Unilever.

Best and worst positioned companies for 2025

KR: Kroger is far ahead of competitors in the consumer analytics game (most grocers have no way to identify shoppers), which began with its dunnhumby JV 15 years ago. Today, it has a very rich and powerful customer database that drives marketing spend efficiency. We believe Kroger has a distinct advantage against most of its retailer peers and will enjoy the balance of power shifting away from CPG to those that own the customer interactions. In addition, Kroger is aggressively pursuing ways to add convenience, while limiting incremental labor. Unlike Instacart and Amazon Prime Now that add two forms of labor over traditional shopping, Kroger Click & Collect ("delivery" out-sourced), partnership with Nuro (self-driving delivery), and facilities with Ocado (automated picking) are better suited to limit costs thereby being more system profitable and/or more appealing to more customers.

UNFI: With rapid consolidation among their vendors and retail customers, wholesalers are facing increased structural challenges. Additionally, UNFI's unique exposure in relation to Whole Foods has turned into a major concentration risk with Amazon and its history of disintermediating partners. Retailers increasingly spending on data analytics enhances bargaining power against distributors. Better transparency of food movement through the supply chain decreases the reliance on third-party expertise. UNFI still carries premium margins over conventional food distributors. We believe that is unjustified going forward.

Strategic decisions that could alter the playing field by 2025

Invest in Consumer Data Analytics: Food retailing is only getting more competitive and maintaining status quo is simply not enough for grocers to survive. While catching up to Kroger's 15-year head-start seems impossible, companies do have other options such as partnering with consumer-insight companies for a jumpstart. Analytics companies can help product assortment and revenue management be more precise and on trend than relying on experience and judgments. Those that don't know their shopper will not exist.

Transform into an Agile Business Model: The world is digitalizing and consumers are moving online. Even though grocery has been slow to move online, our annual grocery e-commerce survey is showing a tipping point in acceptance (36% of survey responds have shopped for groceries online vs. 25% in 2017 and 20% in 2016). Retailers need to upgrade their stores to create a truly seamless online and offline grocery shopping experience. Companies need to look beyond short-term profitability, invest in e-commerce solutions (click & collect/curbside pickup, home delivery by person or autonomous driving vehicles, automated fulfillment centers) and in-store digitalization/flexibility (digital shelve display, mobile scan & go, cashier-less stores operating with product and facial recognition sensors), in order to pivot themselves into food retailer of the future.

US Hardlines Retail

Most important outcomes that are likely to impact US Hardlines Retailers

Omni-channel capabilities have become table stakes – To win in 2025, hardlines/broadlines retailers will continue to invest in their omni-channel capabilities (many if not all are highly focused on this now). Given the shift towards e-commerce, retailers need a differentiated in-store experience in order to drive traffic. Additionally, companies will continue to invest in their businesses in order to improve speed (of delivery) and convenience. Retailers who are at the forefront of these initiatives are investing in buy online pick-up in-store (BOPIS) capabilities, click and collect, especially for food (see Walmart), and home/office delivery for free. In our view, shipping from stores helps increase utilization of the store network, creating a higher return on inventory investments and puts the company closer to the customer. Many retailers are already using a combination of these tactics. Walmart has tested this capability via ride-hailing companies Uber and Lyft, and has also used its own employee network to deliver orders. Home Depot recently rolled out small parcel delivery from store via car in nearly all of their major markets in the US.

AI/Big Data will lead to more personalization than we can currently imagine – When it comes to data collection and leveraging big data to understand one's customer base, brick and mortar retailers are way behind Amazon. That being said, retailers are continually investing in these capabilities to better understand which customers are buying what products. Over time, this will lead to more personalized marketing. Recently, Tractor Supply has started to leverage their loyalty program to enhance their target marketing and understand the frequency and category-specific needs of each customer (even sending personalized merchandising advertisements). These investments will likely lead to sizeable growth in subscription services as companies more keenly understand exactly what customers are buying and how regular (or not) those purchases are.

AR/VR will help set the table for the "endless aisle" – While leveraging AR/VR is still in its nascent stages, companies like Walmart, Lowe's and Williams-Sonoma are all using versions of AR/VR either in-store or online. For example, Walmart has tested AR/VR applications in-store that coincide with new product launches (ex. launching an AR app that coincides with new Teenage Mutant Ninja Turtles licensed merchandise). At Williams-Sonoma, their online website allows you to "envision" how a specific piece of furniture may look in your house using AR. Lastly, at Lowe's, the company has leveraged VR to help customers navigate their massive warehouses in order to find exactly what they are looking for. All of these investments in AR/VR are being done to drive traffic into stores while creating a more engaging omni-channel experience.

Automation and Robotics will continue to ramp – Especially as wage demands rise and technology costs fall, we would expect many retailers to invest more heavily in automation and robotics (substituting Capex for Opex). Early versions included "iPhone" or "iPad" connectivity for retailers to help customers in the store find specific products and, increasingly, allowing customers to check out from a department rather than forcing them to the checkout counters at the front of the store (ex. Home Depot FIRST phone). Walmart appears to be the furthest along as they are using robotics to speed backend truck loading, intra-DC product logistics and even scanning product shelves to find areas that need to be replenished (see below photos from the 2018 Walmart Analyst Day).

Exhibit 206: Robot photos from store tours at the 2018 Walmart Analyst Day

Source: RBC Capital Markets

Sustainability efforts by big companies could lead to significant financial advantages over time – We have also seen a growing recognition of environmental challenges and resource shortages among many of America's corporate titans, particularly in the hardline/broadline retail segment. Specifically, large companies like Walmart, Home Depot, and Costco have all made specific announcements/set long-term goals to reduce waste, reduce overall energy/water usage and boost the usage of renewable energy sources. For example, Walmart is pushing their environmental efforts on their supplier base through their "Project Gigaton," where their goal is to reduce emissions *throughout their entire value chain* by 1 billion metric tons by 2030. In our view, the most aggressive efforts on the sustainability

front are being deployed by the biggest companies in the hardline/broadline space (vs. small to middle-sized organizations). Personally, we applaud the initiatives by these companies and believe they will ultimately lead to a better future for the environment. However, we are also capitalists at heart and believe that many of these exact same initiatives will ultimately lead to cost advantages for those companies that are big enough and financially strong enough to make sizable investments in such sustainability efforts today.

Best and worst positioned companies for 2025

WMT, HD, BBY, KMX – These companies have all invested in the future, even when it has led to lower levels of near-term profitability. Walmart will likely post their 5th annual decline in EBIT $s in 2018, as they have accelerated their investment spend both in their stores and building their on-line/omni-channel capabilities, but have been rewarded with their strongest comp growth/market share gains in a decade. Despite 7+ years of very strong results, HD is undergoing a massive in-store and supply chain revamp with the goal of having the #1 supply chain for their product sector against ALL competitors in an effort to "future-proof" their business. BBY has already made substantial financial sacrifices to improve their long-term competitive positioning and has now been gaining market share for 4+ years, but they continue to invest for the future with their recent acquisition of GreatCall and buildout of their In-home Advisor and Total Tech Support programs. While it likely took longer than expected, KMX has rolled out a program that enables consumers to switch back and forth between in-store and on-line processes to buy a used car, matching the capabilities of on-line disruptors but with superior infrastructure and capabilities.

DKS, WSM – Dick's Sporting Goods (DSG) has an uphill battle to fight, as they are continually put in the position where the company is fighting against its biggest vendors, as companies like Nike and Adidas have ramped up their DTC efforts. These initiatives at DSG's largest suppliers will put DSG at a significant long-term disadvantage. Under Armour sales to Dick's were down (~7%) YOY (based on FY17) and Nike's DTC sales CAGR (from 2011-2017) is ~17%. Further, Williams-Sonoma is still charging (a lot) for shipping, which we think is very difficult to do in today's environment (let alone going forward). While Williams-Sonoma have built out a sizable DTC business of their own, they have been unable to leverage the higher margin structure of their DTC operations and improve on enterprise profitability.

Two strategic developments that could alter the playing field by 2025

Creating partnerships to further improve delivery speed and convenience – As we have highlighted above, we believe one of the key retailer initiatives for the future is speed of delivery and creating a convenient shopping experience for customers. Companies like Walmart have already tested out delivery partnerships with Uber and Lyft, but in our view, we think these types of strategic alliances will likely become the norm by 2025. By leveraging the vast delivery capabilities (particularly in populous major metros) of companies like Uber, Lyft, Deliv and Postmates (to name a few), companies will be able to more quickly and efficiently deliver goods to consumers.

Creating a retail shopping experience (vs. an errand) – In order to win in 2025, we believe that having a traffic-driving retail experience will be critical. Many of our retailers have invested heavily in store re-models and creating innovative ways to shop while in-store. We believe Best Buy has set a good example for creating a traffic-driven business model, by creating a store-within-a-store experience and partnering with other retail giants (some are even competitors, like Amazon). Additionally, Costco has done an excellent job at driving traffic to their stores through their ancillary services such as their gas stations or food courts (~50% of people who buy gas also go into the store). As shopping patterns continue to shift online, retailers will need to look to creating reasons for people to come to shop in their stores, whether it be through interesting store concepts or additional services that customers may need (and can't have delivered).

US Softlines Retail

Most important outcomes that are likely to impact US Softline Retailers

Love Me, Love My Values: With Millennial and Gen-Z consumers craving transparency, sustainability, and diversity, retailers' adopted social values are becoming of even greater importance. Millennials and Gen-Z are impulsive generations when it comes to shopping (typically discard items after 1-5 wears) but at the same time, 87% of Millennials believe that a business's success should be measured beyond just its financial performance. Case in point, 77% of them say they prefer to buy from environmentally conscious brands where transparency is paramount. According to Nielsen 66% of consumers are willing to spend more on a product if it comes from a sustainable brand. Additionally, 81% of Millennials even expect their favorite companies to make public declarations of their corporate citizenship. We expect an ongoing rise in "socially conscious retailing' with brands that employ a philanthropic or transparency-minded model. Examples include Warby Parker (eyeglasses), Everlane (apparel), Allbirds (shoes), Bombas (socks), Roma (boots), Smile Squared (toothbrushes), SoapBox (soaps), Figs (medical scrubs), State (backpacks) and WeWood (watches).

Traditional Forms of Discovery are Changing: As consumers begin to lose trust in large retailers due to various reasons, including lack of pricing integrity and loss of fashion authority, influencers, peer reviews, and social media have been emerging as an even more important source for product research and potential purchases than more traditional forms of marketing and points of sale. For example, Instagram is the primary platform for product reviews. On Instagram, #ootd (outfit of the day) has ~180M posts and LiketoKnow.it app, which is one of the more prominent platforms influencers use to monetize posts, sends 20M+ monthly emails linking back to products and features 1K+ new content daily. An extension of this mindset has resulted in the rise of the resale market and platforms such as ThreadUp. Over the next 5-10 years, ThreadUp estimates that peer-to-peer purchases will account for up to 15%, a significant increase from ~5% today.

New Channels of Retail will Continue to Evolve including Clothing as a Service (CaaS) and Subscriptions: In addition to Amazon's algorithm making suggestions to you for several years now, subscription and personal styling business models have been getting a lot of attention post the SFIX IPO. Although SFIX is not the only one, we believe its subscription-based selling model and personalized styling approach embody how traditional retailers will continue to adopt this hybrid 'data meets personal stylist' approach. With 2.7MM active users today in SFIX's file, there is clearly an appetite from consumers for this more personalized, more convenient, data-driven model. Another example would be Caastle, which facilitates clothing rental services for retailers, including Vince, Ann Taylor, and Express. Through these services, customers are able to rent non-basic items (rather than outright own). As the data pool grows via each interaction, these services are able to get a more precise view of what their customers want and potentially would be willing to try. In this way, the bar for fashion consideration is evolving, as consumers are more willing to try different types of clothes/styles than they normally would, which can ultimately lead to more purchasing as consumers expand their selection offering.

AR/VR both in stores or at home will have a growing impact on retail: The changes over the last five or so years to the retail landscape could pale in comparison to what could be ahead in the next 10 years if AR/VR (both on the customer-facing side as well as company logistics side) see mainstream adoption in the retail industry. According to a 2016 report from Deloitte, 84% of customers use a digital source for shopping-related activities before or during their visit to a brick-and-mortar retailer. Armed with AR/VR tools helping with navigation around the store, product selection, purchase and checkout, and product usage ideas, shoppers will likely be able to find the convenience of online shopping instore. Through the use of AR/VR, retailers will be able to customize storefronts, assortments, and offers directly to each customer. This

technology would enable every consumer to see personalized search results and recommendations using AR tools inside and outside of bricks & mortar.

Best and worst positioned companies for 2025

Forgoing near-term profits for longer-term growth: When we think of retailers that are forward looking and willing to sacrifice near-term profitability for longevity, we would include JWN, TJX and ULTA at the top of the list. These companies have invested in building robust omnichannel infrastructures, entered new countries as longer-term revenue opportunities and have built robust customer databases. Companies focused on offering the best customer experience and understand the move towards personalization include JWN, ULTA, LULU and TIF. Being ahead of the retail curve today gives us confidence that these management teams and their boards are likely to be early adapters of the requirements to be a winner in retail 3.0.

Values that resonate with Millennials: We see rising collective consciousness as an opportunity for retailers to demonstrate their values and resonate with customers that share them. Those companies that have a louder voice regarding what they stand for include American Eagle Outfitters (especially Aerie's body-positive marketing), Lululemon's leadership in athletic lifestyle built around "live your best life" campaigns, and Tiffany, which blends its 100-year+ heritage with its ethical sourcing of diamonds. On the other hand, Victoria's Secret is facing significant pressure to change its brand messaging and become more inclusive. Companies that appear best positioned in a socially influenced retail environment include Nordstrom, Michael Kors and ULTA—all of which seem cutting edge in social media utilization ahead of peers. As Millennials' shopping habits appear to want it all—quality, ethical sourcing and newness—it appears that the peer-to-peer retail ecosystem is only to grow from here. Resale players such as thredUP and Tradesy appear to be best positioned. This could be bad news for the fast-fashion players such as Forever 21, H&M and Primark.

Three strategic developments that could alter the playing field by 2025

Speed from soup to nuts in digital first world: As social media and sharing is speeding up consumer fashion and brand discovery, this is in part encouraging the rapid rise and fall of microfashion trends, putting the onus on the retailers and brands to have the right product available as the consumers' appetite for certain styles and trends is condensing. All in, we expect softline retailers to continue their focus on speed to market, quickening supply chains, and leaving more open-to-buy so product buys can be as exact as possible to cater to customer needs. All in, we'd expect lead time discussions to evolve towards a few months or even weeks in select categories and away from the 6-9-month discussions of a few years ago. As product lead times shorten, so too are customer expectations for product delivery and associated shipping fees. Over time, we believe the consumer mindset is shifting closer to same-day/one-day delivery turnarounds at minimal cost to the consumer.

300 of the bottom 1,200 malls to shutter in mobile first world: From ~20% today, we expect e-commerce penetration for apparel to rise closer to the 40%+ level in the coming years, as the consumer shift to mobile/online only accelerates, discovery methods evolve, and the customer gets even more comfortable with disclosing their payment/account information online. To combat this, we expect the top A-malls in the country will continue to push the experiences available on their properties via newer tenants/concepts, including more restaurants and in-demand brands. As the A-malls fight for share against a growing e-commerce pie, this leaves less and less breathing room for more regional/C/D malls than ever before. As a result, we expect bottom tier of mall closures to be an ongoing theme in our space for the next several years as the anchor tenants from the 1970s such as Sears, J.C. Penney and others shrink their store bases. For our retailers, certainly this will have top-line ramifications but also likely transfer the balance of power even more so to the concepts as

rent renegotiations become an increasing point of leverage as retailers contemplate store closures in declining centers.

Acquisitions of specialized capabilities: While certainly grander scale strategic acquisitions are likely to remain a sporadic occurrence in our universe, we increasingly expect to see companies make smaller, tuck-in acquisitions or strategic investments designed for access to new product categories (see Canada Goose's recent acquisition of Baffin shoes, American Eagle Outfitter's investment in Dormify) or capabilities such as Ulta's acquisition of QM Scientific and PVH's acquisition of True & Co.

Canada Consumer

Most important outcomes that are likely to impact Canadian Consumer Staples and Discretionary

Given the high degree of overlapping themes across geographies, we focus the Canadian discussion on outcomes not previously covered, notably those affecting convenience retailing. It should also be noted that although the outcomes are truly global in nature across the developed world, the cadence of adoption varies by region, with Canadian implementation typically lagging the US and Europe due to population size/relative density.

i) Evolving mobility trends toward vehicular autonomy. As noted on page 46, in our view, autonomous vehicles will likely be one of the most revolutionary applications of AI. Although broad-based deployment and adoption of true vehicular autonomy is undoubtedly a post-2025 event as computing power and advancements in machine learning catch up to the vision, we anticipate unassisted robo-taxis to become a reality by 2025. That being said, urban area penetration is likely to remain very low in 2025 given that level 4/5 (full) autonomy is only expected to have reached 915k vehicles by then, although that number is forecasted to jump to ~34MM 15 years later. In our view, one of the key challenges to overcome before achieving full autonomy in densely populated areas is the human factor, most notably the unpredictability of pedestrians… that is until our minds are connected to Teslas via Neuralink. Having said that, vehicular autonomy is well on its way to becoming reality with wide-reaching implications for the movement of goods and people. As we note on page 50, perhaps the biggest opportunity for retailers and suppliers is autonomous semi-freight truck driving.

ii) Although the tipping point for fuel demand in the developed world is within sight, it is likely a 2025-2030 event. On page 151, we highlight how inequities drive civil unrest, with claims around affordable and accessible energy a recurring theme. Nonetheless, in our view, rising demand for fossil fuel energy in developing countries is likely to supplant gradual diminishing demand in the developed world. In fact, the convergence of green initiatives, including a focus on clean energy and more stringent emission standards, and lower battery and maintenance costs for Electric Vehicles (EVs) is widely anticipated to drive lower gasoline demand over time. Looking ahead, we fully expect c-stores to be part of the charging solution, and as the industry evolves, ATD's size and scale should be a significant competitive advantage. However, we remind investors that gas-focused trips make up only half of c-store visit, with "the store" becoming a more important traffic driver.

Best and worst positioned companies for 2025

Understanding the long game. As innovation growth goes parabolic, the end game is far from scripted. Against this backdrop, proactive investment in innovation capital is key to rising above the pack. Virtually every company in our universe of coverage is focused on the dual imperatives of managing the business for the present and investing capital in new paradigms to be part of the long-term solution.

Leveraging existing competitive advantages. With the last-mile solution chronically underserved in Canada, traditional retail networks and supply chain/distribution

infrastructure can provide significant competitive advantages over pure e-commerce players. In particular: i) delivery/pick-up, with extensive retail networks serving as local hubs for consumer access and convenience; ii) leveraging extensive customer databases and learnings from loyalty programs; and iii) mix of private label/owned brands driving loyalty.

Leveraging scale and cash flow. A strong balance sheet, large asset base and strong cash flow generation are paramount to stay ahead of the curve, surface business opportunities and attract talent in emerging fields like AI, deep learning and Blockchain. In our view, the supply/demand imbalance for talent is likely to accelerate and become a key marker of success for early adopter with means and vision to develop in-house capabilities.

Best positioned/making the right investments today:

Loblaw – a 2025 Portfolio Company: Through the acquisition of Shoppers Drug Mart and QHR, Loblaw has made foundational moves to become Canada's connected healthcare and wellness leader in 2025. Loblaw also has the most successful, deepest loyalty program in Canada with 15MM+ active members, already using AI and machine learning to customize weekly promotions delivered directly to consumers via smartphone, and over 13 MM Canadian consumers—over 1/3 of the Canadian population—visiting one of its stores weekly.

- **Connected healthcare and wellness leader.** The objective is to leverage a connected healthcare system with centralized patient information accessible by both healthcare providers and patient. Shoppers Drug Mart is actively involved in the development of connected healthcare in Canada and by year-end will be the only retail pharmacy network with deep cross-Canada coverage across banners/formats with potential for connected healthcare, including Rx (health), nutrition (wellness), and health management/medical records (QHR). Over time, we envision a scenario whereby patients willing to self-disclose could benefit from a range of nutritionally appropriate menus to suit individual palettes, preferences, and medical requirements, with digitally pre-populated baskets ready for order/pick-up/delivery.
- **Ability to attract and retain talent in emerging fields like AI and Big Data.** Over the past few years, L has created an in-house digital team that now boasts approximately 1,000 employees and has been recognized as one of the top-ten technology employers in Canada. That team is already behind the creation of automation, bots and AI tools, such as distribution center robotics with ~85% efficiency relative to a regular employee but at 10% of the cost, as well as fully AI/machine-learning generation of weekly customized promotions for loyalty program members.
- **Grocery-specific challenges around freshness, selection/substitution and timeliness remain impediments to meaningful acceleration in the penetration of grocery e-commerce in the near term,** a view supported by our 1st annual RBCCM Canadian E-commerce Survey available here. What's more, Canada's population density relative to its land mass is another challenge to overcome, which traditional delivery models are ill equipped to handle. Although last-mile solutions are already well entrenched in the UK (delivery) and France (click-and-collect), Canadian grocers are testing a variety of models with Loblaw the most progressive, in our view, with click-and-collect both in-store and in partnership with Metrolinx, and with a capital-light partnership with Instacart for home delivery.

  Ultimately, drone delivery could become part of the last-mile solution, although the emerging technology does little to address grocery-specific issues like product selection and is likely to be a solution for convenience items rather than full grocery shop. But in this scenario, companies with strong retail networks from which to launch drones will be clear leaders—until and unless blimp warehousing becomes a reality.

  By contrast, Empire is fully invested in the delivery model through its partnership with Ocado. In our view, however, one of the biggest impediment to widespread adoption is

timeliness when 80% of consumers don't know what's for dinner before 4PM. Case in point, the reduction of collect times at Loblaw from four to two hours drove a 30% increase in sales. Loblaw is now working to virtually eliminate that friction point by reducing the collect time to one hour, a milestone that delivery models will be challenged to meet.

ATD—a Global Top 30 company: The convenience store industry is undergoing a major transition with evolving mobility trends and the electrification of transports. Against this backdrop and enabled by its global footprint, Alimentation Couche-Tard remains ahead of the pack on shifting paradigms and business models, investing in automation, AI and Big data to personalize the offering and reduce friction. ATD is the only North American-based c-store operator with a footprint in Norway—a global leader in electrification—and currently operates over 100 charging stations in the country. The company is also partnering with IONITY (BMW, Daimler, Ford, VW, Audi & Porsche) to install and operate a high-powered DC charging network across Europe. Given limited grid capacity, first-mover advantage in superchargers cannot be overstated.

CTC: Canadian Tire established an in-house Digital Innovation Labs to develop "new in-store and online technologies at a faster pace" to support the company's omnichannel mission. This initiative is intended to make CTC more responsive to changing technologies and evolving consumer habits by developing new apps in-house at a fraction of the cost and time required to outsource the work. What's more, CTC's Triangle Rewards loyalty program, tied to a compelling card offering, provides CTC with granular insight into shopping behavior outside of the company's banners, which can prove extremely useful in terms of product and category resets. CTC is already working on next-generation apps and tools, and in our opinion, the company is much further along this curve than investors have come to realize.

TOY, JWEL: These companies have built strong innovation platforms to remain agile in a dynamic environment. The companies are also open to bringing in fresh, new ideas from outside parties to take advantage of emerging market trends. For example, Spin Master receives ~3,000 new ideas every year from inventors from around the world. The company then selects 30-50 ideas for commercialization. One example of a successful partnership between the company and third-party inventors is the successful *Zoomer* platform, which quickly grew to become ~20% of the company's sales by 2014. JWEL has demonstrated commitment to innovation by positioning itself as the most innovative brand in the Vitamin, Mineral & Supplement segment in Canada. The company continually introduces new products and enters new categories to stay ahead of changing consumer preferences. In cases where the company may not be able to enter a category in a cost effective or timely manner on its own, they have been willing to identify and purchase companies that offer a strong platform/brand.

MAV: With rapidly changing demographics, MAV Beauty Brands is positioning itself to capture increasing amounts of the large (and growing) millennial wallet share. The company has not only leveraged its legacy *Marc Anthony* brand to drive growth, but also has acquired two on-trend brands (*Renpure* and *Cake*) to support its growth. *Renpure* is a naturals brand with a growing presence in the mass channel, while *Cake* offers vegan- and cruelty-free products. Although each of the brands are "small" when compared to the personal care brands offered by large global CPG companies, MAV's smaller scale allows the company to be more nimble when responding to evolving consumer tastes/preferences.

Strategic decisions that could alter the playing field by 2025

The deterioration in the fabric of trust is benefiting emerging retailers/brands at the expense of larger, well-established incumbents. While small in revenues, the "ankle biters" are great in numbers, chipping away at the market share of fast-moving consumer goods

companies. In our universe of coverage, large corporate entities are recognizing and addressing this phenomenon by maintaining the brand and culture of smaller players they acquire. We can think of EMP with Farm Boy, MFI with Lightlife and Field Roast, and SAP with Alexis de Portneuf and Montchèvre. Looking ahead, we expect companies in our universe of coverage to remain active consolidators, particularly ATD and SAP that have a strong deal-making culture and track record when it comes to deploying capital.

"Doing the right thing" ahead of maximizing short-term profits. Transparency, sustainability and responsibility are increasingly important with the rise in Collective Action. With the emergence of Blockchain technology, tracking origin and composition across the value chain will become much easier. Maple Leaf Foods' key mission to be the most sustainable protein company on earth is the embodiment of doing the right thing, a strategic decision that is highly appealing to the growing segment of consumers—including Millennials—who are choosing sustainability and social conscience over price.

Making bold capital-allocation decisions to stay relevant in the eyes consumers—the ones setting the agenda. Because the field is evolving so rapidly, the omnichannel proposition has to operate within a framework that is adaptable to be successful and economically viable. For example, while CTC still distributes its costly and inefficient paper flyer to all CTR shoppers, it is already making extensive use of digital flyers at sister banner FGL, which is shopped by a younger demographic. As online retail moves from strictly e-commerce to the digitization-of-all-things-commerce, retailers at the leading edge of digitization and software development such as CTC and Loblaw will have a clear competitive advantage.

European General Retail

Most important outcomes that are likely to impact European general retail

More personalised products and services through big data and artificial intelligence: We are already seeing increased levels of personalization for European retail companies. Going forward, we believe online shopping websites, marketing emails, promotions and even products will all be delivered in a more personalised way. As technological capabilities continue to advance, retailers are increasingly adopting Artificial Intelligence (AI) and big data to improve services. One of the most important applications of AI in retail is data analytics, which has led to better and more personalised product recommendations. In addition, 3D imaging is increasingly used by manufacturers.

Voice assistants driving the next phase of online sales: We think voice will be the next big driver of online sales, following the pattern of online retail demand moving in three-year cycles. AI has helped to create new communication channels. With voice-enabled assistants like Apple's Siri and Amazon's Alexa, consumers are able to buy simple everyday items through voice activation. AI will find out and record the required information, send reminders that will trigger purchases. Increasingly we are seeing more sales relating to smart-home technology helped by voice activation. In our view, smart-home penetration will continue to rise. In time, we believe voice-driven technology could spark a major new upgrade to how our homes will be run, and it will ultimately change our shopping patterns and behavior.

Automation and cost savings. We expect automation to be widely adopted by all retailers going forward, from employing robots to picking up stock in the warehouses, to using robots to communicate with consumers. Many customer services online chat facilities are now powered by AI. Companies such as H&M and Next have been using chatbot technology to have conversations with a customer via texts or audio. In addition, Next has highly automated warehousing, as such, its warehouse unit cost is much lower than for some of its peers. In time, we think more retailers will look to use automated services to save costs and improve operational efficiencies.

More focused on sustainability and being a conscious consumer: Increasingly consumers, especially Millennials, are becoming more environmentally and socially conscious. They are more inclined to see the apparel industry as a polluter and are more concerned about potential harmful substances in their clothing. Looking at our consumer surveys, while the most important factors in shopping purchases remain quality and price, awareness for sustainability is starting to increase. We believe increasingly retailers will share more information about how and where the products are manufactured, and in the process, improve their supply chain to accommodate for more sustainable methods of manufacturing and using more recycled fabric.

Best and worst positioned companies for 2025

Within our European general retail coverage, we think Inditex and Next have invested the most in fast and highly automated systems, and should benefit from their strong digital capability and their ability to offer a fully integrated omnichannel experience for the customer.

Inditex is using RFID technology to improve inventory control and free up staff time to maximise sales. Next is investing in better mobile functionality, improved registration and checkout and intelligent recommendations.

Inditex: We view Inditex as a long-term global multi-channel winner in apparel. We see potential for it to generate durable low double-digit EPS growth (ex currency effects) over time and to maintain a healthy ROCE of c.20%, driven by further LFL share gains and relatively stable margins over time. We also see potential for a strongly improving FCF trend given likely lower capital intensity going forward.

Next: We continue to favor Next for its strong online and cash returns story: [1] we believe continuing online mix shift should drive valuation upside; [2] we think Next has reached an inflection point where online growth is now able to offset retail decline, as such we see an improved sales and profit outlook; and [3] Next is increasingly leveraging its best-in-class supply-chain capabilities to introduce new online and retail initiatives.

In terms of the worst-positioned companies, we think department stores that are over-spaced and encumbered with long leases are the worst-positioned retailers for 2025. Too much space leads to additional buying of perhaps inferior products to try and fill up the floor space, and consequently leads to heavy markdowns.

Debenhams: We have a Sector Perform rating on Debenhams. While Debenhams continues to work on improving its customer propositions, its progress has been held back by legacy department store issues. Given the increasingly competitive landscape and structural pressures on department stores, we see further pressures on its earnings and risks to its future dividend payout.

Sports Direct: We rate Sports Direct Underperform. Sports Direct has a strong position in UK mass-market sportswear but has found it challenging to grow outside its core activities. In addition, we think its recent acquisition of the House of Fraser department store chain leaves it exposed to further pressures on profitability and to structural pressures affecting department stores. In particular, we think department stores have lost their range advantage to online players and are no longer so appealing to relatively affluent, time-constrained shoppers.

Strategic decisions that could alter the playing field by 2025

Invest in supply-chain flexibility. Given the increasingly competitive retail landscape, unpredictable weather patterns and fickle consumer buying behavior, retailers should invest more to improve their speed to market. More flexible supply chains would improve the relevance of product assortment and product availability, ensuring more products are sold at full price in season.

Data analysis and know your customers and trends. Investing in customer data analytics will provide retailers with a competitive advantage when it comes to knowing their customers and predicting the latest trends. Given the ever-changing and faster churn of fashion cycles, the ability to identify trends and accurately deliver on them will ensure brand relevance and consumer engagement, in our view. In an era where there is no scarcity of choice, we believe any retailer that truly listens and acts on the needs of its customers will win the race.

Full integration of online with stores will provide a competitive advantage. Full integration of online with stores, in conjunction with the rollout of RFID, should boost full price sales for retailers as it will enable in-store fulfillment of some online orders. This will lead to less broken ranges and stranded inventory, and should enable items to be sent out online from store rather than being kept back in a stockroom to be sold at a reduced price. It should also optimize in-store staff efficiency by allowing them to assist with online orders. We think Inditex is leading the way in this regard and will be one of the few companies that can roll this out globally.

European Consumer Staples

Most important outcomes that are likely to impact European Consumer Staples

Catering to the individuals: FMCG companies' traditional strategy of "catering to the masses" is no longer viable as consumers increasingly demand personalised products and experiences. In addition, use of the cloud, digital marketing and distribution services such as Amazon and Alibaba have leveled the playing field, and it is now easier than ever for a new brand to come to market. This has led to accelerated losses in market share for the staples incumbents that no longer benefit from their economies of scale in production and marketing and that have not been quick enough to adapt their business models to the increasing demand for personalization. We reiterate that between 2011 and 2015 the top 25 food and beverage brands, (despite generating 45% of their respective category's US sales), only contributed 3% of the category's growth, according to Nielson. We expect an increase in bolt-on acquisitions and new brand launches to continue as our coverage try to catch up with the trends led by smaller, fast-growing start-ups. For example, Unilever has launched 28 new brands in the last 18 months compared to 3 in the previous 10 years. Marketing and product launches will become increasingly targeted and harnessing consumer data will be of upmost importance in enabling this.

The only economy of scale left is data: It is obvious to us, the companies that have the best data (and the ability to harness it) will be able to deliver more personalised and better-value propositions to the consumer over the coming years. As global conglomerates with access to millions of consumers, this should give our coverage an advantage over smaller competition. Companies must harness this data, finding innovative ways to collect it, analyses and interpret it. For example, Diageo has developed a "smart bottle" with Thin Film Electronics. It uses printed sensor tags attached to the bottle which, when tapped with a smartphone, allow Diageo to collect data on who purchased it, where and when. This enables Diageo to interact directly with consumers, showing them available promotions and cocktail recipes when they tap the bottle and thus disintermediating social networks and online marketplaces. Further possibilities with this technology include offering the consumer a simple and easy way to write reviews, improving the brand's ability to innovate and improve products. AB InBev's Connected POC Platform is using AI to collect data at each product's point of contact (POC). As evidence of the power of harnessing consumer data, AB InBev learnt from data collected through this platform that beer sales declined after 10pm, consumption shifting towards spirits and especially whisky. It used this insight to launch a specific promotion of whiskey and beer for late nights, resulting in a revenue increase of over 5%.

AI as a cost-saving tool: Beyond improving the efficiency of marketing, we expect Artificial Intelligence to continue to transform the efficiency of back-office and supply-chain processes. For example, AB InBev is using AI to track trucks, for image recognition for loading and unloading processes and in drones to measure crop productivity. It is used to predict the cost and availability of barley globally and data is shared between farmers so they can improve growing environments and maximise sustainability. As discussed on page 51 within Product(AI)vity, AI can also serve as a retail labor substitute. AB InBev aims to move 70% of its consumer and customer interactions to digital by 2021 through AI as well as chat-bots and RPA, in order to free up its sales team for value-adding activities. It estimates this will reduce its cost of sell by 20%. Looking out to 2025, we expect the vast majority of transactional processes and consumer interactions to be done by AI and machine learning, enhancing efficiency and productivity for firms.

Transformation of the way we buy: Augmented reality and artificial intelligence are being used to create a more personalised shopping experience through virtual product tests, skincare diagnostic, shade finders, service booking at salons and smart sampling. For example, L'Oréal has launched a "Try it On" feature on its website, enabled by its acquisition of AI and AR company ModiFace, and a collaboration with Facebook's camera products. The feature allows you to observe what you look like with the hair or cosmetics product on. We reiterate that the advancements of VR will substantially limit the need for consumers to leave the house, accelerating the shift from traditional to digital marketing.

Health and wellness: A trend unlikely to go away as incomes increase in emerging markets and social media continues to make society more appearance-conscious than ever before. Our coverage continues to increase exposure to this space, for example Unilever's recent acquisition of Horlicks and Danone's acquisition of WhiteWave. Nestlé is significantly exposed to this category, currently employing more than a hundred scientists in areas including cell biology, gastrointestinal medicine and genomics at the Nestle Institute of Health Sciences. It has also recognized the increased demand for personal nutrition advice; its Institute of Health Sciences has developed tools to analyze and measure people's nutrient levels. The Nestlé Wellness Ambassador program in Japan offers personalised nutrition advice to users who send genetic information and pictures of their meals through an app. Using AI and genetic testing, the app then recommends lifestyle changes and supplements to the user, including Nestlé products such as capsules making nutrient-rich teas, smoothies and vitamin-fortified snacks. The app currently has over 100,000 Japanese users, but Nestlé aims to scale up the app by developing an algorithm between users' genetic information and the app's recommended solution. Looking out to 2025, we expect sectors such as nutrition and skincare to benefit the most, while categories such as tobacco and alcohol will fall out of favor.

Best and worst positioned companies for 2025

We think the majority of our coverage has been slow to react to the emerging technologies and trends discussed in Imagine 2025. However, exceptions include:

L'Oréal: Unlike peers, L'Oréal has been leading the digitalization of the personal care sector, using technology to create relevant products and personalised customer experiences. L'Oréal's Founders Factory in London and Station F in Paris, the largest start-up incubator in the world, offer partnerships to over 10 beauty startups each year. It also has a Digital Upskilling Programme, focused on improving the digital capabilities of its workforce. This includes an online test, which assesses the digital proficiency of each employee and provides them with a personalised upskilling track. It has also been at the forefront of using social media and influencers to garner positive attention around its products. So far, it has received over 170 million reviews of its brands on different e-commerce platforms and in 2017, 4 of its brands were in the top ten of earned media value from mentions on social networks. 40% of its media spend is now in digital and it has 250 million social media followers and reaches

an audience of 1 billion on its websites. We currently rate L'Oréal Sector Perform due to its valuation, however we believe it is better placed for 2025 than the majority of our coverage.

Fever-Tree: An example of a winning "ankle biter". It successfully capitalized on the spirits premiumization trend and has disrupted the mixers category in the UK. The category was previously dominated by Schweppes, which had been underinvesting in its products for years and using its dominant position to limit retailers' margins on the product. Coca-Cola Europe's efforts to compete (it launched a premium version in 2017) were too little too late and Fever-Tree has now reached 30% value share in the UK's off-trade tonic water market. It is bent on doing the same thing in the US, the rest of Europe and around the world, and we expect success considering its strong brand execution and focus on quality. We rate Fever-Tree Outperform.

AB InBev has demonstrated successful use of digitalization more so than the other brewers under our coverage. In its Capital Markets Day in South Africa, technology was highlighted as a core driver for future growth. It targets its growth and innovation team, ZX Ventures, to become the #1 driver of growth by 2020 (currently represents 10% of growth). As already discussed, it is digitizing back-office functions, its supply chain and communications at the POC level. It recognizes the importance of e-commerce for beer and has constructed partnerships with over 70 online retailers. It also has three active pilot projects using Blockchain. We rate AB InBev Sector Perform due to lackluster global beer volumes, however it is certainly well positioned technology-wise for 2025.

Unilever: We think Unilever is the worst-positioned of our coverage. Post its approach from Kraft-Heinz, it has constrained itself with joint 2020 margin and growth targets, in our opinion. A short-term focus on cost cutting needed to meet the margin target is likely to prevent much-needed investment in the technologies outlined in our report, which are needed to reinvigorate currently lackluster growth and win in 2025. It is currently undergoing a digital transformation, however we do not think its technological advancements stand out from what the rest of our coverage is doing. We rate Unilever Underperform.

BAT and Imperial Brands: The tobacco stocks are badly positioned for 2025 for several reasons. Firstly, growing health and wellness trends and rising incomes and education levels in emerging markets are likely to accelerate the decline in cigarette consumption. In addition, we foresee a headwind to its relatively high margins to the rest of the consumer staples sector. With less regulation and tax than the cigarette industry, we expect the NGP industry to suffer from intense competition, which should limit margin potential. The need to invest in new growth opportunities will also restrain near-term EPS growth. We rate BAT Sector Perform and Imperial Brands Underperform.

Strategic decisions that could alter the playing field by 2025

The need for speed: De-centralization of decision making, brand innovation and marketing is imperative for FMCG companies to be able to compete successfully in 2025. As consumers demand more personalised products and experiences, product innovations will need to be rolled out quicker and centralized decision making will act as a barrier, restricting the speed of the route to market of new innovations. A digital transformation of the back office is also key for rolling out new products quickly and will enable companies to be agile in responding to consumers' changing needs and tastes.

Investing for the long-term: We reiterate that it is now more important than ever to be managing companies for the long term, investing in technologies that are going to be able to compete not just today, but in the future. Companies need to start leading consumer trends and technological advancements instead of fighting to catch up with smaller, more agile players. A key part of this is the need to upskill companies' current workforces alongside making key hires and acquisitions to improve their technological capability. We reiterate that

large FMCG companies will suffer from a talent disadvantage—the best people never work for you, they work for themselves. Therefore, a start-up culture is key for retaining talent; our coverage must allow brand founders and developers independence.

European Luxury Goods, Sporting Goods and Premium Brands

Most important outcomes likely to impact European Luxury, Premium and Sporting Brands

Not being left behind in the digital race: being an iconic brand is not enough. Luxury brands are adapting to offer an omnichannel experience (seamless experience online and offline), which requires reorganizing IT and physical processes. Being slow to adapt may become a key risk to laggards (and being an iconic brand is not enough anymore for success). By only adapting incrementally/gradually, some brands may be left behind in the digital race. Digital-savvy younger consumers also expect an enhanced in-store experience (e.g. more personalization), requiring more-frequent investment in stores, with rising customer service levels (luxury consumers are not only shopping a product but also experiences).

Defending market share in a digitally social world: The top 5 luxury brands today are exactly the same names as in the last 10, 20 and 30 years (and the bigger leading brands have actually gained market share in recent years), with scale advantages becoming more apparent as marketing dollars shift online. That said, the ability for ideas, products and content to go 'viral' reflects the rapid velocity of information in the new digital age, lowering entry barriers and creating a different type of competitive threat. In Sporting Goods, the success stories of Lululemon and Under Armour are supported by the role of digital, which has allowed these brands to take market share.

Remaining relevant to Millennials and Gen Z: For luxury brands, remaining inclusive and exclusive at the same time is the tightrope that must be walked. In this process, creating experiences with a greater level of product personalization and higher customer service levels will be key success factors. Part of Gucci's recent success has been related to its ability to connect with and engage with a Millennial audience. Gone are the days of re-leveraging a brand campaign that was three months in the making for a further three months. The flows of digital information require more frequency, more intensity and more newness. Competition for consumers' attention is fierce, and human attention spans are clinically proven to be reducing given the deluge of information available.

Technology enabled customization, supply-chain speed to market and the desire for services and experiences: Novelty, individuality and scarcity are the attributes that younger consumers who are digitally native seek. Often it is younger, start-up companies/brands with unique selling points that resonate with consumers. New technologies such as 3D imaging for custom-made clothing and footwear offer greater choice and progress for consumer categories. The winners will be those that successfully identify ways in which to commercially deploy these new ways of working. Legacy Asian sourcing supply chains with long lead times (for mass-market products) continue to work for now, however over time, we may see fragmentation towards closer proximity manufacturing as companies and consumers yearn for speed to market. For example, luxury brands deploy more frequent product novelties in-stores to offer newness to customers vs legacy 18-month product cycles (fashion calendar driven). This is made possible by internalizing production (e.g. Gucci, Prada), which allows for greater flexibility.

Augmentation and micro-targeting of target consumer groups: Segmentation and targeting tools have advanced exponentially with the rise of the digital age, which brand owners can successfully leverage to deepen their relationships with specific groups of consumers, often at a micro level. To do so, requires upfront investment, development of increasingly advanced machine-learning algorithms and deep and clean datasets. Augmentation of target

consumer groups is already happening through the creation of global and local networks of individuals with like-minded interests, enabled by internet and ubiquitous smartphones. Examples include smartphone app communities in sports (running clubs, yoga, HIIT, spin classes, etc) and remote networks such as GitHub (a network for software developers and repository for source code storage, recently acquired by Microsoft for $7.5bn).

Best and worst positioned companies for 2025

In our European luxury goods and premium brands coverage, we think LVMH, Kering, Richemont and adidas benefit from a greater talent pool and financial resources be sector leaders in digital capabilities and offer a fully integrated omnichannel experience to luxury consumers faster than smaller competitors offer.

adidas: We believe the company is a market leader in utilizing technology to improve the consumer shopping experience (e.g. trialing facial recognition technology in stores in China for CRM and payment purposes). adidas has also developed its Speedfactory concept, which is proximity robotics manufacturing that can be tailored for individual specifications. The factory caters directly to European consumers with digital designs and robots that customize designs: its proximity to the end consumer also enables faster speed to market in the future. Futurecraft is another technological innovation being developed by adidas, which harnesses the power of 3D and 4D printing to allow for more-complex design and construction techniques. Further, adidas' Parley concept reclaims and recycles waste ocean plastics to manufacture sneakers, and in 2018 adidas has ramped up to 5m pairs, with further growth expected in the future. Parley is environmentally and socially conscience, and demonstrates the importance adidas places on its ESG responsibilities. From a production perspective it also demonstrates adidas' ambitions in leading the industry and its ability to develop technologies that can generate positive externalities in dealing with scale issues that affect our planet.

LVMH: In addition to a portfolio of more than 60 brands including industry-leader Louis Vuitton, LVMH should benefit from its Digital Strategy Corporate Group headed by Ian Rogers (who joined LVMH from Apple a few years ago). Incidentally, we just came back from an analyst event in China where we had the chance to learn how its local corporate digital group supports all LVMH maisons to strengthen its omnichannel capabilities in China, leverage digital to improve consumer experience (e.g. WeChat), reinforce brand desirability online (e.g. social media in a country where 79% of consumers are mobile users) and drive e-commerce (supporting the maisons working with Alibaba and Tencent). In China, 8 LVMH brands have their own website, 11 brands are in T-Mall, 7 in JD and 9 in Sephora.cn as well as more than 100 digital platforms for communication. In 2015, LVMH launched 24-Sevres, its own multi-brand e-commerce platform offering an exclusive brand selection (including Louis Vuitton, Dior and Celine) with the capability of one-click connect with the stylist in Paris. LVMH has been investing in emerging digital platforms (e.g. Lyst) and extensively working with technology partners. One of the ingredients behind Sephora's tremendous success in the last decade or so has related to how well it leverages digital technologies to enhance shopping experience in-store or online. Some examples of how Sephora is at the forefront of digital innovation include: AR experiences in-store through the Sephora app, Sephora Virtual Artist (e.g. enabling customers to try different shades of lipstick using facial recognition features), workshops of large digital screens in-store where customers can take beauty lessons, go through online tutorials and browse Sephora's Beauty Board.

Kering: The company's integrated model results in cross-brand expertise, innovation and digital capabilities, supply-chain synergies and a talent pool with sharing of best practices across its maisons. Kering has recently announced new milestones on its digital journey, including: (a) in-store customer experience: Kering is working on a suite of apps in partnership with Apple, the first of which is a store experience app that enables sales

associates in stores to access stock levels in real time; (b) client service: new approach to customer service with centralized teams in Europe/US focused on addressing customers' requests; (c) CRM: launched pilot projects using data science techniques to deliver personalized messages and focus on WeChat mini-programs; (d) e-commerce(6% of total retail sales in 1H18): Kering will fully internalize the e-commerce activities handled by YNAP, with the transition to happen in 1H20; and (e) digital capabilities: data science team created at group level to improve services (including a China-based Client & Digital).

Richemont: The company is trying to position itself ahead of the industry by embracing digital not only with significant organic investment but two acquisitions, YNAP (one of the largest luxury e-commerce player) and Watchfinder (entering the fast-growing pre-owned watch market). The Yoox Net-a-Porter purchase particularly demonstrates Richemont's commitment to developing a robust omnichannel proposition, and the company recently announced a strategic partnership with Alibaba to capitalize on the growth potential for the Chinese luxury e-commerce market, which is still in its infancy.

European Internet (eCommerce)

Most important outcomes that are likely to impact European Internet

AI increasing personalization in the consumer proposition. We believe machine-learning techniques will be widely deployed by 2025 across the Internet sector to improve the personalization of companies' offerings. Content, product promotions, advertising, recommendations are all likely to be more personalized than they are today. All major Internet companies should benefit from this trend, as should their core customers. As internet companies continue to improve search and product recommendation algorithms to offer a more personalized experience, we believe this could result in greater cross-sell opportunities and higher conversion, driving growth of its higher-spending loyal customer base.

Greater efficiency and cost savings to be delivered by automation/AI. Internet businesses can become more efficient by using AI to optimize for cheaper and faster delivery/shipping methods and less fulfilment center square footage by making improvements in optimizing shelf space, including the use of robots. Advanced robotics could become a central part of logistics operations for vertically integrated e-commerce companies. The impact of this should be greater operational efficiency.

Increased regulatory scrutiny over the "gig" economy could increase cost pressures. The online three-sided takeaway marketplaces that handle own delivery are growing rapidly as the "gig economy" expands. These include Foodora (owned by Delivery Hero), Deliveroo and global players UberEATS and Amazon Restaurants. Such digital platforms that connect independent workers with those needing their services will likely be winners. However, as "gig-economy" companies grow, we expect pressure from unions and local officials around compensation and employee rights to increase. Increased regulatory scrutiny over terms of employment for riders in certain regions could negatively impact the profit potential of takeawaydelivery services longer term as labor costs increase.

Increased government regulation over "big data". Regulation in the sector is becoming focused on privacy protection as advancements in technology have enabled companies to increase their possession and usage of valuable consumer data. Currently, there is a large demand for "big data", as companies are increasingly able to leverage data to more efficiently target customers. Companies such as Zalando and ASOS continue to aggregate data provided by their users and are able to both commoditize this data and utilize this data to strengthen their business.

Best and worst positioned companies for 2025

We believe ASOS and Zalando are best positioned to continue taking market share because of their agility and technology expertise enabling a higher pace of innovation.

ASOS (Top Pick, PT 7,700p): ASOS's ongoing innovation, strong execution and product extension give us confidence that the group can sustain continued high levels of growth. ASOS has increasingly defendable competitive moats, in our view. ASOS's competitive advantages are its strong brand loyalty, supported by its own brand offer and editorial content, as well as its in-house developed technology supporting a higher pace of innovation. ASOS's own brand has assisted its fashion credibility while enabling greater flexibility of supply and frequency of new product uploaded on its website.

Zalando (Outperform, PT €35): Zalando is well positioned as the leading online fashion destination in Europe, together with its expertise in technology, to continue taking market share as well as monetize its platform through delivering value-added services to its brand partners. We view this as one of Zalando's longer-term revenue drivers, along with improved personalization and entry into new markets and product categories over time. Also, its in-house developed technology enables a greater pace of innovation and a superior website experience versus peers. Zalando's competitive advantages include its powerful network effects created by its large customer base and number of partners, and its strong distribution network through which it has achieved a highly competitive delivery proposition.

By contrast, we believe the worst-positioned companies are those that hold on to higher margins relative to peers rather than catching up more aggressively for the sake of higher market share and growth in the future. In our coverage, we believe Boohoo is less well positioned.

Boohoo (Underperform, PT 180p): We lack confidence in Boohoo's ability to sustain top-line growth without making further investments in the proposition, technology and towards building more defendable competitive moats. Boohoo lags its peers on key aspects of its proposition, e.g. the delivery service as it chooses to maintain its high margins.

Strategic decisions that could alter the playing field by 2025

Developing technology in-house versus outsourcing creates a competitive advantage in terms of pace of innovation, differentiation, cost savings and agility. Given the rapid pace of technology development and innovation in the internet sector, it is increasingly important for companies to remain agile and nimble. Internet companies that are at the forefront of technology are best positioned to adapt to changing consumer preferences and therefore take market share. In-house technology development allows internet companies to adopt new technologies early on, react more dynamically and better differentiate the customer experience among peers. We believe internet companies need to invest in technology in order to maintain a rapid pace of innovation thereby continuously enhancing the proposition in order to satisfy the ever-changing needs of the consumer.

Consolidation to increase scale and establish stronger network effects. While in the near term we do not anticipate significant M&A activity, there is greater potential longer term within each sub-sector, given the large number of players entering the sector and high levels of competition. As Amazon continues to dominate the internet retail industry and focus its efforts on penetrating the fashion category, we think this has the potential to incentivize smaller competitors to consolidate. Within the internet takeaway sector, we expect to see continued M&A activity among the major players in order to consolidate their leading market positions.

Prioritizing future market share/top-line growth ahead of short-term profits. We believe companies that are willing to sacrifice near-term margin expansion to invest for future growth will be better positioned long term and have deeper competitive moats. Whether through investing in the user experience, product or delivery service (faster and cheaper delivery), these companies, for example, ASOS and Zalando, continue to see the bigger picture in an ever-changing retail environment.

Consumer Coverage Universe

Company Name	Exchange	Pricing Symbol		Price (12/07/2018)	Rating	Risk	Price Target	Consumer Sub-Sector
Nik Modi (Analyst) (212) 905-5993; nik.modi@rbccm.com								
Altria Group, Inc.	NYSE	MO US	USD	54.18	Outperform	Not Assigned	68.00	Tobacco
Avon Products, Inc.	NYSE	AVP US	USD	1.99	Sector Perform	Not Assigned	2.00	Personal Products
Brown-Forman Corporation	NYSE	BF/B US	USD	45.93	Sector Perform	Not Assigned	57.00	Distillers & Vintners
Church & Dwight Co., Inc.	NYSE	CHD US	USD	66.81	Sector Perform	Not Assigned	60.00	Household Products
Colgate-Palmolive Company	NYSE	CL US	USD	62.71	Sector Perform	Not Assigned	69.00	Household Products
Constellation Brands, Inc.	NYSE	STZ US	USD	188.61	Outperform	Not Assigned	300.00	Distillers & Vintners
Cott Corporation	NYSE	COT US	USD	14.70	Outperform	Not Assigned	20.00	Soft Drinks
Coty Inc.	NYSE	COTY US	USD	7.50	Outperform	Not Assigned	18.00	Personal Products
Edgewell Personal Care Company	NYSE	EPC US	USD	41.73	Outperform	Not Assigned	64.00	Personal Products
Energizer Holdings, Inc.	NYSE	ENR US	USD	46.00	Outperform	Not Assigned	70.00	Household Products
Keurig Dr Pepper Inc.	NYSE	KDP US	USD	26.30	Outperform	Not Assigned	31.00	Soft Drinks
Kimberly-Clark Corporation	NYSE	KMB US	USD	113.50	Sector Perform	Not Assigned	107.00	Household Products
Monster Beverage Corporation	NASDAQ	MNST US	USD	57.41	Outperform	Not Assigned	75.00	Soft Drinks
Newell Brands Inc.	NYSE	NWL US	USD	22.68	Sector Perform	Not Assigned	24.00	Housewares & Specialties
PepsiCo, Inc.	NASDAQ	PEP US	USD	115.82	Sector Perform	Not Assigned	115.00	Soft Drinks
Spectrum Brands Holdings, Inc.	NYSE	SPB US	USD	47.36	Outperform	Not Assigned	75.00	Household Products
The Boston Beer Company, Inc.	NYSE	SAM US	USD	265.90	Sector Perform	Not Assigned	210.00	Brewers
The Clorox Company	NYSE	CLX US	USD	162.47	Sector Perform	Not Assigned	134.00	Household Products
The Coca-Cola Company	NYSE	KO US	USD	49.09	Outperform	Not Assigned	56.00	Soft Drinks
The Estée Lauder Companies Inc.	NYSE	EL US	USD	137.12	Outperform	Not Assigned	158.00	Personal Products
The Procter & Gamble Company	NYSE	PG US	USD	92.45	Sector Perform	Not Assigned	80.00	Household Products
David Palmer (Analyst) (212) 905-5998; david.palmer@rbccm.com								
B&G Foods, Inc.	NYSE	BGS US	USD	29.79	Outperform	Not Assigned	35.00	Packaged Foods & Meats
Bojangles', Inc.	NASDAQ	BOJA US	USD	16.10	Sector Perform	Not Assigned	16.00	Restaurants
Brinker International, Inc.	NYSE	EAT US	USD	49.51	Outperform	Not Assigned	53.00	Restaurants
Campbell Soup Company	NYSE	CPB US	USD	37.77	Sector Perform	Not Assigned	43.00	Packaged Foods & Meats
Chipotle Mexican Grill, Inc.	NYSE	CMG US	USD	467.43	Outperform	Not Assigned	510.00	Restaurants
Conagra Brands, Inc.	NYSE	CAG US	USD	30.84	Outperform	Not Assigned	46.00	Packaged Foods & Meats
Darden Restaurants, Inc.	NYSE	DRI US	USD	104.83	Outperform	Not Assigned	130.00	Restaurants
Dunkin' Brands Group, Inc.	NASDAQ	DNKN US	USD	71.63	Sector Perform	Not Assigned	75.00	Restaurants
General Mills, Inc.	NYSE	GIS US	USD	38.48	Sector Perform	Not Assigned	52.00	Packaged Foods & Meats
Hostess Brands, Inc.	NASDAQ	TWNK US	USD	11.71	Sector Perform	Not Assigned	12.00	Packaged Foods & Meats
Kellogg Company	NYSE	K US	USD	60.84	Sector Perform	Not Assigned	72.00	Packaged Foods & Meats
McDonald's Corporation	NYSE	MCD US	USD	182.96	Outperform	Not Assigned	190.00	Restaurants

Company Name	Exchange	Pricing Symbol	Price (12/07/2018)		Rating	Risk	Price Target	Consumer Sub-Sector
Mondelez International, Inc.	NASDAQ	MDLZ US	USD	43.80	Outperform	Not Assigned	52.00	Packaged Foods & Meats
Noodles & Company	NASDAQ	NDLS US	USD	7.44	Outperform	Not Assigned	12.00	Restaurants
Pinnacle Foods Inc.	NYSE	PF US	USD	66.66	Sector Perform	Not Assigned	68.00	Packaged Foods & Meats
Restaurant Brands International Inc.	NYSE	QSR US	USD	54.67	Outperform	Not Assigned	70.00	Restaurants
Starbucks Corporation	NASDAQ	SBUX US	USD	65.47	Outperform	Not Assigned	68.00	Restaurants
Texas Roadhouse, Inc.	NASDAQ	TXRH US	USD	63.51	Outperform	Not Assigned	66.00	Restaurants
The Hain Celestial Group, Inc.	NASDAQ	HAIN US	USD	19.30	Sector Perform	Not Assigned	24.00	Packaged Foods & Meats
The Hershey Company	NYSE	HSY US	USD	107.14	Sector Perform	Not Assigned	105.00	Packaged Foods & Meats
The Kraft Heinz Company	NASDAQ	KHC US	USD	48.71	Outperform	Not Assigned	68.00	Packaged Foods & Meats
The Wendy's Company	NASDAQ	WEN US	USD	17.11	Sector Perform	Not Assigned	17.00	Restaurants
Tyson Foods, Inc.	NYSE	TSN US	USD	56.21	Sector Perform	Not Assigned	72.00	Packaged Foods & Meats
Yum! Brands, Inc.	NYSE	YUM US	USD	90.43	Outperform	Not Assigned	98.00	Restaurants
William Kirk (Analyst) (212) 548-3183; william.kirk@rbccm.com								
Natural Grocers by Vitamin Cottage, Inc.	NYSE	NGVC US	USD	17.80	Outperform	Not Assigned	21.00	Food Retail
Performance Food Group Company	NYSE	PFGC US	USD	34.07	Sector Perform	Not Assigned	32.00	Food Distributors
Smart & Final Stores, Inc.	NYSE	SFS US	USD	5.82	Outperform	Not Assigned	13.00	Food Retail
Sprouts Farmers Market, Inc.	NASDAQ	SFM US	USD	24.45	Outperform	Not Assigned	32.00	Food Retail
Sysco Corporation	NYSE	SYY US	USD	65.02	Sector Perform	Not Assigned	65.00	Food Distributors
The Kroger Co.	NYSE	KR US	USD	29.17	Outperform	Not Assigned	36.00	Food Retail
United Natural Foods, Inc.	NASDAQ	UNFI US	USD	14.88	Sector Perform	Not Assigned	24.00	Food Distributors
US Foods Holding Corp.	NYSE	USFD US	USD	31.83	Sector Perform	Not Assigned	34.00	Food Distributors
Scot Ciccarelli (Analyst) (212) 428-6402; scot.ciccarelli@rbccm.com								
Advance Auto Parts, Inc.	NYSE	AAP US	USD	167.59	Outperform	Not Assigned	203.00	Automotive Retail
AutoZone, Inc.	NYSE	AZO US	USD	870.16	Sector Perform	Not Assigned	899.00	Automotive Retail
Best Buy Co., Inc.	NYSE	BBY US	USD	60.58	Sector Perform	Not Assigned	69.00	Computer & Electronics Retail
CarMax, Inc.	NYSE	KMX US	USD	62.56	Outperform	Not Assigned	75.00	Automotive Retail
Costco Wholesale Corporation	NASDAQ	COST US	USD	224.86	Outperform	Not Assigned	254.00	Hypermarkets & Super Centers
Dick's Sporting Goods, Inc.	NYSE	DKS US	USD	36.34	Sector Perform	Not Assigned	38.00	Specialty Stores
Dollar General Corporation	NYSE	DG US	USD	102.70	Outperform	Not Assigned	122.00	General Merchandise Stores
Dollar Tree, Inc.	NASDAQ	DLTR US	USD	83.39	Outperform	Not Assigned	98.00	General Merchandise Stores
Five Below, Inc.	NASDAQ	FIVE US	USD	95.58	Outperform	Not Assigned	120.00	Specialty Stores
Genuine Parts Company	NYSE	GPC US	USD	99.54	Sector Perform	Not Assigned	104.00	Distributors
Lowe's Companies, Inc.	NYSE	LOW US	USD	89.40	Outperform	Not Assigned	99.00	Home Improvement Retail
Ollie's Bargain Outlet Holdings, Inc.	NASDAQ	OLLI US	USD	69.13	Sector Perform	Not Assigned	89.00	General Merchandise Stores
O'Reilly Automotive, Inc.	NASDAQ	ORLY US	USD	331.45	Outperform	Not Assigned	389.00	Automotive Retail
The Home Depot, Inc.	NYSE	HD US	USD	172.79	Outperform	Not Assigned	191.00	Home Improvement Retail

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Tractor Supply Company	NASDAQ	TSCO US	USD	88.79	Outperform	Not Assigned	105.00	Specialty Stores
Walmart Inc.	NYSE	WMT US	USD	93.19	Sector Perform	Not Assigned	101.00	Hypermarkets & Super Centers
Williams-Sonoma, Inc.	NYSE	WSM US	USD	53.99	Sector Perform	Not Assigned	62.00	Homefurnishing Retail
Brian Tunick (Analyst) (212) 905-2926; brian.tunick@rbccm.com								
Abercrombie & Fitch Co.	NYSE	ANF US	USD	18.76	Sector Perform	Not Assigned	24.00	Apparel Retail
American Eagle Outfitters, Inc.	NYSE	AEO US	USD	18.96	Outperform	Not Assigned	28.00	Apparel Retail
Ascena Retail Group, Inc.	NASDAQ	ASNA US	USD	3.01	Sector Perform	Not Assigned	2.50	Apparel Retail
Burlington Stores, Inc.	NYSE	BURL US	USD	157.79	Outperform	Not Assigned	175.00	Apparel Retail
Canada Goose Holdings Inc.	TSX	GOOS CN	CAD	77.77	Outperform	Not Assigned	100.00	Apparel, Accessories & Luxury Goods
Chico's FAS, Inc.	NYSE	CHS US	USD	5.80	Sector Perform	Not Assigned	4.50	Apparel Retail
J.Jill, Inc.	NYSE	JILL US	USD	5.99	Sector Perform	Not Assigned	7.00	Apparel Retail
Kohl's Corporation	NYSE	KSS US	USD	62.48	Sector Perform	Not Assigned	73.00	Department Stores
L Brands, Inc.	NYSE	LB US	USD	31.82	Outperform	Not Assigned	35.00	Apparel Retail
lululemon athletica inc.	NASDAQ	LULU US	USD	113.87	Outperform	Not Assigned	165.00	Apparel, Accessories & Luxury Goods
Macy's Inc	NYSE	M US	USD	31.69	Sector Perform	Not Assigned	39.00	Department Stores
Michael Kors Holdings Limited	NYSE	KORS US	USD	40.48	Sector Perform	Not Assigned	60.00	Apparel, Accessories & Luxury Goods
Nordstrom, Inc.	NYSE	JWN US	USD	49.36	Sector Perform	Not Assigned	60.00	Department Stores
Ralph Lauren Corporation	NYSE	RL US	USD	104.90	Sector Perform	Not Assigned	140.00	Apparel, Accessories & Luxury Goods
Ross Stores, Inc.	NASDAQ	ROST US	USD	78.34	Sector Perform	Not Assigned	88.00	Apparel Retail
Signet Jewelers Limited	NYSE	SIG US	USD	38.55	Sector Perform	Not Assigned	46.00	Specialty Stores
Tapestry, Inc.	NYSE	TPR US	USD	35.34	Outperform	Not Assigned	50.00	Apparel, Accessories & Luxury Goods
The Gap, Inc.	NYSE	GPS US	USD	26.99	Sector Perform	Not Assigned	30.00	Apparel Retail
The TJX Companies, Inc.	NYSE	TJX US	USD	45.29	Outperform	Not Assigned	52.00	Apparel Retail
Tiffany & Co.	NYSE	TIF US	USD	86.02	Sector Perform	Not Assigned	105.00	Specialty Stores
Ulta Beauty, Inc.	NASDAQ	ULTA US	USD	254.47	Sector Perform	Not Assigned	300.00	Specialty Stores
Urban Outfitters, Inc.	NASDAQ	URBN US	USD	37.04	Sector Perform	Not Assigned	46.00	Apparel Retail
V.F. Corporation	NYSE	VFC US	USD	76.00	Outperform	Not Assigned	88.00	Apparel, Accessories & Luxury Goods
Irene Nattel (Analyst) (514) 878-7262; irene.nattel@rbccm.com								
Alimentation Couche-Tard Inc.	TSX	ATD/B CN	CAD	66.58	Outperform	Not Assigned	80.00	Food Retail
Aritzia Inc.	TSX	ATZ CN	CAD	17.91	Outperform	Not Assigned	22.00	Apparel, Accessories & Luxury Goods
Canadian Tire Corporation, Limited	TSX	CTC/A CN	CAD	144.90	Outperform	Not Assigned	201.00	General Merchandise Stores
Casey's General Stores, Inc.	NASDAQ	CASY US	USD	121.48	Sector Perform	Not Assigned	131.00	Food Retail
Dollarama Inc.	TSX	DOL CN	CAD	32.80	Outperform	Not Assigned	49.00	General Merchandise Stores
Empire Company Limited	TSX	EMP/A CN	CAD	25.37	Sector Perform	Not Assigned	29.00	Food Retail
George Weston Limited	TSX	WN CN	CAD	94.81	Outperform	Not Assigned	125.00	Food Retail
Loblaw Companies Limited	TSX	L CN	CAD	61.01	Outperform	Not Assigned	75.00	Food Retail
Maple Leaf Foods Inc.	TSX	MFI CN	CAD	28.32	Sector Perform	Not Assigned	36.00	Packaged Foods & Meats

Company Name	Exchange	Pricing Symbol	Price (12/07/2018)		Rating	Risk	Price Target	Consumer Sub-Sector
METRO INC.	TSX	MRU CN	CAD	45.94	Sector Perform	Not Assigned	47.00	Food Retail
Saputo Inc.	TSX	SAP CN	CAD	40.67	Outperform	Not Assigned	48.00	Packaged Foods & Meats
Sabahat Khan (Analyst) (416) 842-7880; sabahat.khan@rbccm.com								
Alcanna Inc.	TSX	CLIQ CN	CAD	6.54	Sector Perform	Not Assigned	8.00	Food Retail
Dorel Industries Inc.	TSX	DII/B CN	CAD	17.54	Sector Perform	Not Assigned	27.00	Home Furnishings
Freshii Inc.	TSX	FRII CN	CAD	2.55	Underperform	Speculative Risk	3.00	Restaurants
Gildan Activewear Inc.	NYSE	GIL US	USD	32.39	Sector Perform	Not Assigned	33.00	Apparel, Accessories & Luxury Goods
Great Canadian Gaming Corporation	TSX	GC CN	CAD	49.66	Outperform	Not Assigned	64.00	Casinos & Gaming
High Liner Foods Inc.	TSX	HLF CN	CAD	6.83	Sector Perform	Not Assigned	7.00	Packaged Foods & Meats
Hudson's Bay Company	TSX	HBC CN	CAD	9.37	Sector Perform	Not Assigned	11.00	Department Stores
Jamieson Wellness Inc.	TSX	JWEL CN	CAD	21.28	Outperform	Not Assigned	28.00	Personal Products
MAV Beauty Brands Inc.	TSX	MAV CN	CAD	11.01	Outperform	Not Assigned	17.00	Personal Products
Parkland Fuel Corporation	TSX	PKI CN	CAD	36.88	Sector Perform	Not Assigned	41.00	Oil & Gas Refining & Marketing
Premium Brands Holdings Corporation	TSX	PBH CN	CAD	78.29	Outperform	Not Assigned	100.00	Packaged Foods & Meats
Recipe Unlimited Corp	TSX	RECP CN	CAD	25.57	Outperform	Not Assigned	34.00	Restaurants
Roots Corporation	TSX	ROOT CN	CAD	3.46	Sector Perform	Not Assigned	4.50	Apparel Retail
Sleep Country Canada Holdings Inc.	TSX	ZZZ CN	CAD	22.25	Outperform	Not Assigned	32.00	Homefurnishing Retail
Spin Master Corp.	TSX	TOY CN	CAD	40.11	Outperform	Not Assigned	64.00	Leisure Products
The North West Company Inc.	TSX	NWC CN	CAD	29.07	Sector Perform	Not Assigned	31.00	Food Retail
Rogerio Fujimori (Analyst) +44 20 7429 8470; rogerio.fujimori@rbccm.com								
Burberry Group PLC	LSE	BRBY LN	GBp	1730.50	Underperform	Not Assigned	1800.00	Apparel, Accessories & Luxury Goods
Compagnie Financiere Richemont SA	SWX	CFR SW	CHF	64.02	Outperform	Not Assigned	85.00	Apparel, Accessories & Luxury Goods
Hermes International	NXT PA	RMS FP	EUR	482.10	Sector Perform	Not Assigned	505.00	Apparel, Accessories & Luxury Goods
Kering	NXT PA	KER FP	EUR	395.30	Outperform	Not Assigned	520.00	Apparel, Accessories & Luxury Goods
LVMH Moet Hennessy-Louis Vuitton SE	NXT PA	MC FP	EUR	249.50	Outperform	Not Assigned	327.00	Apparel, Accessories & Luxury Goods
PRADA spa	HKSE	1913 HK	HKD	26.50	Sector Perform	Not Assigned	37.00	Apparel, Accessories & Luxury Goods
Salvatore Ferragamo S.p.A.	MILAN	SFER IM	EUR	20.55	Underperform	Not Assigned	20.00	Apparel, Accessories & Luxury Goods
The Swatch Group AG	SWX	UHR SW	CHF	291.10	Sector Perform	Not Assigned	370.00	Apparel, Accessories & Luxury Goods
TOD'S S.p.A.	MILAN	TOD IM	EUR	42.42	Underperform	Not Assigned	46.00	Footwear
Piral Dadhania (Analyst) +44 207 429 8644; piral.dadhania@rbccm.com								
adidas AG	XETRA	ADS GR	EUR	194.50	Outperform	Not Assigned	235.00	Apparel, Accessories & Luxury Goods
EssilorLuxottica	NXT PA	EL FP	EUR	109.90	Sector Perform	Not Assigned	118.00	Health Care Supplies
Hugo Boss AG	XETRA	BOSS GR	EUR	59.88	Outperform	Not Assigned	82.00	Apparel, Accessories & Luxury Goods
Luxottica Group SpA	MILAN	LUX IM	EUR	52.00	Sector Perform	Not Assigned	54.00	Apparel, Accessories & Luxury Goods
Moncler SpA	MILAN	MONC IM	EUR	29.45	Outperform	Not Assigned	40.00	Apparel, Accessories & Luxury Goods
PANDORA	CSE	PNDORA DC	DKK	343.00	Sector Perform	Not Assigned	450.00	Apparel, Accessories & Luxury Goods

Company Name	Exchange	Pricing Symbol	Price (12/07/2018)		Rating	Risk	Price Target	Consumer Sub-Sector
PUMA SE	XETRA	PUM GR	EUR	452.00	Underperform	Not Assigned	375.00	Footwear
Superdry PLC	LSE	SDRY LN	GBp	674.50	Sector Perform	Not Assigned	900.00	Apparel Retail
Ted Baker PLC	LSE	TED LN	GBp	1493.00	Outperform	Not Assigned	2500.00	Apparel, Accessories & Luxury Goods
Sherri Malek (Analyst) +44 20 7653 4510; sherri.malek@rbccm.com								
ASOS plc	LSE	ASC LN	GBp	4588.00	Top Pick	Not Assigned	7700.00	Internet & Direct Marketing Retail
Auto Trader Group PLC	LSE	AUTO LN	GBp	436.90	Sector Perform	Not Assigned	410.00	Interactive Media & Services
boohoo Group PLC	LSE	BOO LN	GBp	185.85	Underperform	Not Assigned	160.00	Internet & Direct Marketing Retail
Delivery Hero AG	XETRA	DHER GR	EUR	30.18	Sector Perform	Not Assigned	35.00	Internet & Direct Marketing Retail
Just Eat PLC	LSE	JE/ LN	GBp	551.40	Top Pick	Not Assigned	900.00	Internet & Direct Marketing Retail
Majestic Wine PLC	LSE	WINE LN	GBp	265.00	Outperform	Not Assigned	500.00	Food Retail
Ocado Group PLC	LSE	OCDO LN	GBp	802.80	Sector Perform	Not Assigned	750.00	Internet & Direct Marketing Retail
Rightmove plc	LSE	RMV LN	GBp	440.95	Sector Perform	Not Assigned	460.00	Interactive Media & Services
Scout24 AG	XETRA	G24 GR	EUR	36.54	Sector Perform	Not Assigned	43.00	Interactive Media & Services
Takeaway.com N.V.	NXT AM	TKWY NA	EUR	45.00	Sector Perform	Not Assigned	50.00	Internet & Direct Marketing Retail
Zalando SE	XETRA	ZAL GR	EUR	25.56	Outperform	Not Assigned	35.00	Internet & Direct Marketing Retail
James Edwardes Jones (Analyst) +44 20 7002 2101; james.edwardesjones@rbccm.com								
Anheuser-Busch InBev SA/NV	BRU	ABI BB	EUR	62.66	Outperform	Not Assigned	75.00	Brewers
Beiersdorf AG	XETRA	BEI GR	EUR	93.72	Sector Perform	Not Assigned	90.00	Personal Products
British American Tobacco p.l.c.	LSE	BATS LN	GBp	2663.50	Sector Perform	Not Assigned	2700.00	Tobacco
Britvic PLC	LSE	BVIC LN	GBp	811.00	Sector Perform	Not Assigned	730.00	Soft Drinks
Carlsberg A/S	CSE	CARLB DC	DKK	715.40	Sector Perform	Not Assigned	730.00	Brewers
Danone	NXT PA	BN FP	EUR	63.80	Outperform	Not Assigned	71.00	Packaged Foods & Meats
Davide Campari-Milano S.p.A.	MILAN	CPR IM	EUR	7.73	Sector Perform	Not Assigned	6.60	Distillers & Vintners
Diageo PLC	LSE	DGE LN	GBp	2784.50	Sector Perform	Not Assigned	2300.00	Distillers & Vintners
Fevertree Drinks PLC	LSE	FEVR LN	GBp	2276.00	Outperform	Speculative Risk	4000.00	Soft Drinks
Heineken NV	NXT AM	HEIA NA	EUR	78.56	Outperform	Not Assigned	92.00	Brewers
Henkel AG & Co. KGaA	XETRA	HEN3 GR	EUR	99.74	Sector Perform	Not Assigned	103.00	Household Products
Imperial Brands PLC	LSE	IMB LN	GBp	2337.50	Underperform	Not Assigned	2300.00	Tobacco
L'Oreal	NXT PA	OR FP	EUR	206.00	Sector Perform	Not Assigned	175.00	Personal Products
Nestle S.A.	SWX	NESN SW	CHF	84.80	Outperform	Not Assigned	85.00	Packaged Foods & Meats
Pernod Ricard	NXT PA	RI FP	EUR	138.00	Sector Perform	Not Assigned	120.00	Distillers & Vintners
Reckitt Benckiser Group PLC	LSE	RB/ LN	GBp	6273.00	Underperform	Not Assigned	5100.00	Household Products
Unilever N.V.	NXT AM	UNA NA	EUR	48.95	Underperform	Not Assigned	37.00	Personal Products

Company Name	Exchange	Pricing Symbol		Price (12/07/2018)	Rating	Risk	Price Target	Consumer Sub-Sector
Richard Chamberlain (Analyst) +44 20 7429 8092; richard.chamberlain@rbccm.com								
Associated British Foods plc	LSE	ABF LN	GBp	2242.00	Outperform	Not Assigned	2900.00	Packaged Foods & Meats
Debenhams PLC	LSE	DEB LN	GBp	5.75	Sector Perform	Not Assigned	12.00	Department Stores
Dixons Carphone plc	LSE	DC/ LN	GBp	156.85	Outperform	Not Assigned	200.00	Computer & Electronics Retail
Hennes & Mauritz AB	OMX	HMB SS	SEK	159.04	Underperform	Not Assigned	145.00	Apparel Retail
Inditex	SIBE	ITX SM	EUR	26.80	Top Pick	Not Assigned	32.00	Apparel Retail
Kingfisher plc	LSE	KGF LN	GBp	228.40	Sector Perform	Not Assigned	240.00	Home Improvement Retail
Marks and Spencer Group plc	LSE	MKS LN	GBp	282.20	Sector Perform	Not Assigned	320.00	Department Stores
Sports Direct International plc	LSE	SPD LN	GBp	275.90	Underperform	Not Assigned	300.00	Specialty Stores
WH Smith PLC	LSE	SMWH LN	GBp	1872.00	Outperform	Not Assigned	2400.00	Specialty Stores
Shelly Xie (Analyst) +44 20 7653 4881; shelly.xie@rbccm.com								
B&M European Value Retail S.A.	LSE	BME LN	GBp	324.60	Outperform	Not Assigned	450.00	General Merchandise Stores
Dunelm Group PLC	LSE	DNLM LN	GBp	610.00	Underperform	Not Assigned	525.00	Homefurnishing Retail
Next PLC	LSE	NXT LN	GBp	4677.00	Outperform	Not Assigned	6300.00	Department Stores

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Required disclosures

Non-U.S. analyst disclosure

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As of 30-Sep-2018

			Investment Banking Serv./Past 12 Mos.	
Rating	Count	Percent	Count	Percent
BUY [Top Pick & Outperform]	859	54.33	251	29.22
HOLD [Sector Perform]	646	40.86	125	19.35
SELL [Underperform]	76	4.81	5	6.58

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