



THE DIGITAL STRENGTH INDEX

PHARMACEUTICALS: LINKING DIGITAL TO SHAREHOLDER VALUE

April 2018

isobar +  alpha-DNA

“

*If a firm isn't gaining digital share,
it is jeopardizing its future market
share – yet few companies look
at their digital growth.*

”



**Harvard
Business
Review**

<https://hbr.org/2017/09/are-you-accurately-measuring-your-companys-digital-strength>



For our first analysis of the healthcare industry – part of our ongoing Digital Strength Index (DSI) study – Isobar and alpha-DNA evaluate Large Pharmaceuticals.



abbvie

Johnson + Johnson



Lilly



INTRODUCTION

As we've looked across numerous industries analyzing digital strength, it's become more apparent that there isn't necessarily one standard definition. Even though everyone has the same goal, they're all calling plays from a different playbook. Whereas it's more obvious with an industry like retail to determine what digital transformation looks like, for an industry like pharmaceuticals, the vision is much less apparent.

In comparison to other verticals, the pharmaceuticals industry is digitally immature. When looking at the Digital Strength Index, these companies score on the low end of the spectrum overall. This standing is also seen with Trajectory, the metric which measures the correlation between digital consumer interactions and overall revenues of a business over time. However, the rules of the game are different when you're literally dealing with life and death. Because of the nature of the business as well as regulations from the Food and Drug Administration (FDA), innovation will continue to move forward but at a much slower pace.

As an example, the digital Social presence for these companies is almost non-existent. The reason being is because they would open themselves up to adverse event reporting and legal liability. The risk/reward for this channel can be hard to justify. From 2005 to 2015, Big Pharma was fined more than \$30 billion, the majority of which was a result of promoting drugs for uses other than those approved by the FDA.¹

Even though Big Pharma could be considered digitally nascent, they just have a different interpretation of what digital transformation means. In reality, Big Pharma, with their billions of dollars, is one of digital's most progressive and innovative industries. But, similar to the lengthy duration of the drug testing lifecycle, the benefits of these digital efforts have yet to be realized.

Nonetheless, there is a digital wave on the horizon which is pushing these companies to go "beyond the pill." Drugs will continue to be the core business model, but digital technologies are starting to shift the paradigm from reactive to proactive; i.e., from a sickness-based model to a preventative model. By making digital a priority, the system will become not only more efficient but more effective, allowing Big Pharma to focus on selling outcomes, not pills.

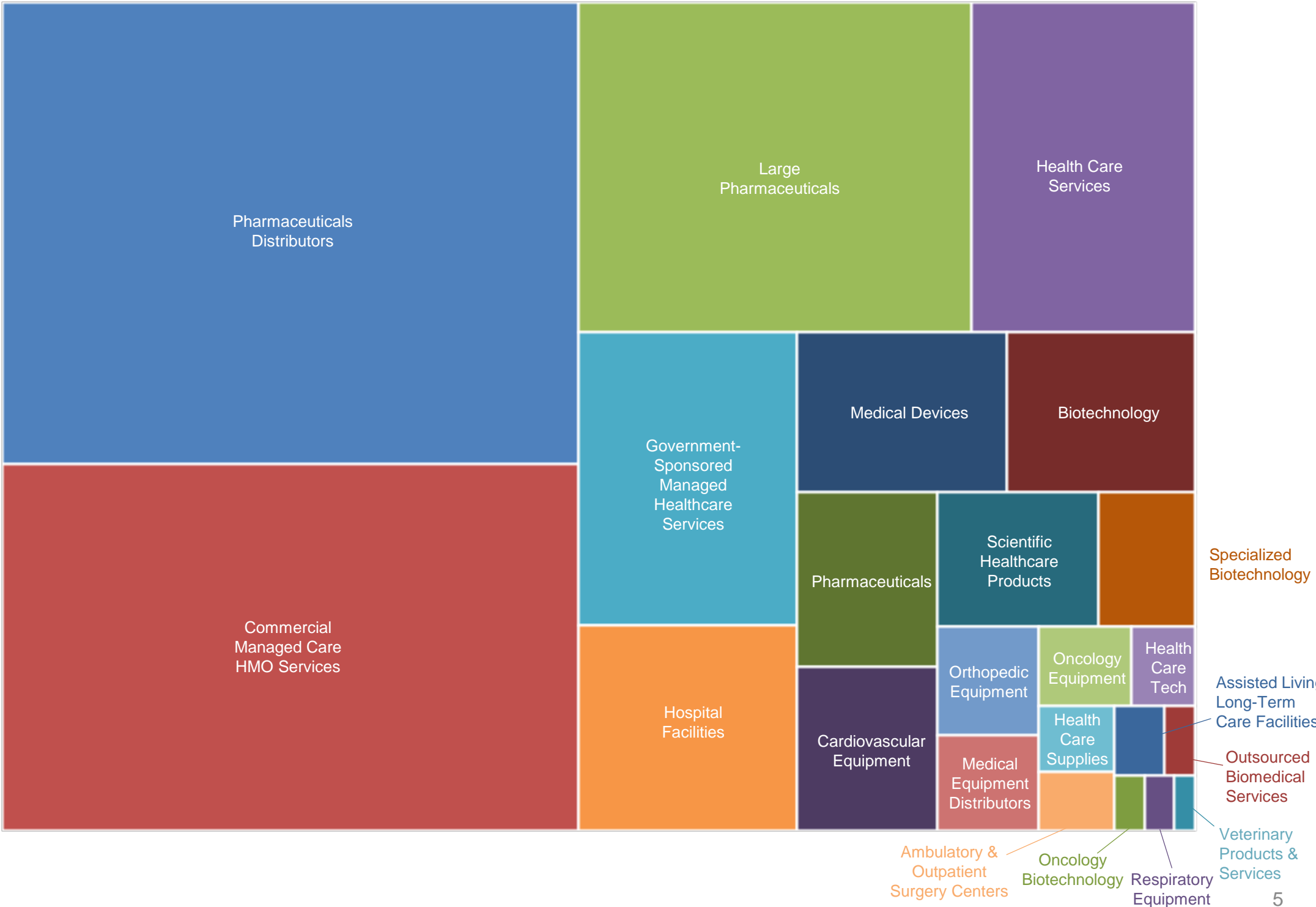
HEALTHCARE

The DSI looks at nearly 10,000 data points across the top 1,000 public companies in the U.S. We use the taxonomy of the financial community, Global Industry Classification Standard (GICS), and apply a proprietary scoring mechanism.

Within the Digital Strength Index, we have separated 104 healthcare companies into 23 different sub-categories. The total peer groups combine for \$1.83T TTM in revenue. Pharmaceuticals, biotechnology, and life sciences account for \$424B, of which \$240B comes from Large Pharmaceuticals.

When analyzing pharmaceuticals through the DSI, it should be noted that there are two separate business models. Consumer healthcare incorporates over-the-counter drugs and nutritional supplements; e.g., BAND-AID from Johnson & Johnson and Advil from Pfizer. The other side of the business is Rx, which incorporates prescription drugs.

TRAILING TWELVE MONTH REVENUE (\$MM)



NOTES ON THE PEER GROUP

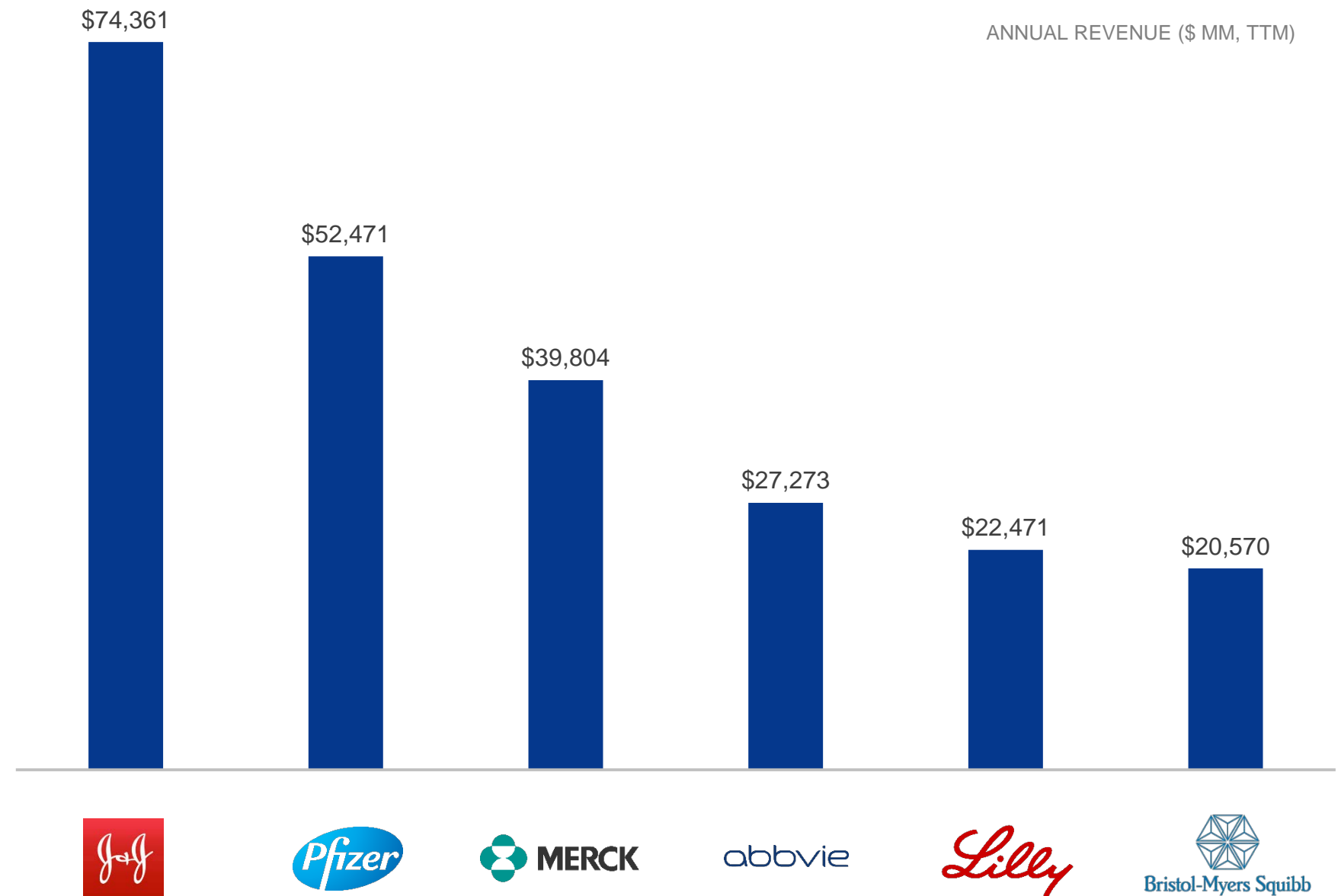
The companies listed are in order from largest to smallest in revenue. As shown, Johnson & Johnson is by far the biggest in terms of revenue and market cap, more than 3x bigger than Eli Lilly and Bristol-Myers Squibb.

When comparing Merck to AbbVie, Merck is bigger by ~30% in revenue, but has a market cap smaller than AbbVie's. Also, relative to revenues, Eli Lilly's and Bristol-Myers Squibb's market caps are disproportionately smaller than AbbVie's.

Regarding this peer set, the business model is unique in the sense that the companies are dependent on a pipeline of drugs, huge R&D budgets, greater time-to-market, and FDA regulations. In addition, the data will be slightly skewed toward companies that have a consumer health (CH) division. Johnson & Johnson's CH business had ~\$13B of revenue in 2017 while Pfizer had \$3.5B. Merck sold their CH division in October 2014. Even though the CH businesses will have a greater digital footprint, the revenues pale in comparison to the drug side of the business.

It should also be noted that there are a lot of moving parts within this peer group as well as organic growth. The M&A pace is rapid, although not necessarily for entire companies – more for their divisions.

ANNUAL REVENUE (\$ MM, TTM)



MARKET CAP (\$ BILLIONS)	377	216	154	156	89	101
P/E (TTM)	18.0	13.2	13.9	14.5	18.5	19.5

Company 10k's and yahoofinance.com

KEY FINDINGS



DIGITAL STRENGTH INDEX (DSI)

When dealing with digital, you're dealing with endless amounts of data. Not only is there the challenge of gathering the right data, but also how you interpret it and what it means for your business.

Isobar and alpha-DNA have built the **Digital Strength Index (DSI)** to capture both financial and digital data. The DSI was created on the hypothesis that Digital Strength is a leading indicator of revenue, which ultimately leads to shareholder value. Armed with this hypothesis that the stock market was undervaluing digital, Isobar and alpha-DNA sought to create the largest known repository of digital data on U.S. companies.

In our first peer group analysis of the healthcare industry (part of our ongoing DSI study), Isobar and alpha-DNA evaluate Big Pharma. The DSI looks at nearly 10,000 data points across the top 1,000 companies in the U.S. We use the taxonomy of the financial community, Global Industry Classification Standard (GICS), and apply a proprietary scoring mechanism.

KEY FINDINGS



Pfizer's digital strength has started to lose some Momentum, but when looking at their non-consumer health verticals the company appears to have a leg up on the peer group in driving interactions in Search and Social.



Johnson & Johnson, with its large consumer packaged goods portfolio and medical devices, has the largest digital presence by far in terms of digital properties and overall consumer interactions across platforms.



Merck's digital strength assessment points to weakness and continued headwinds for future topline revenue growth.









AbbVie is the high-growth ticker in this peer group, aided by its relatively higher digital share among pharmaceuticals and recent Momentum.



Both Eli Lilly and Bristol-Myers Squibb trail the peer set due to their relative digital and revenue size versus the rest of the group. Whereas Eli Lilly shows strength in Momentum and Growth, Bristol-Myers Squibb lags in all categories.

DIGITAL STRENGTH INDEX: OVERALL WEIGHTED SCORECARD






When analyzing data for this peer set, the companies should be compared by those that have a consumer health division (Johnson & Johnson and Pfizer) and those that don't (Merck, AbbVie, Eli Lilly, and Bristol-Myers Squibb).

	LEADER		CHALLENGER		LAGGARD	
DSI	▲	—	—	▲	—	▼
						
MAGNITUDE	▲▲	▲	—	▼▼	▼	▼
SHARE	▲▲	—	▼	—	▼	▼▼
MOMENTUM	—	▼	▼▼	▲	▲	—
GROWTH	▲	▼	—	▲	▲	▼
TRAJECTORY	—	—	▼	▲	—	—

DIGITAL STRENGTH INDEX: OVERALL WEIGHTED SCORECARD

When analyzing data for this peer set, the companies should be compared by those that have a consumer health division (Johnson & Johnson and Pfizer) and those that don't (Merck, AbbVie, Eli Lilly, and Bristol-Myers Squibb).







Johnson & Johnson and Pfizer lead in Magnitude due to their consumer-facing brands.

	LEADER		CHALLENGER		LAGGARD	
DSI	▲	—	—	▲	—	▼
						
MAGNITUDE	▲▲	▲	—	▼▼	▼	▼
SHARE	▲▲	—	▼	—	▼	▼▼
MOMENTUM	—	▼	▼▼	▲	▲	—
GROWTH	▲	▼	—	▲	▲	▼
TRAJECTORY	—	—	▼	▲	—	—

DIGITAL STRENGTH INDEX: OVERALL WEIGHTED SCORECARD

When analyzing data for this peer set, the companies should be compared by those that have a consumer health division (Johnson & Johnson and Pfizer) and those that don't (Merck, AbbVie, Eli Lilly, and Bristol-Myers Squibb).







However, the companies with consumer health divisions are starting to lose momentum, while smaller companies like AbbVie are catching up.

	LEADER		CHALLENGER		LAGGARD	
DSI	▲	—	—	▲	—	▼
						
MAGNITUDE	▲▲	▲	—	▼▼	▼	▼
SHARE	▲▲	—	▼	—	▼	▼▼
MOMENTUM	—	▼	▼▼	▲	▲	—
GROWTH	▲	▼	—	▲	▲	▼
TRAJECTORY	—	—	▼	▲	—	—

DIGITAL STRENGTH INDEX: OVERALL WEIGHTED SCORECARD

When analyzing data for this peer set, the companies should be compared by those that have a consumer health division (Johnson & Johnson and Pfizer) and those that don't (Merck, AbbVie, Eli Lilly, and Bristol-Myers Squibb).

When compared to the entire index, pharmaceutical companies in general have trajectories that are at the lower end of the spectrum.

	LEADER		CHALLENGER		LAGGARD	
DSI	▲	—	—	▲	—	▼
						
MAGNITUDE	▲▲	▲	—	▼▼	▼	▼
SHARE	▲▲	—	▼	—	▼	▼▼
MOMENTUM	—	▼	▼▼	▲	▲	—
GROWTH	▲	▼	—	▲	▲	▼
TRAJECTORY	—	—	▼	▲	—	—



MAGNITUDE



Magnitude measures the volume of digital customer interactions for a business across the broad online landscape. It is represented as a z-score calculated within the specific competitor peer set. It aggregates a diverse set of metrics across platforms (Website, Search, Social) and effectiveness dimensions (Penetration, Engagement, Popularity). Bigger businesses with larger customer files should score high in Magnitude. Understanding your company's Magnitude versus that of competitors is a key indicator.

MAGNITUDE

No surprises here. Because of the impact of its consumer-facing brands, Johnson & Johnson is the leader in Magnitude, ahead in all metrics except Engagement.

AbbVie, Eli Lilly, and Bristol-Myers Squibb lag in this category due to their relative digital size to Johnson & Johnson and Pfizer.

DSI	▲▲	▲	—	▼▼	▼	▼
FIGURES REPRESENT Z-SCORES						
TOTAL MAGNITUDE	1.39	0.14	-0.19	-0.50	-0.38	-0.41
WEBSITE SCORE	1.34	-0.44	0.24	-0.38	-0.38	-0.23
SEARCH SCORE	1.10	1.04	-0.46	-0.70	-0.36	-0.62
SOCIAL SCORE	1.73	-0.18	-0.35	-0.42	-0.39	-0.39
PENETRATION SCORE	1.82	-0.12	-0.34	-0.38	-0.42	-0.48
ENGAGEMENT SCORE	-0.26	-0.74	1.02	-0.58	-0.15	0.66
POPULARITY SCORE	2.02	-0.22	-0.40	-0.49	-0.46	-0.46

MAGNITUDE


No surprises here. Because of the impact of the consumer-facing brands, Johnson & Johnson is the leader in Magnitude, ahead in all metrics except Engagement.

AbbVie, Eli Lilly, and Bristol-Myers Squibb lag in this category due to their relative digital size to Johnson & Johnson and Pfizer.

Due to certain legal risks that come with social media, there is not much of a Social digital presence in this peer set.

However, Search is a huge component of digital activity, opening up an opportunity for a company to own some of that Search.

The branded websites don't see as much Engagement as the parent companies' websites. Companies should consider an umbrella brand that would encourage further research resulting in additional collateral benefits.

DSI	▲▲	▲	—	▼▼	▼	▼
FIGURES REPRESENT Z-SCORES						
TOTAL MAGNITUDE	1.39	0.14	-0.19	-0.50	-0.38	-0.41
WEBSITE SCORE	1.34	-0.44	0.24	-0.38	-0.38	-0.23
SEARCH SCORE	1.10	1.04	-0.46	-0.70	-0.36	-0.62
SOCIAL SCORE	1.73	-0.18	-0.35	-0.42	-0.39	-0.39
PENETRATION SCORE	1.82	-0.12	-0.34	-0.38	-0.42	-0.48
ENGAGEMENT SCORE	-0.26	-0.74	1.02	-0.58	-0.15	0.66
POPULARITY SCORE	2.02	-0.22	-0.40	-0.49	-0.46	-0.46

MAGNITUDE

No surprises here. Because of the impact of the consumer-facing brands, Johnson & Johnson is the leader in Magnitude, ahead in all metrics except Engagement.

AbbVie, Eli Lilly, and Bristol-Myers Squibb lag in this category due to their relative digital size to Johnson & Johnson and Pfizer.

Due to certain legal risks that come with social media, there is not much of a Social digital presence in this peer set.

However, Search is a huge component of digital activity, opening up an opportunity for a company to own some of that Search.

The branded websites don't see as much Engagement as the overall companies' websites. Companies should consider an umbrella brand that would encourage further research resulting in additional collateral benefits.

DSI

FIGURES REPRESENT Z-SCORES

	J&J	Pfizer	MERCK	abbvie	Lilly	Bristol-Myers Squibb
TOTAL MAGNITUDE	1.39	0.14	-0.19	-0.50	-0.38	-0.41
WEBSITE SCORE	1.34			-0.38	-0.38	-0.23
SEARCH SCORE	1.10	1.04			-0.36	-0.62
SOCIAL SCORE	1.73	-0.18	-0.35	-0.42	-0.39	-0.39
PENETRATION SCORE	1.82	-0.12	-0.34	-0.38	-0.42	-0.48
ENGAGEMENT SCORE	-0.26	-0.74	1.02	-0.58		
POPULARITY SCORE	2.02	-0.22	-0.40	-0.49	-0.46	-0.46

Johnson & Johnson dominates in Websites.

Pfizer is relatively strong in Search.

A bright spot for AbbVie is its clear leadership in app downloads.



S H A R E

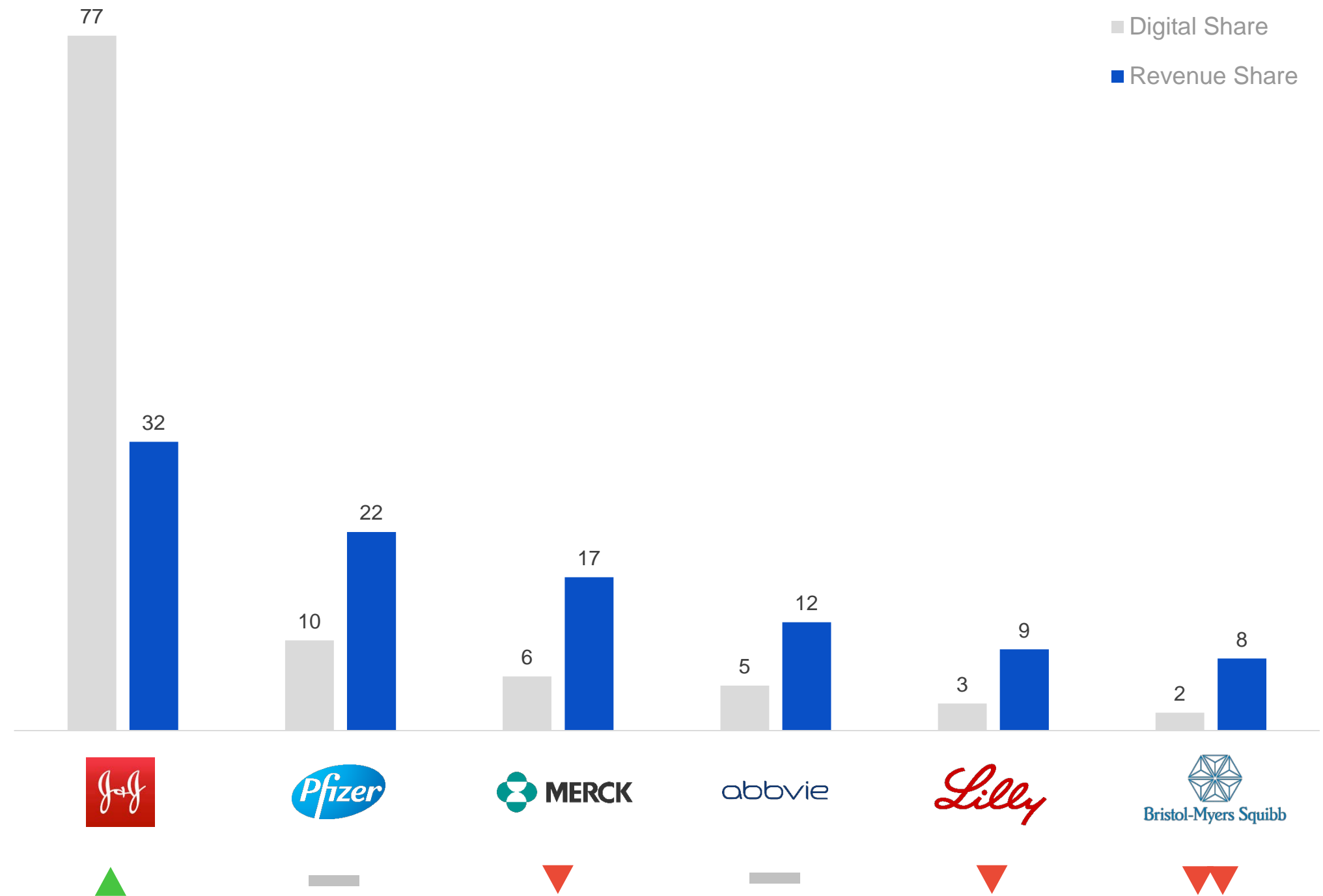


The company's digital Share is its Magnitude divided by the sum of the Magnitude of its competitive set. You should compare this number to your company's actual market share. High-growth companies tend to score better on this Share measure since digital interaction often reflects underlying growth dynamics in the customer base and points to market share gains in the near future. If your digital Share is larger than your market share, you are in a strong position to increase your market share.

SHARE

If a company's digital Share is larger than its market share, it's in a strong position to increase its market share.

DIGITAL SHARE RELATIVE TO REVENUE SHARE WITHIN PEER GROUP



SHARE

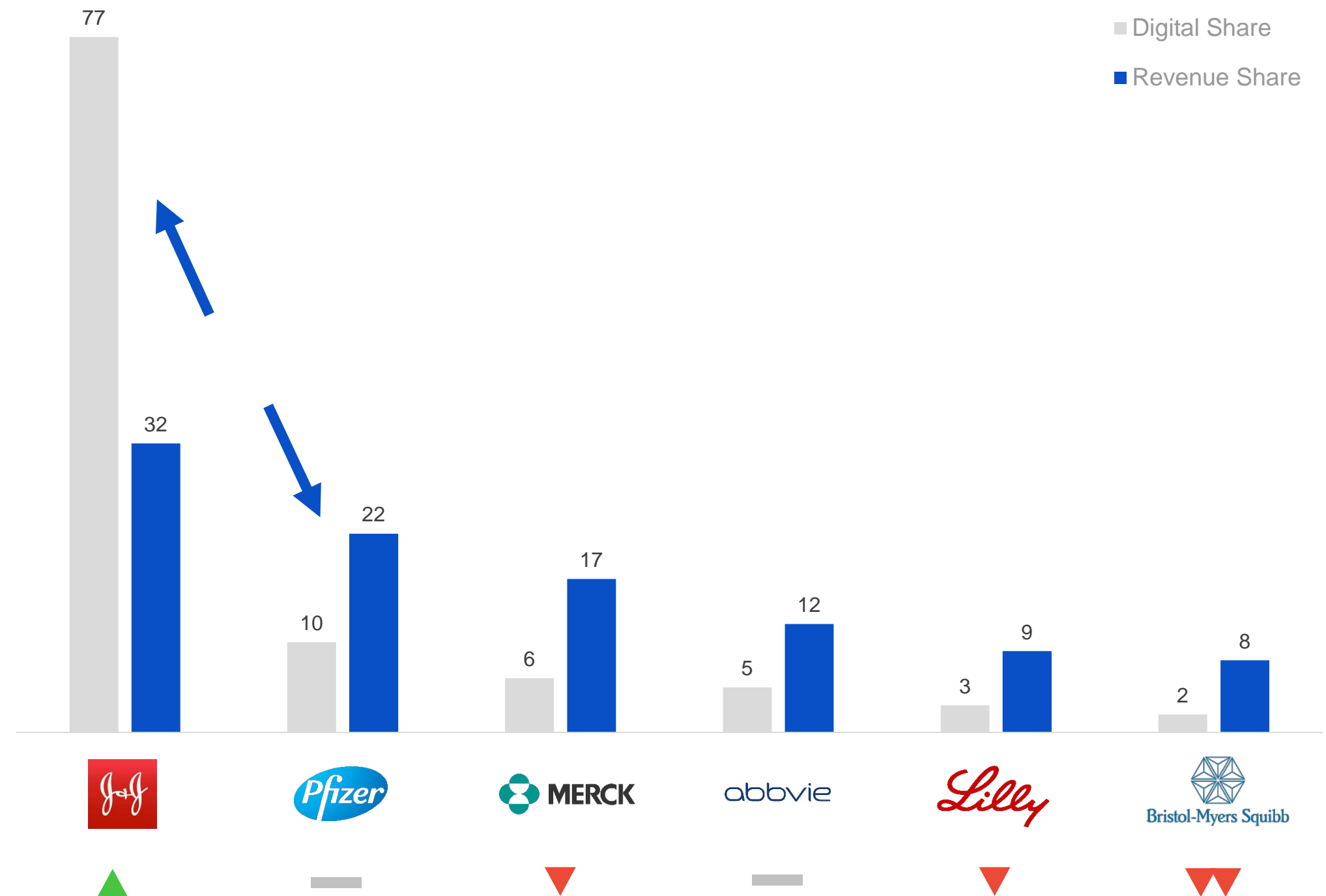
If a company's digital Share is larger than its market share, it's in a strong position to increase its market share.

Johnson & Johnson and Pfizer by definition are going to have a better digital footprint because their products appeal to more customers.

When looking at this data, you need to separate Johnson & Johnson and Pfizer from the other four companies.

Johnson & Johnson has ~2.5x digital Share to revenue Share. Relative to Pfizer, Johnson & Johnson leads.

DIGITAL SHARE RELATIVE TO REVENUE SHARE WITHIN PEER GROUP



SHARE

If a company's digital Share is larger than its market share, it's in a strong position to increase its market share.

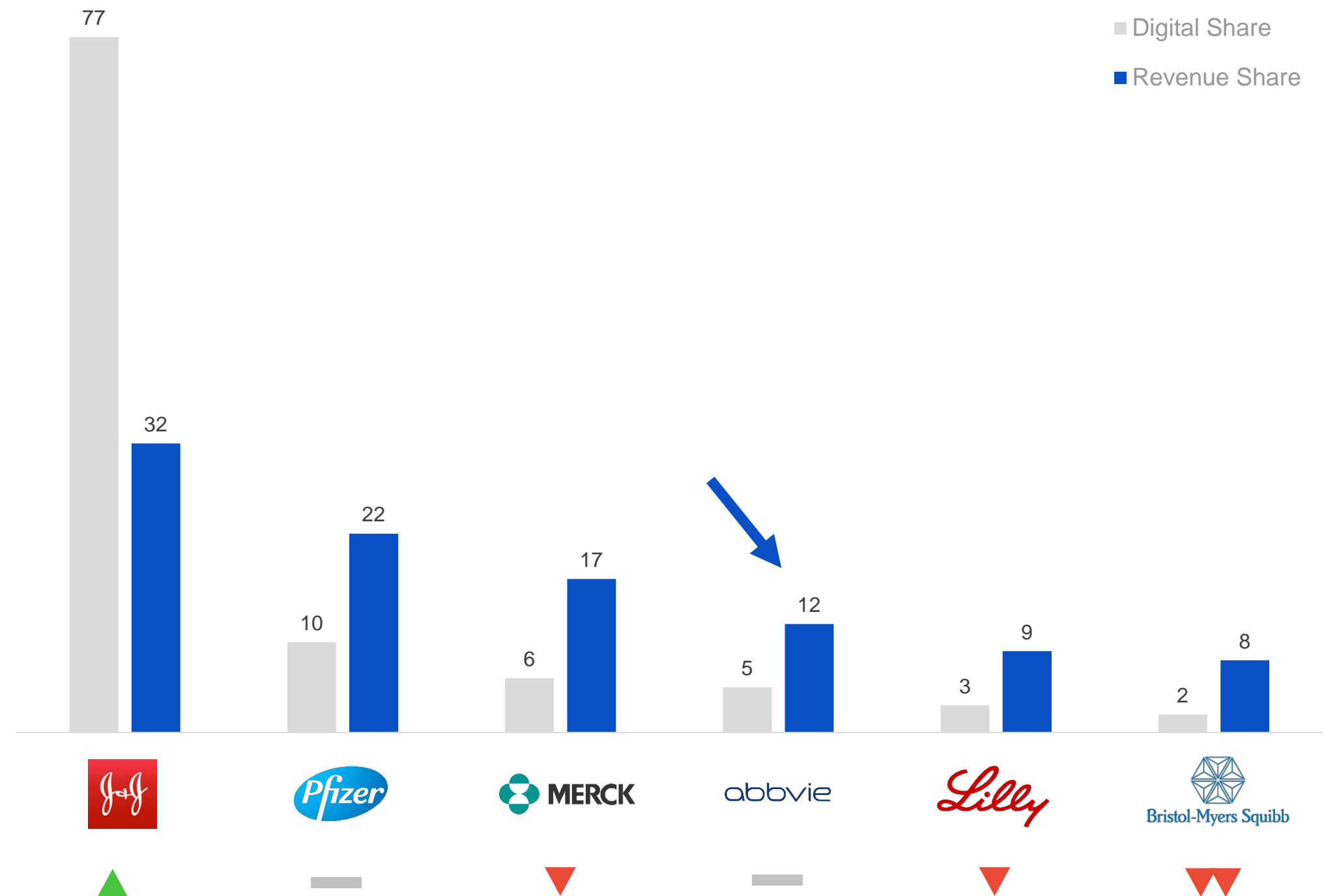
Johnson & Johnson and Pfizer by definition are going to have a better digital footprint because their products appeal to more customers.

When looking at this data, you need to separate Johnson & Johnson and Pfizer from the other four companies.

Johnson & Johnson has ~2.5x digital Share to revenue Share. Relative to Pfizer, Johnson & Johnson leads.

For the remaining four companies, AbbVie is the leader with a 2.5 to 1 revenue to digital.

DIGITAL SHARE RELATIVE TO REVENUE SHARE WITHIN PEER GROUP





M O M E N T U M

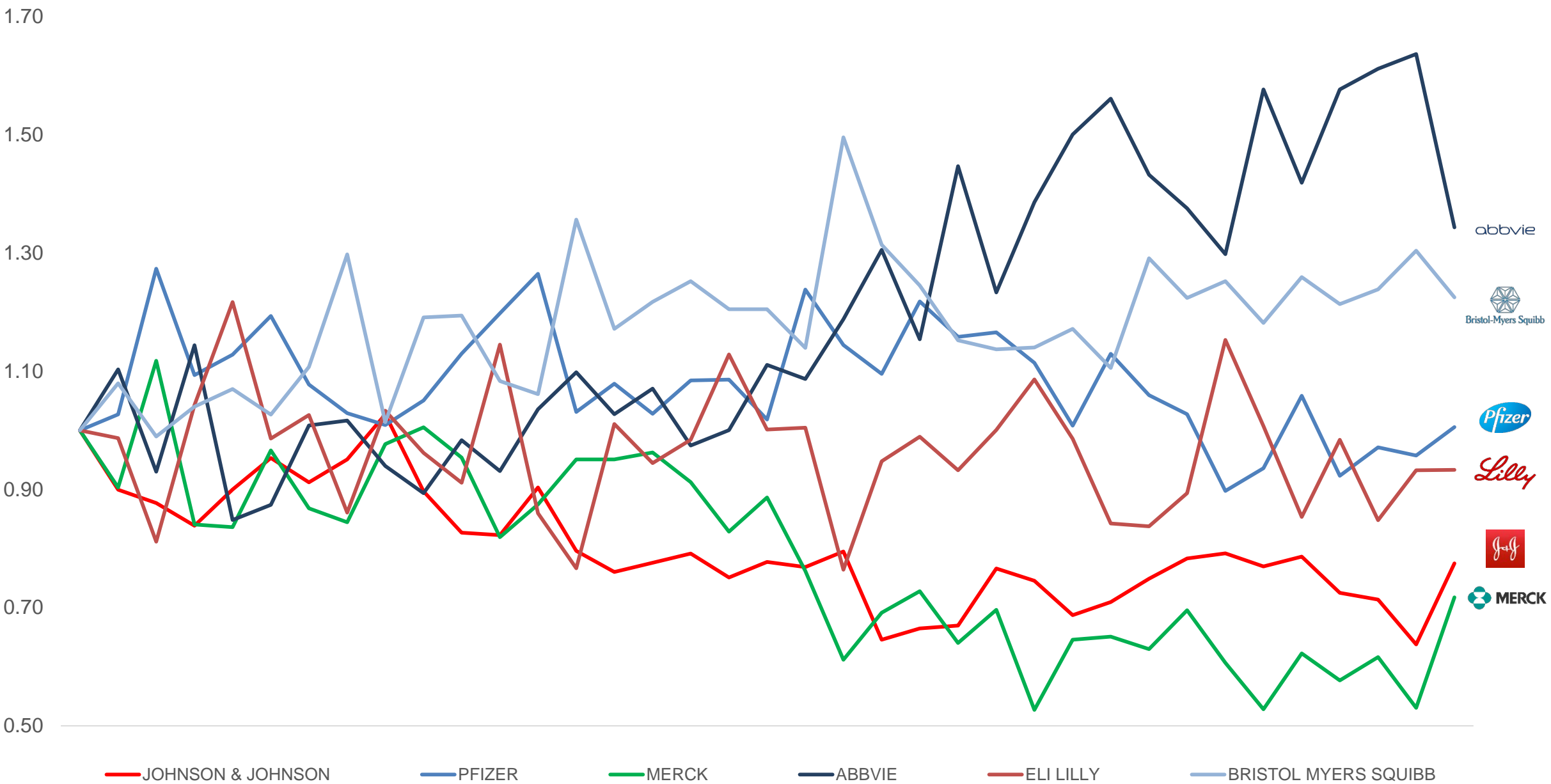


Momentum captures the strength of the incoming trend in digital customer interactions for a business in recent times, typically two-to-three years depending on the category. It is represented as a percentage of digital acceleration measures with positive growth. A simple way for a company to calculate its Momentum is for it to take monthly snapshots for all metrics and track which ones are increasing or decreasing. Businesses experiencing customer acquisition spurts typically score high on Momentum.

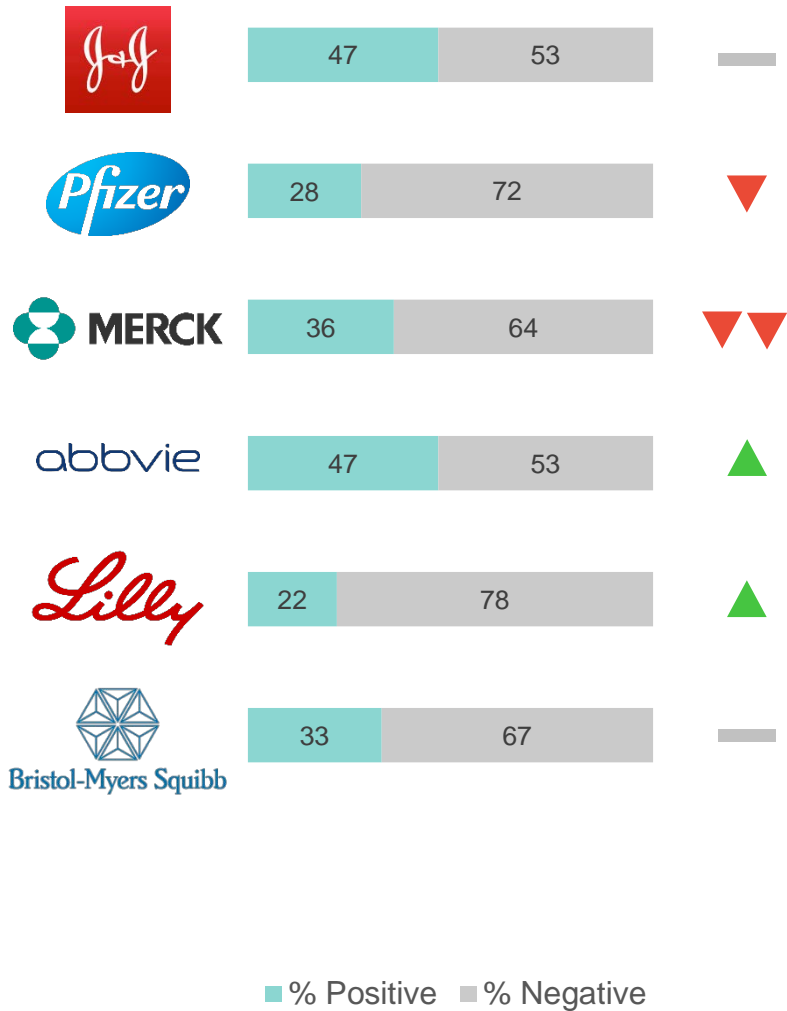
MOMENTUM

The companies with the consumer health businesses, interestingly, have started to lose Momentum and trend lower. Perhaps a signal that the consumer health divisions are slowing the company's Momentum – and why companies are looking to shed these divisions.

DIGITAL MEASURES WITH POSITIVE SEQUENTIAL ACCELERATION, RECENT 3 YEARS



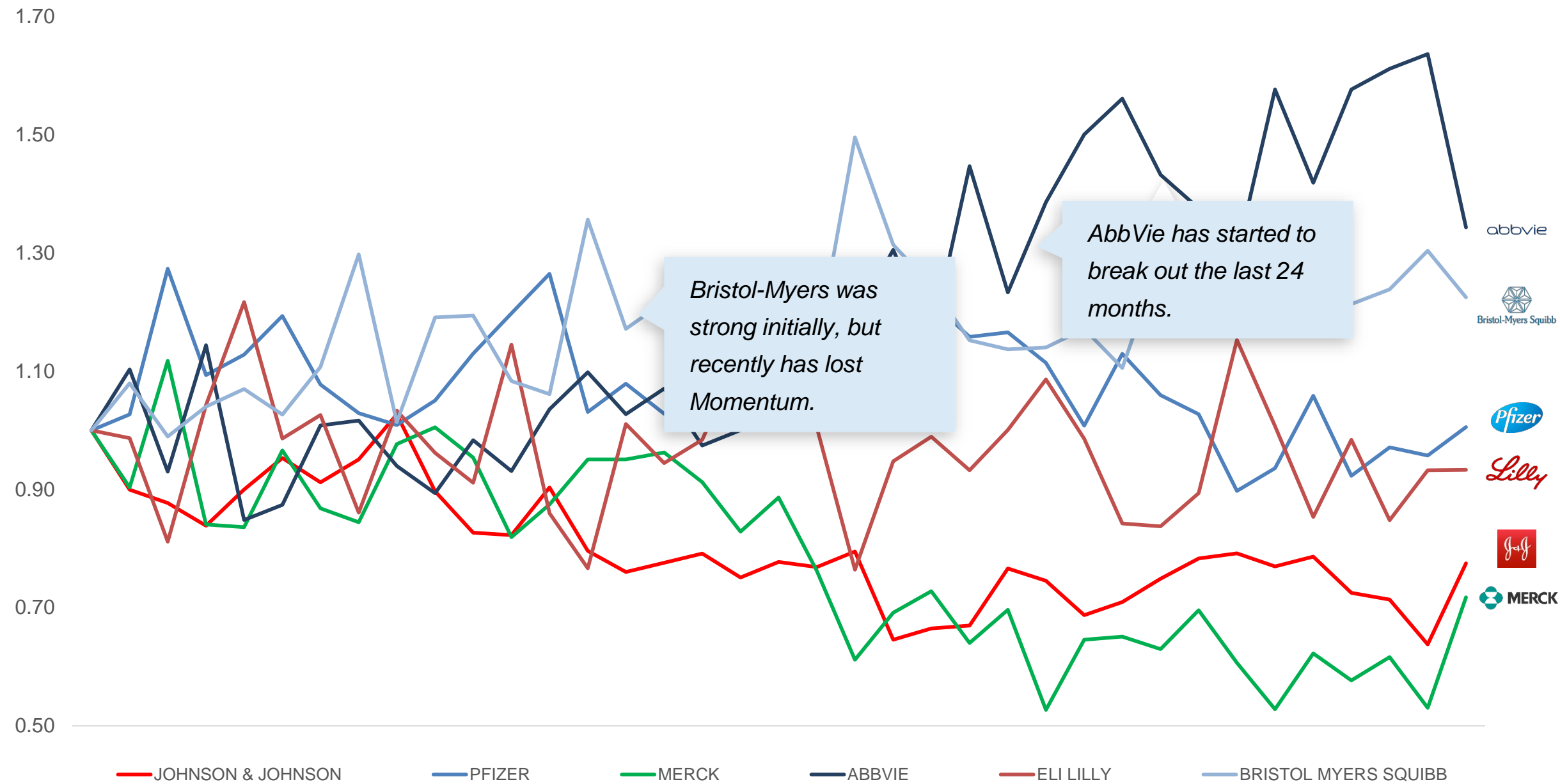
Most recent snapshot of which proportion of metrics are trending positively.



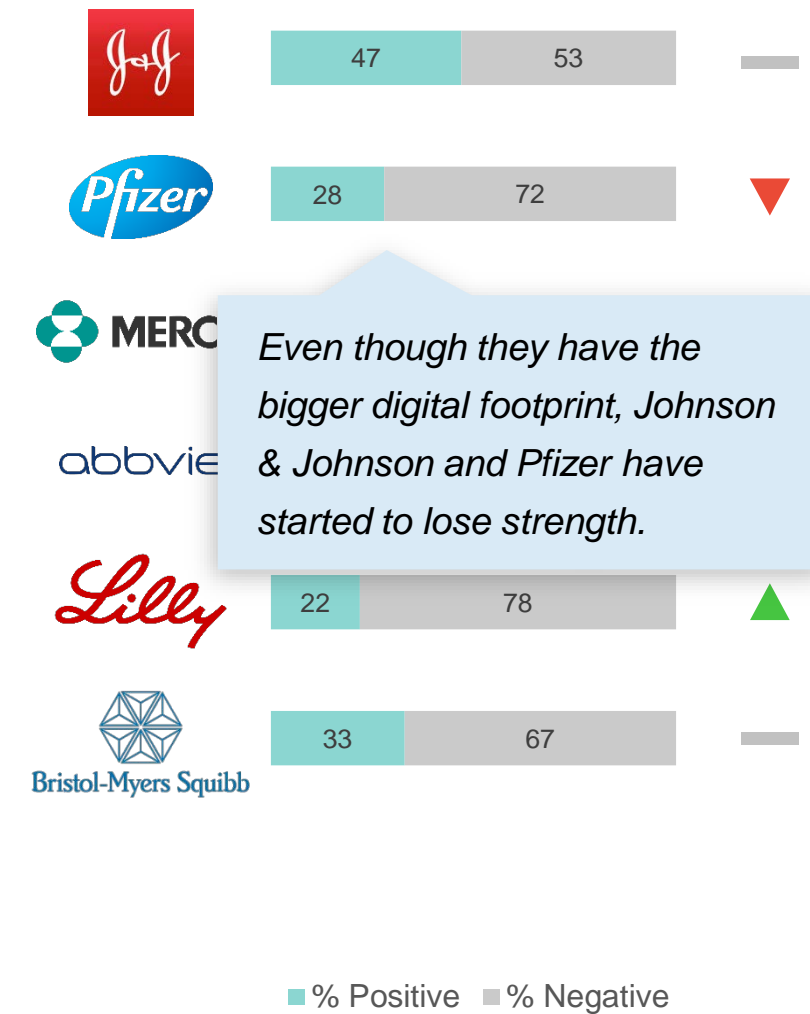
MOMENTUM

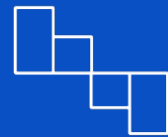
The companies with the consumer health businesses, interestingly, have started to lose Momentum and trend lower. Perhaps a signal that the consumer health divisions are slowing the company's Momentum – and why companies are looking to shed these divisions.

DIGITAL MEASURES WITH POSITIVE SEQUENTIAL ACCELERATION, RECENT 3 YEARS



Most recent snapshot of which proportion of metrics are trending positively.





G R O W T H



Growth is the translation of change in digital velocity to forward-looking topline revenue Growth expectations for a business. The predictive signal has been developed primarily to rank-order a portfolio of companies based on their future Growth potential. The underlying algorithms leverage and benefit from near-real-time digital data on businesses available after the last quarter earnings release publicly disclosed by the company. Growth is expressed as a year-over-year percentage change in topline revenue expected in the upcoming period.

GROWTH

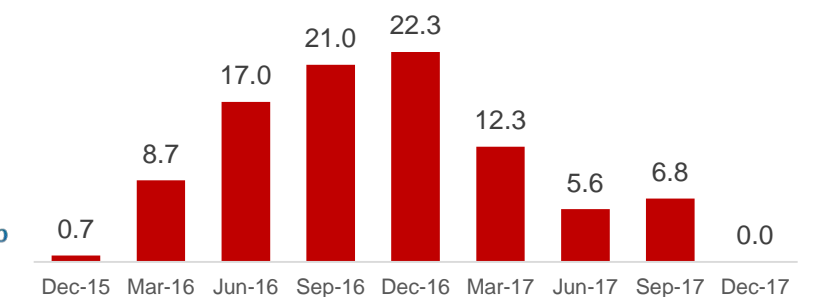
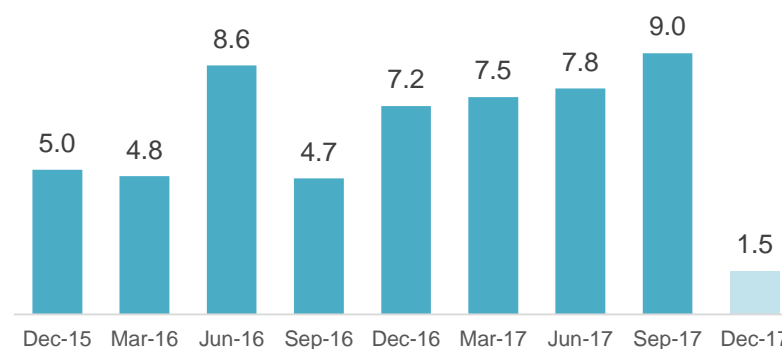
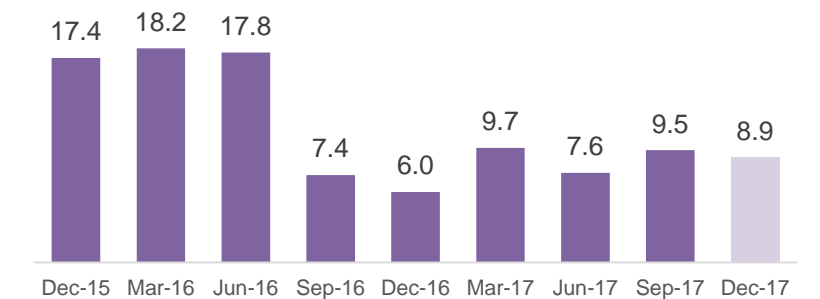
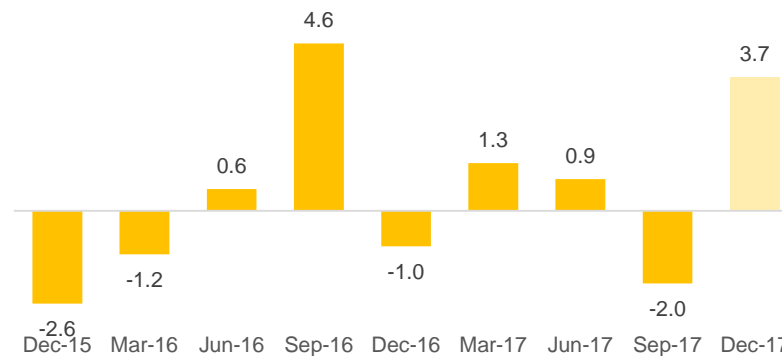
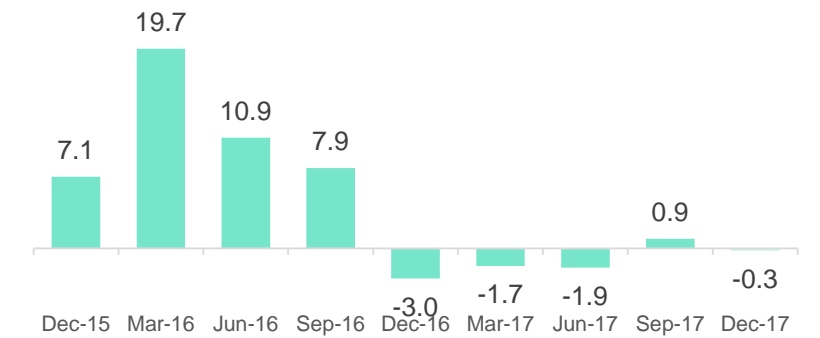
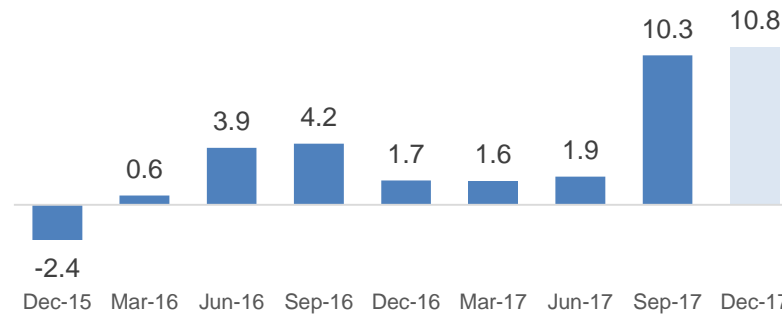
Year-over-year percentage change in topline revenue expected in the upcoming period.

To reiterate, there are a lot of moving parts within this industry. Combined with organic growth, pharmaceutical companies are very active in mergers and acquisitions.

With Humira (“the best selling drug in the world”), along with an increasing pipeline of drugs, AbbVie has shown strong consistent Growth.²

Eli Lilly has also shown strong Growth.

Regarding Johnson & Johnson’s improved numbers, Growth was “augmented by [the acquisition of] Actelion and other recent acquisitions.” Excluding acquisitions, sales rose 3.8% in Q3 2017.³





TRAJECTORY

Trajectory reflects the strength of the fit between digital consumer interactions and overall revenues of a business over time. Companies with fundamentally stronger customer bases, superior customer experience, and high Growth profiles typically have a digital Trajectory that mirrors its revenue Trajectory. Conversely, struggling businesses lag in their digital act compared to peers, and it manifests in poor digital correlation measures. Trajectory is visualized as a measure of correlation.

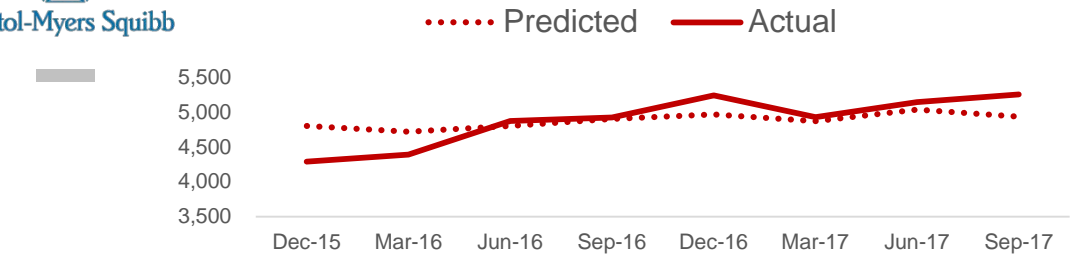
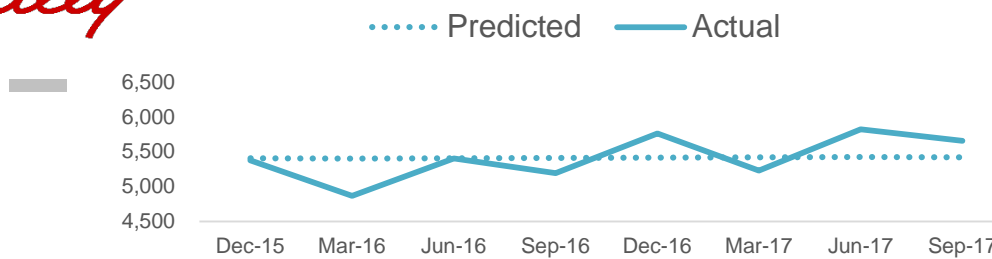
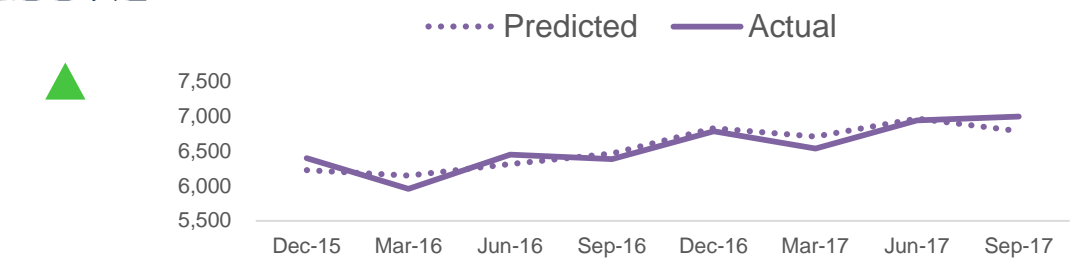
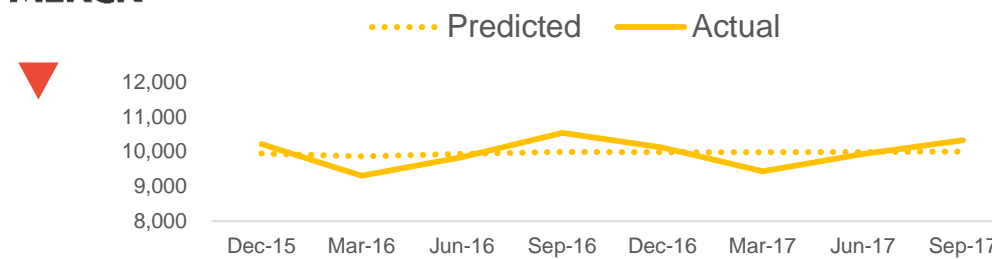
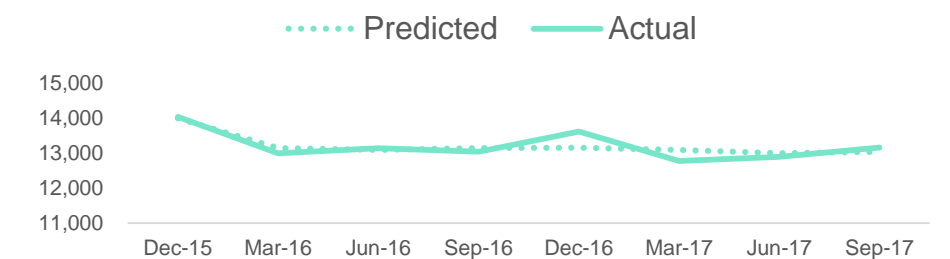
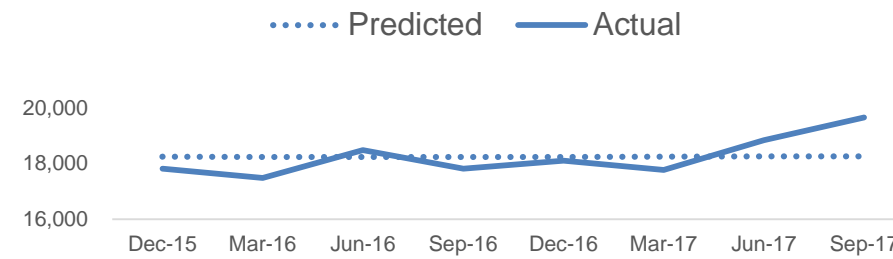
TRAJECTORY

Trajectory is visualized as a measure of correlation.

Partially due to the unique business model and regulatory environment, pharmaceutical companies are on the lower end of the Trajectory spectrum compared to other industries.

Where it's more obvious how an industry like retail might use digital, it's a little less obvious for pharmaceutical companies. It's harder to answer the question, "What does digital transformation mean for this space?"

When looking at this peer set's Trajectory, since AbbVie is tracking more closely, the company is theoretically more poised to take advantage of digital transformation if it should happen.



LANDSCAPE



Threats and Opportunities

The big players aren't going anywhere, but they need to actively protect against disruption in order to maintain growth and momentum.

Potential for disruption of these big players is rife. They all need to find ways to be less rigid and embrace innovation.

Disruption driven by regulatory changes

While the passage of the Affordable Care Act largely left the pharmaceutical industry untouched, the regulatory impacts on patients, insurers, hospitals, and providers have affected pharma indirectly by raising expectations for greater transparency, efficiency, and patient-centric practices. However a new administration has created new regulatory uncertainties. While some factions remain vocal about increasing pharma regulations, the Trump administration has been a strong proponent of decreased requirements for research, development, and clinical trials⁴. A shift in this direction could enable increased speed-to-market and greater innovation.

Disruption driven by technology

For many years, Big Pharma has been characteristically conservative in its adoption of new digital technologies, lagging behind other industries that have undergone significant changes. However, this stance is becoming increasingly untenable as the market demands more innovative solutions. The FDA's embrace of digital health initiatives leaves the door wide open to mobile health (mHealth) applications⁵. Likewise, advances in AI, cognitive computing, 3D printing, Internet of Things, and blockchain technology hold great promise in helping to transform all aspects of the pharma industry as we know it, enabling a future that is more personalized, precise, and portable.

Disruption driven by business model innovation

Technology is a key ingredient for innovation, but the greatest transformations are the result of deep insights into the wants, needs, and frustrations of the markets served. Pharma companies in particular are increasingly examining ways to go beyond pills and products, orchestrating touchpoints and technologies to provide end-to-end solutions that radically improve the way conditions like diabetes and COPD are treated⁶. New business models are beginning to emerge that place patients at the center, ultimately making it easier for them to take control over their own healthcare decisions while simultaneously delivering better patient outcomes.

Disruption from unexpected sources

The pharma giants that make up our peer group will maintain their hold on the industry for the foreseeable future. However, these giants should keep a watchful eye toward potential disruption from outside entrants into the field, both large and small. Digital leaders like Amazon, Apple, and Google are focused on reinventing major aspects of the pharma value chain, from R&D to manufacturing and delivery. But smaller startups and "garage labs" are also making their mark, focusing on niche specializations and taking advantage of agility that the big players lack. In this complex and evolving landscape, partnerships and collaboration are key.

MODEL DISRUPTION



Telemedicine

The flu epidemic this past year provides a good example of where telemedicine would be useful. Many were told not to come to the hospital if it wasn't urgent. If people are able to stay home and still be able to consult with a doctor, risks like flu contagion can be reduced.

Telemedicine, which was originally created to treat patients located in remote areas, has now become more prevalent due to the technological digital advances.⁷ From using the telephone and sending X-rays between offices to now personalized video chat and mobile applications, medical care is becoming increasingly convenient.

Along with accessibility to doctors and specialists, another benefit of telemedicine is cost savings. The technology could streamline the expensive and slow clinical trial process. To recruit participants to a randomized trial, researchers could use a digital health platform to reach out to potential candidates around the country and could also monitor trial participants in their own homes and communities.⁸ By being able to effectively aggregate that data, telemedicine should not only reduce the cost of observational studies but also expedite findings within the data.⁹

In general, telemedicine is about removing a point of friction in the patient experience. Scheduling doctor visits around work, for example, or traveling to repeated appointments is enough to stop patients from pursuing medical treatments. With telemedicine, this barrier is significantly reduced.



Self-Tracking

Self-tracking runs the gamut from tracking sleep quality to blood pressure to cognitive skills. Categories include offerings such as “smart clothes,” “insideables” (devices implanted in your body), and “digestables” (pills that can be swallowed to track specific data.)¹⁰ There are companies like 23andMe which will analyze your DNA and uBiome that analyzes your microbiome.

The advent of these new technologies has allowed individuals to take more control of their health. It's now easier to track your health, as well as engage in creative ways to facilitate behavioral changes for better health. The technologies have shifted the paradigm from a sickness-based model to a preventative one.

What's driving the phenomenon is the quest for more data. Not only from individuals wanting to learn more about themselves, but also healthcare companies with their insatiable thirst for more information. Because this new data is easier to collect, pharma companies are able to tap into this resource to help with broader and deeper data analysis, more efficient clinical trials, and better medical adherence.

Just this past year, for the first time, the FDA approved the first smart pill called Ablify MyCite developed by Proteus Digital Health and Otsuka Pharmaceuticals. The pill is meant to monitor medicine taking to help improve adherence.¹¹



Gamification

While gamification is an older digital trend, it's seeing new life in the pharmaceutical industry as a way to change or reinforce certain behaviors. It's a way to keep people focused, motivated, and engaged via rewards or recognition. For healthcare in general, it's a great way to encourage preventative care and better health habits; for example, counting and tracking how many steps you take over time. Regarding pharma, gamification has helped in drug adherence to encourage better medication management.

The cynic would say this is just another way to keep selling pills. It's true, they're in the business of making money; more pills equals more money. But they're also in the business of saving money. According to Tom Kottler, CEO of HealthPrize Technologies, it's estimated that \$637 billion in revenue loss for pharmaceuticals each year is due to medication non-adherence. Not only that, medical non-adherence is the #1 leading cause of organ rejection in transplant patients.¹² If you want to change someone's habits, you have to engage with them, and gamification is a great vehicle to do that. Kottler explains, “Pharma is a business of getting better outcomes. Pharma can't just sell pills; it has to sell outcomes.”¹³

DISRUPTORS



Telemedicine



[Teladoc](#) is a telehealth company that uses telephone and videoconferencing technology to provide on-demand remote medical care. The company went public in 2015.



[Dr. On Demand](#) is a fast, easy way to consult with an urgent care doctor or psychologist from the comfort of your home.



[American Well](#) provides telemedicine services for health systems, health plans, employers, and physicians.



[Babylon](#) is a subscription health service provider that enables users to have virtual consultations with doctors and healthcare professionals.



[MDLIVE](#) is a telehealth provider focused on digital delivery of convenient, online visits with a board-certified doctor, counselor, psychiatrist, or dermatologist.



Self-Tracking



[iCarbonX](#) is leading the way in the post-genomic era by creating the platform for digitizing, analyzing, and understanding life.



[Cue](#) is a deep health tracker that lets you go beyond tracking steps and your weight.



[Proteus](#) is a digital medicine offering that measures the effectiveness of medication treatment and helps physicians improve clinical outcomes.



[Scanadu](#) is developing next-generation tests, devices, and services that empower anyone to monitor and better understand their own health – anytime, anywhere.



[uBiome](#) is a biotechnology company that analyzes and sequences the human microbiome.



[Akili](#) builds clinically-validated cognitive therapeutics, assessments, and diagnostics that look and feel like video games.



[Ayogo](#)'s experts can help improve patient engagement, compliance, and patient activation.



[Cohero Health](#) is a digital health company that empowers respiratory patients to engage in their care through a proprietary-connected platform.



[Mango Health](#) is a mobile health company on a mission to inspire and empower patients with chronic conditions to lead healthier lives.



[MEGA MEDS](#) is a free medicine management app that encourages you to track your medications through a game.



Gamification

TECH DISRUPTION



AR/VR

Similar to the aforementioned disruptions, augmented reality and virtual reality can be used in the collection of data or improvement of medical adherence. However, where AR/VR might be able to add the most value is in education.

The obvious example is education and training for doctors and healthcare professionals. Simulated surgeries can help supplement real-world experiences and provide effective hands-on training and practice for both doctors and students.¹⁴

For patients, AR/VR can be used for disease and medicine awareness. Regarding disease, AR/VR can simulate the effects of a certain condition. It would allow patients to see and experience the treatment which could help remove any uncertainty or anxiety.¹⁵ In terms of medicine, for example, rather than getting a box with hard-to-read instructions, patients would be able to see how to use a certain device and then how the drug will function within your body.¹⁶

Finally, from a pharma business-model perspective, AR/VR can help in marketing. Instead of a sales rep bombarding a healthcare professional with stats and graphs, an immersive experience that they could see would be much more compelling.¹⁷ Also, creating a sense of empathy in which the client could see and feel what their patients will experience, is an effective way to simulate a shared understanding.¹⁸



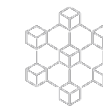
3D Printing

Fast-forward a few years – maybe a few decades – and instead of waiting for your doctor to write you a script, you’ll be able to walk into a pharmacy and the pharmacist will print your medication within 15 minutes. Maybe even instead of a prescription, your doctor writes you an algorithm that you can take home and enter into your own personal 3D printer.¹⁹ Even though these scenarios may take years to come to fruition, 3D drug printing first arrived when the FDA approved a 3D-printed pill from Aprelia Pharmaceuticals in 2015.²⁰

The hopes for 3D drug printing are that it will make drugs not only cheaper and more accessible, but also more personalized. As we begin to understand our “quantified self,” it will be possible to customize the dosage based on one’s biology. According to Max Shtein, a researcher from the University of Michigan, “A doctor prescribes a certain amount of a drug not because it is the right amount to take but because that’s the number of milligrams it comes in,” he said. “This allows the ultimate tune-ability.”²¹

Along with fine-tuning drug taking for individuals, 3D printing also has the potential to make the overall drug creation process more efficient. The technology could improve the R&D phase where it could be possible to 3D-print sample tissues and organs for drug-testing purposes.²² The intent is to test out drugs on 3D human organs instead of on animals or synthetic models.

Obviously, this technology will raise huge questions, with the FDA playing a major role on how quick 3D drug printing is adopted.



Blockchain

Blockchain software is a digital ledger system used to record and log transactions that are inherently resistant to modification of the data. Besides financial services, healthcare is a close second in terms of the value blockchain could yield. Because Big Pharma deals with sensitive data, blockchain would be able to keep data decentralized. The data wouldn’t reside with the pharmaceutical companies, but instead in “blocks.”²³ Through this technology, the data could become more accessible, allowing all parties to collectively use the data to make better decisions.

In addition, the distributed ledger technology could play a huge role in supply chain management, in part by putting a dent in the counterfeit medicine trade. It’s estimated the global annual loss due to counterfeit drugs is \$200 billion.²⁴

As Pharmaceutical Technology points out, “there are in-built vulnerabilities in the drug supply chain at the many points where drugs transfer ownership on their way to patients, and pharma manufacturers and other stakeholders have little visibility to track the authenticity of products. Blockchain could provide significant benefits here, with barcode-tagged drugs scanned and entered into secure digital blocks whenever they change hands. This ongoing real-time record could be viewed anytime by authorised parties and even patients at the far end of the supply chain.”²⁵

With greater visibility across the supply chain, it makes it that much harder for fake meds to reach the market.

DISRUPTORS



AR/VR

mindmaze

[MindMaze](#) builds intuitive human/machine interfaces through its breakthrough neuro-inspired computing platform.



[Firsthand Technology](#) is a virtual reality platform that helps relieve acute and chronic pain.



[Osso VR](#) is the leading, validated virtual reality surgical training platform designed for surgeons, sales teams, and hospital staffs.

appliedVR

[AppliedVR](#) provides a virtual reality platform to offer patients a highly enjoyable escape from scary and painful experiences in healthcare.



[GestureTek](#) is an interactive technology for therapy and rehabilitation.



3D Printing



[Aprecia](#) is a drug-delivery technology platform company committed to enhancing the patient experience through novel approaches for the delivery of drugs.



[MakerBot](#) is a global leader in the 3D printing industry.



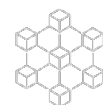
[Aspect Biosystems](#) is a 3D bioprinting and tissue engineering company that creates human tissue on demand.

organovo

[Organovo](#) creates bioprinted human tissue models that are structurally and functionally accurate.



[Nano Dimension](#) is focused on R&D for advanced 3D-printed electronics. The company also successfully bioprinted stem-cell-derived tissues.



Blockchain



[Blockverify](#) is a blockchain-based, anti-counterfeit solution.



[Viant](#) is a blockchain-based platform for modeling business processes, tracking assets, and building supply chains of the future.



[Guardtime](#)'s KSI is a blockchain platform designed for enterprise solutions with security, scale, and performance built in.



[Chronicled](#) is a blockchain technology company for the secure exchange of physical assets.



[iSolve](#) provides blockchain innovation for biopharma using Advanced Digital Ledger Technology to advance the drug development lifecycle.

BIG TECH

The once formidable regulatory moat that surrounds the pharmaceutical industry can keep Big Tech at bay for only so long. Companies like Apple, Google, and Amazon have found the backdoor to the empire, and the only way Big Pharma will survive is if they share in the spoils.



Collect the data...

Starting with wellness apps and devices, Apple continues to encroach on the healthcare landscape. In a recent interview with Fortune, Tim Cook made it sound as though that's just beginning. Cook states, "(healthcare) is a business opportunity....if you look at it, medical health activity is the largest or second-largest component of the economy."²⁶

Apple has broadened its reach from doctor/patient relations to patient care at home and medical research. But with 1B+ active users of its devices, Apple clearly has a huge head start in the collection of data.²⁷

One example is Apple's ResearchKit released in 2015. Researchers at Stanford University School of Medicine were able to enroll 54,000 patients in a heart study and track their physical activities, sleeping hours, and fitness.²⁸ Apple also partnered with GlaxoSmithKline where they used the ResearchKit for clinical trials and studies with the intent of making the clinical research process more efficient and less costly.²⁹

More recently, again with Stanford, Apple launched an app that allows the company to gather irregular heart rhythm data from Apple Watch's heart rate sensor called the Apple Heart Study app.³⁰



Analyze the data...

Google also has been wading in the pharmaceutical waters where, for example, it is leveraging Google Cloud to facilitate the collection and sharing of medical images.³¹ The company is also developing a digital contact lens which will be able to measure blood sugar.³²

In terms of its core competencies, Google is in a prime position to help with the analysis of data. From Google's healthcare website, the company states, "We think that AI is poised to transform medicine, delivering new, assistive technologies that will empower doctors to better serve their patients. Machine learning has dozens of possible application areas, but healthcare stands out as a remarkable opportunity to benefit people." Google continues, "Two of the areas we're most excited about and where we've made the most progress in research to date are ophthalmology and digital pathology."³³

Google will also be able to predict if you're going to die...kind of. They are developing a version of artificial intelligence that could predict the outcome of your hospital visit the moment you're admitted. The algorithms provide valuable research whereby it could not only warn doctors to act sooner in order to increase patients' survival chances, but also reduce the cost of healthcare through more accurate diagnoses.³⁴



Fulfill the data...

With the recent announcement of the Amazon/JP Morgan Chase/Berkshire Hathaway partnership,³⁵ there's no doubt healthcare is firmly in Amazon's sights. If Amazon sees an opportunity where it can leverage its size and utilize technology to drive down costs, it's guaranteed they'll go after it.

Even though details of the JP Morgan/Berkshire partnership are sparse, the common sentiment among analysts is that Amazon will go after the simpler markets first like medical supplies and devices.³⁶ From there, pharmaceuticals could follow.

Amazon already sells branded, over-the-counter medications such as Advil, Mucinex, and Nicorette. In addition, last August, Amazon rolled out a line of consumer health products called Basic Care in partnership with Perrigo.³⁷ This doesn't necessarily point to prescription drugs as the next step since the company would have to navigate the complex, primarily state-based regulatory environment. But that said, according to a review of records by the St. Louis Post-Dispatch, Amazon has received approval for wholesale pharmacy licenses in at least 12 states.³⁸

IMPLICATIONS



DRIVE THE INNOVATION WAVE

Major pharma companies would be remiss to sit back and watch startups and Big Tech transform the landscape around them.

The smartest incumbents are channeling the forces of disruption to their own ends, leading digital transformation in order to avoid ultimately being left behind.



While this pharma giant's scale was once considered a liability to innovation, Johnson & Johnson has made aggressive changes to position itself as a leader in the industry's digital transformation. An Innovation division was founded to break down silos, explore new partnerships, and incubate ideas to positively impact all aspects of human health. The division's bold moves are now beginning to make headlines. The company joined a revolutionary FDA program to fast-track digital health applications³⁹ while simultaneously rolling out an omnichannel Health Partner platform⁴⁰ that has the potential to set a new gold standard for digitally-enabled, patient-centric care, regardless of condition.



Pfizer has taken a relatively cautious, measured approach, focused less on breakthrough transformation and more on delivering greater value and efficiency within existing business models.⁴¹ While their strategy may need adjustment to sustain momentum in this rapidly evolving landscape, Pfizer's strong track record of successful digital initiatives is helping to steadily advance the industry. Notably, the company has made significant strides in digitizing their global supply chain.⁴² Their IBM Watson partnership is uncovering new applications of AI ranging from drug discovery to patient diagnosis. Pairing AI with rich data from wearables and biosensors also helps improve patient outcomes.⁴³



An entrepreneurial spirit is central to Merck's digital transformation strategy. Through the Merck Global Health Innovation Fund, the company has cultivated a strong portfolio of startups that will play a key role in reshaping the digital health landscape. Merck recently announced its fourth "health innovation hub" to be located in Austin, Texas,⁴⁴ partnering startups with academia to develop new solutions. Believing that data is "the currency of healthcare," Merck is focused heavily on merging existing with new data sources to accelerate clinical trials and improve quality of care.⁴⁵ Innovative AI-driven models for drug design are emerging through partnerships with firms like Atomwise and Numerate.⁴⁶



When AbbVie spun off from Abbott Laboratories in 2013, the new company restructured to place patient-centricity and innovative thinking at its core.⁴⁷ This decision is now paying dividends as AbbVie shows great momentum, being recognized as a medical innovation leader and potential model for how modern pharma companies should operate. Much of their success is attributable to an impressive drug portfolio and robust pipeline.⁴⁸ However, AbbVie also shows unique prowess for transforming products into services that enhance the patient experience. Humira, for example, incorporates mHealth apps and IoT to provide ongoing support and resources across the full treatment journey.



REALIZING THE FUTURE OF PHARMA

In what will likely become one of the most exciting periods of innovation in pharma's history, we look at key areas where pharmaceutical companies must focus in order to drive the industry forward.

Strike a careful balance

To stem the tide of disruption that threatens to steal growth and momentum one brand at a time, pharma giants must commit firmly to innovation across the board. However, the pace of innovation is unpredictable, making it just as important for pharma companies to maintain their existing digital efforts until viable new service models emerge.

Keeping this balance can be quite a challenge, especially if the funds for both of these efforts are drawn from the same budget. Faced with a choice between optimizing an existing campaign with success a near-certainty versus spending the same funds on exploring potentially transformative yet unproven new service models, the choice for most pharma CMOs is clear.

Investments in SEO/SEM and display ads will remain hugely important as they play a key role in converting unbranded searches about conditions into awareness of the brands designed to address the conditions. Likewise, smart social tactics will remain valuable even in spite of the requisite challenges of adverse event reporting.

Nonetheless, these kinds of investments will do little to sway consumers when faced with alternatives that place them in control of their conditions and ultimately deliver better outcomes. Pharma companies need to ensure that separate budgets are allocated towards keeping their brands at the forefront of the innovation wave.

Patient-focused digital transformation

While it's easy to chase technology advancements as a way to stay current, breakthrough innovation comes from a deep understanding of a patient's treatment journey.

Today's typical journey entails navigating a series of disconnected parties – doctors, pharmacies, insurers – each one requiring the patient to adapt rather than they themselves adapting. Patients can feel like cogs in a complex machine, and are often left to wonder if their efforts are achieving the best outcomes.

In tomorrow's journey, all of these parties will be unified into a single service, orchestrated around key moments along the patient's continuum of care. Mobile apps and web portals will keep treatment on track, while biosensors and AI will provide clinicians with rich data and insights to enable delivery of timely, personalized patient-care decisions. Each brand in a company's portfolio presents a new opportunity to deliver this level of patient service.

Invest in operational efficiency

Beyond the patient experience, pharma giants must also identify operational areas where new technologies can help increase competitive advantages. Many have made major investments in AI and blockchain to accelerate clinical trials, aid drug R&D, and optimize supply chains – making it all the more important for other pharma companies to watch the competition and match their efforts to avoid being left behind.



Digital strength may be the most important determinant of business health and future growth not being measured or managed by enterprises today. Managing against this measure is essential for all businesses that want to grow – if not survive.

Not only do we believe companies should be tracking their Digital Strength, they should also approach digital the same way that digital businesses do: build digital scale and strength before pursuing monetization. All too many traditional corporations make the mistake of applying the same metrics and hurdle rates to digital as they do to their other channels.

Companies should rethink how they develop business cases for possible digital investments.

To properly account for the disproportionate impact of digital on future revenues and shareholder value, companies might want to value digital revenue and digitally-influenced revenue higher than traditional channels.

They need to consider whether a loss of market share is an indication that they are not investing enough in digital. Few business cases include the cost of doing nothing, but they should.

SOURCES

1. <http://business-ethics.com/2016/05/05/1606-drug-companies-pony-up-in-illegal-marketing-cases-but-critics-wonder-if-penalties-are-enough-see-more-at-http/>
2. <http://www.pharmtech.com/finding-right-mix-2018-biopharma-success>
3. <https://www.fda.gov/medicaldevices/digitalhealth/>
4. <https://www.wsj.com/articles/how-apps-can-help-manage-chronic-diseases-1498443120>
5. <https://www.biopharmadive.com/news/pharma-of-the-year-abbvie-humira-2017/509912/>
6. <http://www.investor.jnj.com/releasedetail.cfm?ReleaseID=1044155>
7. <https://evisit.com/what-is-telemedicine/>
8. <https://mhealthintelligence.com/news/is-pharma-ready-to-realize-the-value-of-mhealth>
9. <https://www.forbes.com/sites/joshwolfe/2015/10/29/telemedicine-making-drug-trials-cheaper-and-quicker/>
10. <http://medicalfuturist.com/what-comes-after-the-wearable-health-revolution/>
11. <https://www.fiercebiotech.com/medtech/otsuka-proteus-win-fda-approval-for-digital-medicine>
12. <https://technomy.com/conf/health17/videos-short-talks-health-17/how-gamification-and-behavioral-economics-help-people-take-the-drugs-theyre-prescribed/>
13. <https://technomy.com/conf/health17/videos-short-talks-health-17/how-gamification-and-behavioral-economics-help-people-take-the-drugs-theyre-prescribed/>
14. <http://www.pharmavoices.com/article/2016-11-virtual-reality/>
15. <http://josephineborrillo.com/vrar-for-pharma-2/>
16. <https://www.mddionline.com/ar-and-vr-are-poised-revolutionize-medtech%E2%80%94are-you-ready>
17. <https://www.pm360online.com/virtual-reality-in-pharmaceutical-marketing-the-targets-point-of-view/>
18. <https://www.pm360online.com/vr-in-pharma-marketing-going-beyond-moa-to-shift-behavior/>
19. https://www.washingtonpost.com/news/innovations/wp/2015/08/11/why-it-matters-that-the-fda-just-approved-the-first-3d-printed-drug/?utm_term=.0ca6118f3189
20. https://www.aprecia.com/pdf/2015_08_03_Spritam_FDA_Approval_Press_Release.pdf
21. <https://gizmodo.com/the-future-of-pharmaceuticals-is-printing-custom-drugs-1818846684>
22. <http://social.eyeforpharma.com/clinical/3d-printing-set-revolutionize-pharma>
23. <https://www.forbes.com/sites/julianmitchell/2017/12/15/how-blockchain-a-i-and-other-tech-trends-will-disrupt-healthcare-in-2018/#567a9422127f>
24. <http://www.healthcareitnews.com/news/next-big-thing-pharmacy-supply-chain-blockchain>
25. <https://www.pharmaceutical-technology.com/features/blockchain-pharma-opportunities-supply-chain/>
26. <http://fortune.com/2017/09/11/apple-tim-cook-education-health-care/>
27. <https://www.macrumors.com/2018/02/01/apple-now-has-1-3-billion-active-devices-worldwide/>
28. <https://www.nytimes.com/2017/12/26/technology/big-tech-health-care.html>
29. <https://www.theverge.com/2016/7/18/12211970/apple-GlaxoSmithKline-researchkit-first-study>
30. <https://www.theverge.com/2017/11/30/16719458/apple-watch-study-irregular-heart-rhythms-stanford-university>
31. <https://medcitynews.com/2017/11/google-imaging/?rf=1>
32. <http://medicalfuturist.com/augmented-reality-in-healthcare-will-be-revolutionary/>
33. <https://research.google.com/teams/brain/healthcare/>
34. <https://www.marketwatch.com/story/google-is-developing-its-own-prescription-for-us-health-care-costs-smarter-artificial-intelligence-2018-02-08>
35. <https://www.bloomberg.com/news/articles/2018-01-30/amazon-berkshire-jpmorgan-to-set-up-a-health-company-for-staff>
36. <https://www.fiercepharma.com/pharma/amazon-eyeing-medical-device-sales-before-pharmaceuticals-report>
37. <https://finance.yahoo.com/news/amazon-quietly-launched-exclusive-line-201400306.html>
38. http://www.stltoday.com/business/local/amazon-gains-wholesale-pharmacy-licenses-in-multiple-states/article_4e77a39f-e644-5c22-b5e6-e613a9ed2512.html
39. <https://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm577480.htm>
40. <https://www.jnj.com/innovation/health-partner-for-weight-loss-and-joint-pain>
41. <http://syneoshealthcommunications.com/blog/pfizers-innovation-lead-on-changing-culture>
42. <https://rctom.hbs.org/submission/pfizers-digital-supply-chain-transformation-innovation-or-necessity/>
43. <http://www.wired.co.uk/article/pfizer-wired-health>
44. <https://medcitynews.com/2017/07/merck-reveals-plans-role-austin-health-innovation-hub/>
45. <http://merckghifund.com/>
46. <https://www.wsj.com/articles/how-ai-is-transforming-drug-creation-1498442760>
47. <https://www.abbvie.com/our-company/strategy.html>
48. <https://www.abbvie.com/our-science/pipeline.html>

CONTRIBUTORS



Arun Muthupalaniappan

CO-FOUNDER, ALPHA-DNA

Arun is co-founder and Managing Partner at alpha-DNA. Through his 20+ year career, he has led data-centric capabilities transformation across Fortune 500 brands. He has a successful track record of designing and monetizing information-based strategies across consumer finance, retail, e-commerce, and advertising businesses. Prior to founding alpha-DNA in 2014, Arun was Senior Vice President, Global Analytics & Research at The Western Union Company. He has also held leadership roles at Sears Holdings, GE Capital (Analytics Center of Excellence), and STARCOM (Media Research). Arun holds a Masters degree in Marketing from MICA and a Bachelors in Business Administration from Loyola College.



Rod Fertig

CO-FOUNDER, ALPHA-DNA

Rod is co-founder and Partner of alpha-DNA. He has spent over a decade leading customer and digital analytics transformation inside large global financial services businesses. Rod is passionate about creating structure around unstructured digital data, making it truly actionable for improved high-value decisions. Prior to alpha-DNA, Rod was Vice President, Global Analytics & Research at The Western Union Company where he led their digital analytics, pricing strategy, and account-based relationship optimization teams. He has also held roles at Capital One where he was responsible for credit risk management and policy, offer strategy, and customer value optimization. Rod has a BS degree in Economics from Duke University.



Tony Owens

**EXPERIENCE STRATEGY &
DESIGN DIRECTOR, ISOBAR US**

Tony holds a deep talent and passion for delivering interactive solutions that captivate users, ranging from omnichannel marketing ecosystems to complex B2B applications. Drawing from 20 years of diverse digital experience, he leads companies through experience and service design processes to achieve transformational outcomes. Tony's extensive healthcare experience includes engagements with Johnson & Johnson, Pfizer, Abbot, Novartis, and Bayer AG. Most recently, he's worked with Alcon to unify their global digital ecosystem and IntegraMed Fertility to establish a digitally-enabled vision for the future of fertility services. He holds a Masters degree from the prestigious Interactive Telecommunications Program (ITP) at NYU's Tisch School of the Arts.



Bryce Tolman

THOUGHT LEADERSHIP MANAGER, ISOBAR

Bryce is the Thought Leadership Manager at Isobar. He has 15+ years in the public and private markets. Previously an equity derivatives trader, Bryce has shifted his focus to financial research and data analysis. He is passionate about finding value in obscure places or where others might not be looking. Bryce has an MBA in Finance and Entrepreneurship from the University of Chicago Booth School of Business, and a BA in International Studies from the University of Washington.

CONTACT

*Your digital
transformation
starts here:*

isobar

300 East Randolph
Suite 4000
Chicago, IL
60601
1 (800) 700 0098

info@us-isobar.com



117011 Lincoln Avenue
PMB 73
Parker, CO
80134
1 (877) 874 8628

info@alpha-dna.com

isobar +  alpha-DNA