



Disruptive Forces in US Healthcare

Capturing the Digital Opportunity

Pharmaceutical Information Systems Association
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- BS, Indian Institute of Technology (IIT); MBA, Kellogg

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Partner, McKinsey & Company

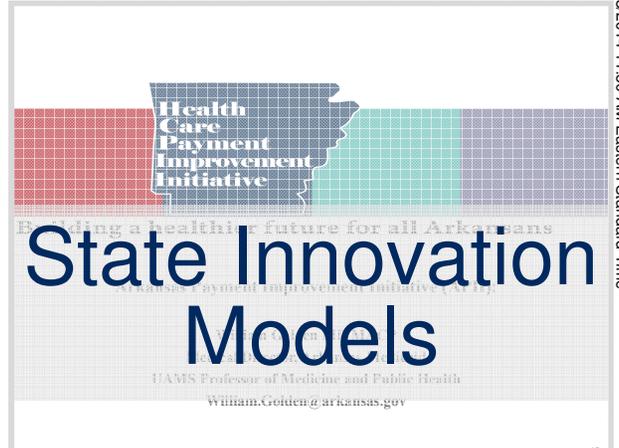
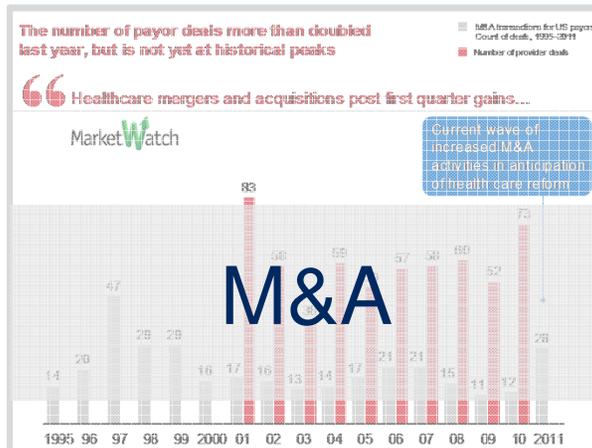
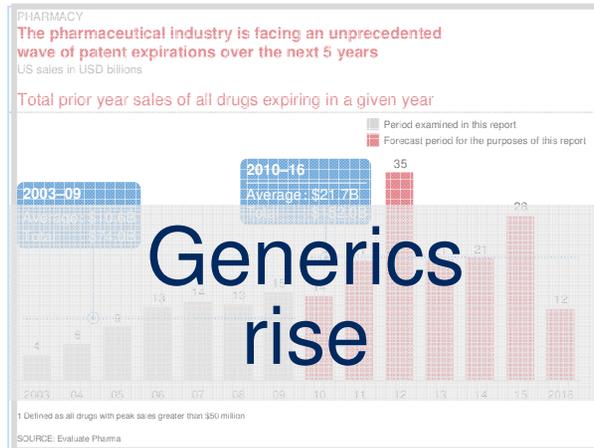
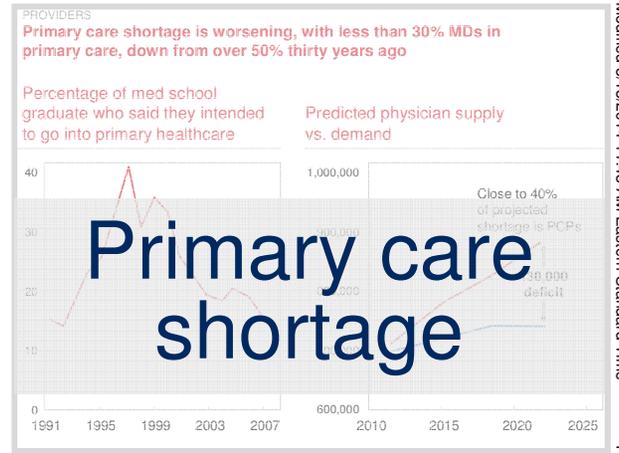
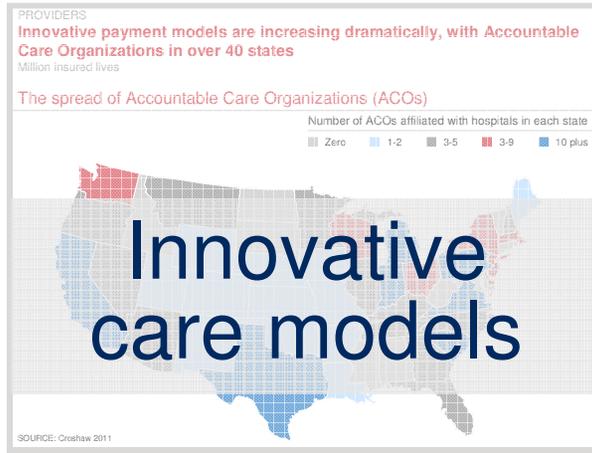
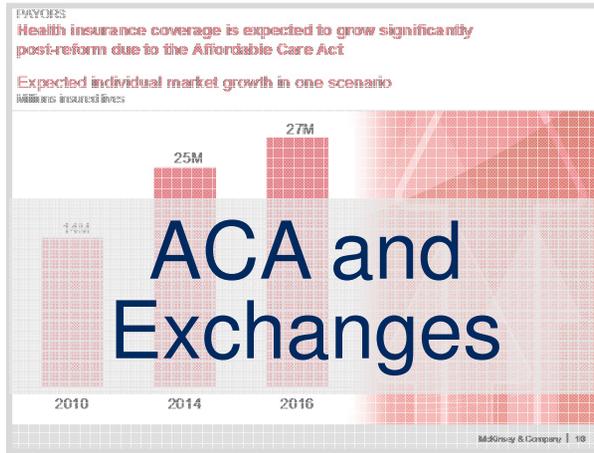
- Branded and Generic Pharmaceuticals
- Digital Marketing and Sales
- PhD, Economics, University of Chicago

Contents

Disruptive forces shaping the US Healthcare industry

- Capturing the Digital Opportunity

The current landscape represents unprecedented shifts across the industry



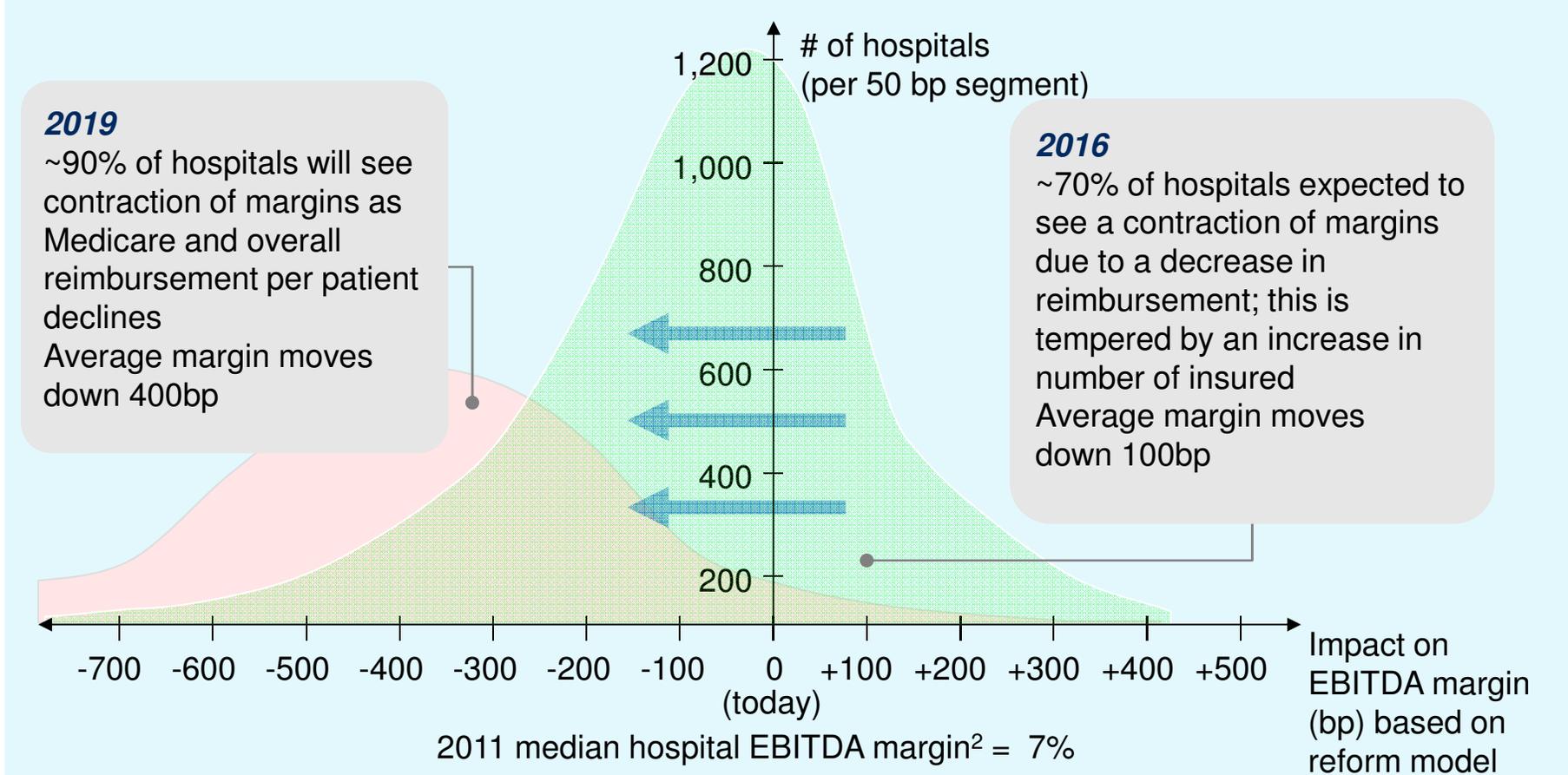
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PROVIDERS

Providers are struggling to maintain future profitability with declining reimbursement

2016 2019

Distribution of reform impact on hospital customer's EBITDA margins¹



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¹ 3248 US acute care hospitals modeled in Objective Health; assumes all states expand Medicare and hospitals do not make changes to cost or revenue
² Median determined by margin at 50% of hospital market revenue
 SOURCE: Objective Health Outside in Reform Impact estimates; CMS Cost Reports 2010

PROVIDERS

Six strategic priorities for providers

- 1 Implement **broad-ranging cost control programs**, (“Medicare margin” efforts)
- 2 Build sufficient **scale in core hospital operations** (through in-region M&A or outsourcing), and expand across the continuum of care
- 3 Drive **physician alignment** to support efficiency and quality improvements and improve care coordination
- 4 Explore the full range of **innovative reimbursement models** (including episode-based payments, ACOs or even IDNs)
- 5 Create a **distinctive capability in infrastructure** that addresses value over volume (e.g., EHR & IT infrastructure to allow for data exchange)
- 6 Strengthen **retail capabilities**, including more sophisticated value-based pricing, direct-to-consumer and direct-to-employer supplemental care products

CHANNEL

New types and combinations of intermediaries are emerging



CHANNEL Intermediaries – strategic priorities

| PBMs | Retailers | Distributors |
|---|--|---|
|  <p>Differentiating on cost by offering narrow formularies and more aggressive product management</p> |  <p>Playing in specialty (Walgreens / ABC)</p> |  <p>Globalization (e.g., Amerisource Bergen / Alliance Boots)</p> |
|  <p>Scaling mid-size players to be more competitive (e.g., Catamaran)</p> |  <p>Increasing involvement in adherence / outcomes (CVS Pharmacy Advisor)</p> |  <p>New value added services / solutions for providers, payors, manufacturers</p> |
|  <p>Involvement in delivering outcomes</p> |  <p>Providing care or collaborating with providers (CVS Minute Clinic; Walgreens activity in vaccines)</p> |  <p>Value chain migration (e.g., Medline)</p> |
|  <p>Investing in specialty to differentiate and grow</p> |  <p>New approaches to and emphasis on private label (front-store excellence in WAGS/Alliance Boots)</p> |  <p>Strategic redirection (e.g., Celesio)</p> |
|  <p>Negotiating on rebates / COGs, to preserve shrinking EBIT margins</p> |  <p>Growth of omnichannel (drugstore.com and Amazon)</p> |  <p>New sites of care (e.g., McKesson and DSSI, Cardinal and AssuraMed)</p> |

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Key changes to payor market resulting from healthcare reform

| | | |
|---|---|---|
|  | <p>Consumer-driven market</p> | <ul style="list-style-type: none"> ▪ By 2016, ~40% of lives in plans actively chosen by consumers ▪ Individual market 60-70% low/middle income consumers (<400% FPL) ▪ Employer market increasingly consumer choice-driven (e.g., defined contribution private exchanges) |
|  | <p>Key consumer insights</p> | <ul style="list-style-type: none"> ▪ Brand and price matter ▪ Majority say they will trade off provider access to optimize price |
|  | <p>New distribution channels</p> | <ul style="list-style-type: none"> ▪ Many first time buyers likely to seek multiple channels and consultative support ▪ Alternative channels (vs. broker, telesales) expected to grow |
|  | <p>Changing economics</p> | <ul style="list-style-type: none"> ▪ Health plans expect operating margins at 2%-5% similar to government programs ▪ Risk adjustment rules (3R's) will influence economics – e.g., relative value of compliant, chronically ill patients more valuable than relatively healthy patients |
|  | <p>New bases of competition</p> | <ul style="list-style-type: none"> ▪ Competition largely by state and local market ▪ Increasingly consolidated marketplace with significant new entrants (e.g., in managed Medicaid) |

Five strategic priorities for payors

1 **Reduce traditional medical and admin costs** to compete in more price-sensitive world

2 **Further drive down cost (“bend the trend”) through innovative “re-found” health care value approaches**, e.g.,

- Develop narrow networks and new care / payment models
- Manage high-risk patients with improved care management

3 **Shift to a consumer-centric business model and organization**

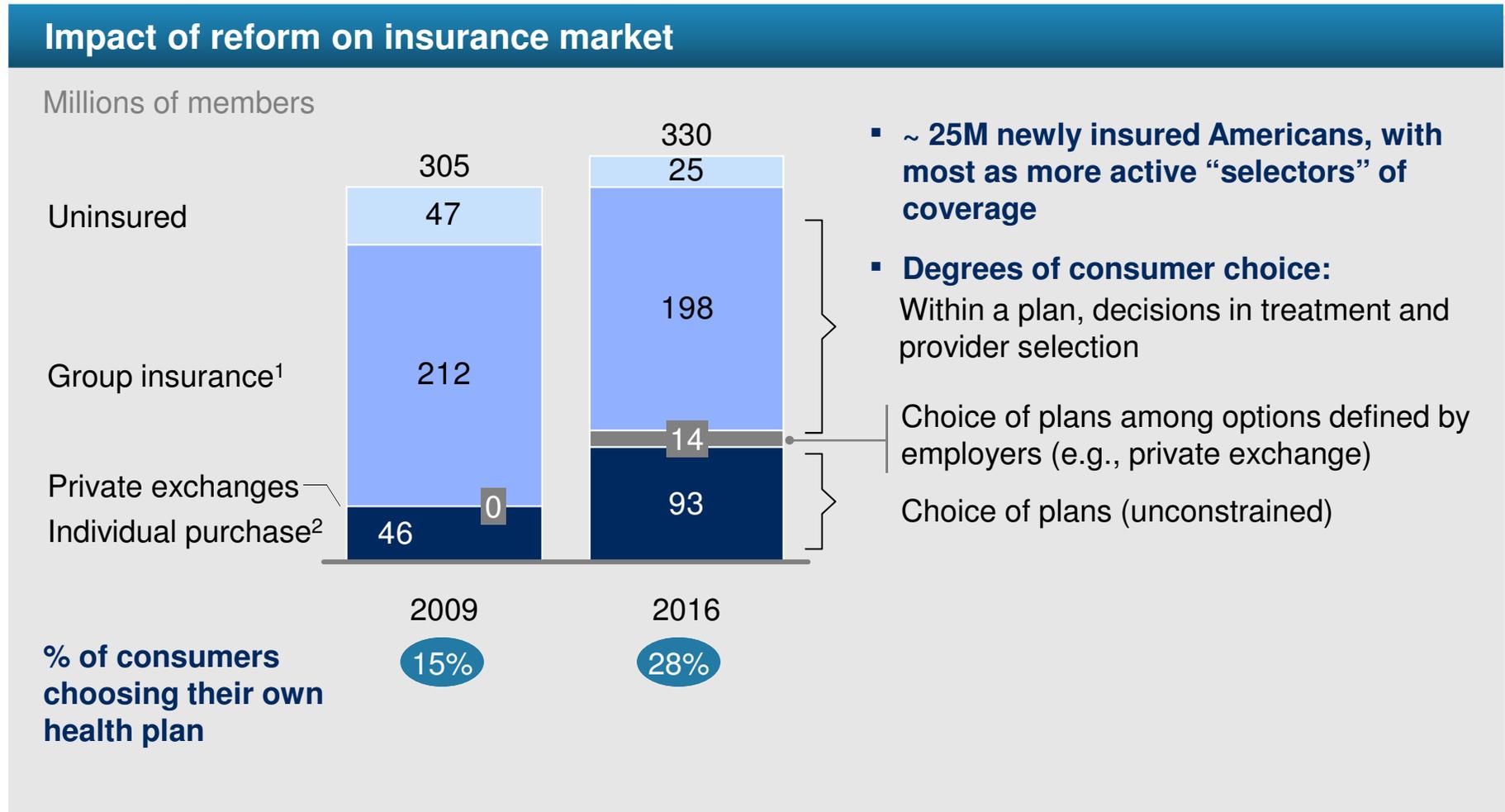
- Evolve offerings to compete in consumer-driven markets
 - Attract profitable high-risk patients
 - Build capabilities in consumer insights and marketing
 - Develop new pricing approaches to replace traditional underwriting
- Develop consumer-facing and care management capabilities to win in the growing government (Medicare and Medicaid) segment

4 **Determine which businesses / markets to play in**

5 **Prepare for new competitors** entering the market (e.g., Medicaid pure plays, providers, other smaller players)

PATIENTS

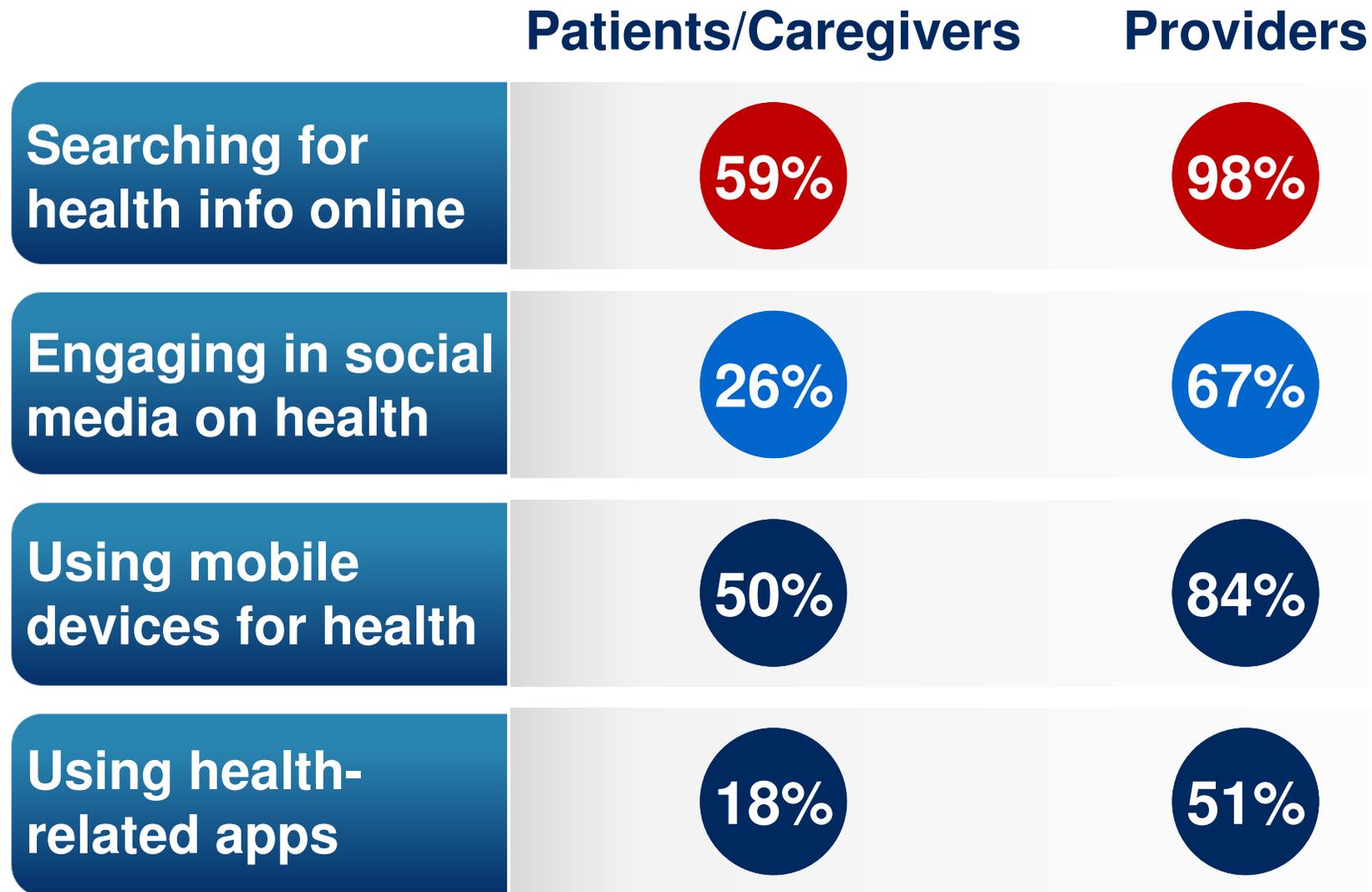
What is the impact on patients? Many more (confusing) choices ...



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1 Includes Medicare (FFS, MA), traditional health plan, medicaid
2 Includes individual coverage, MA-PDP

PATIENTS
... and a digital reaction



Implications vary across portfolio – US pharma access environment diverging

| TA categories | Access environment | Primary care examples | Specialty care examples |
|--|--|--|--|
| <p>Generics available</p> <p>No generics but highly substitutable</p> | <ul style="list-style-type: none"> Payer control is tightening In some cases, net prices are falling | <p>Hypertension 55% of spend</p> <p>Cholesterol</p> <p>>90% discounts up to 70+% rebates</p> | |
| | | <p>Insulin 30% of spend</p> <p>DPP4s</p> <p>SABAs</p> <p>Up to 60+% rebates</p> | <p>Human growth hormone 5% of spend</p> <p>Up to 50+% rebates</p> |
| <p>Hard to substitute once patient is on treatment</p> <p>Highly challenging to substitute</p> | <ul style="list-style-type: none"> Limited payer control Prices are increasing rapidly (up to double digit YoY growth) and rebates are nowhere close to keeping up with the price increase | <p>Combo ICS/LABAs for asthma 8% of spend</p> <p>Up to 20% rebates</p> | <p>MS (inj's) 70% of spend</p> <p>Anti-TNFs</p> <p>Hemophilia</p> <p>Infertility</p> <p>Up to 10% rebates</p> |
| | | <p>Anti-clotting agents 7% of spend</p> <p>0-1% rebates</p> | <p>Orphan txs 25% of spend</p> <p>HIV</p> <p>Most of Onc</p> <p>0-1% rebates</p> |

What does this all mean?

More healthcare spending

Increased healthcare consumption, and potentially in new outlets

Greater value orientation

Governments, payors, consumers, and employers will all seek greater value

Margin squeeze

Margin pressures mean players must evolve and differentiate on value

Confused consumers

Consumers changing coverage face complicated healthcare landscape



What role will technology play in all this disruption?

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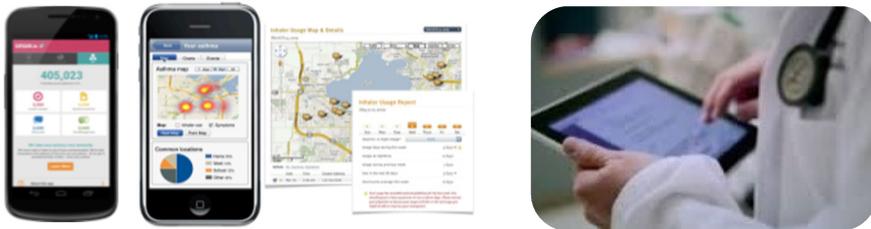
- Disruptive forces shaping the US Healthcare industry
- **Capturing the Digital opportunity**

There are six main drivers of digital transformation for Pharmaceutical companies

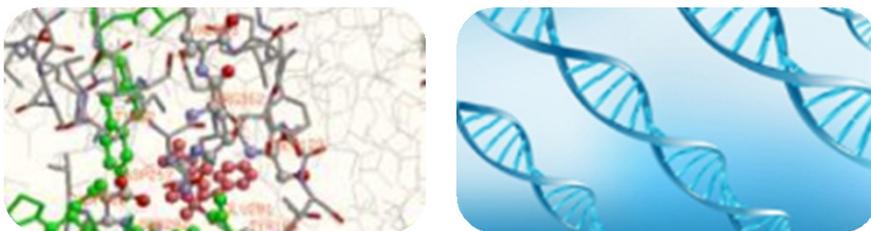
Healthcare IT: Most transactions are digital now



Mobile healthcare becoming platform for interactions



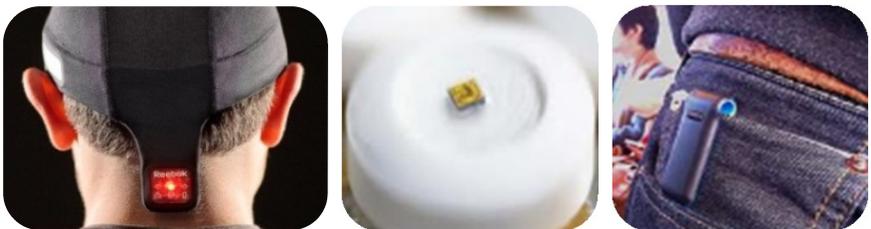
Genomics driving more personalized care



Social media use driving insight and influence



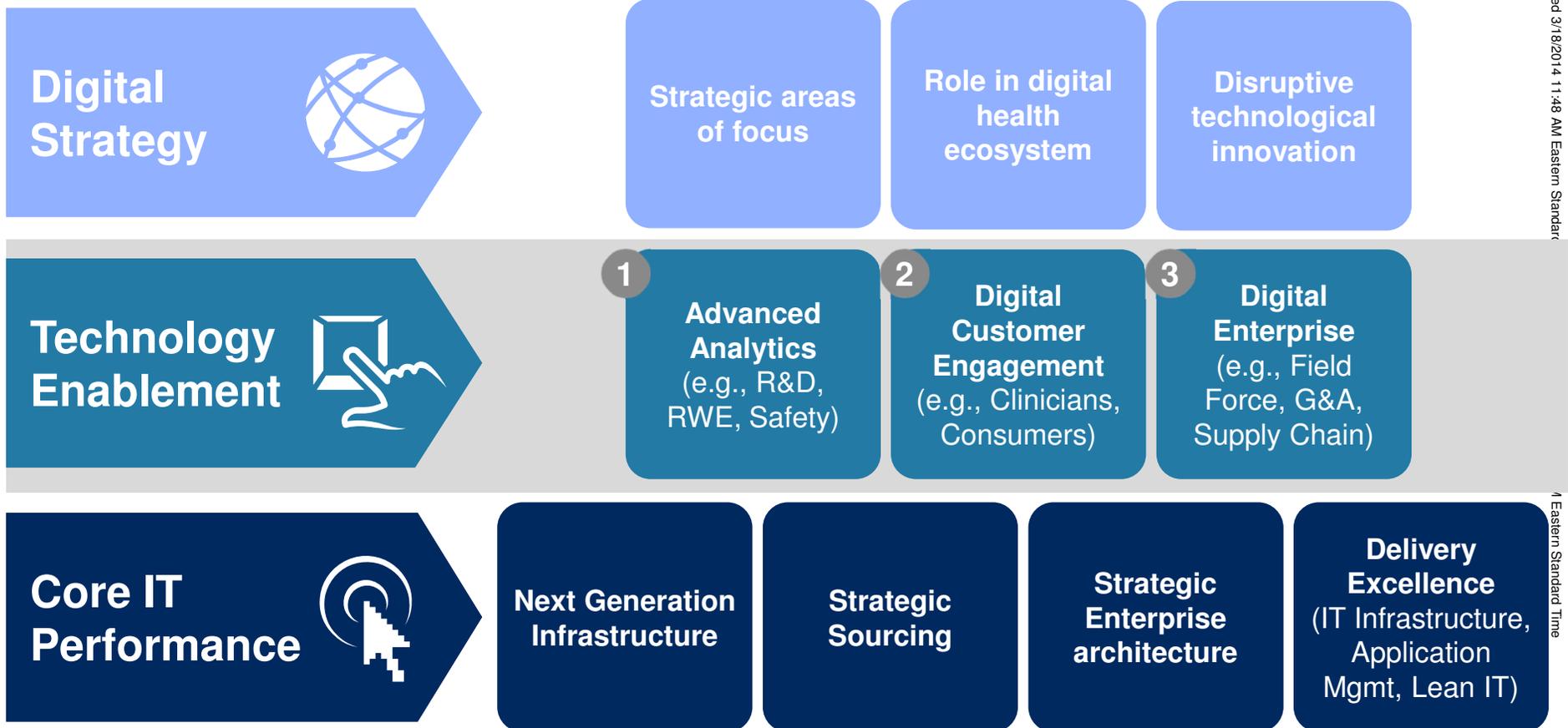
Sensors providing real time insight on patients



Big data/advanced analytics



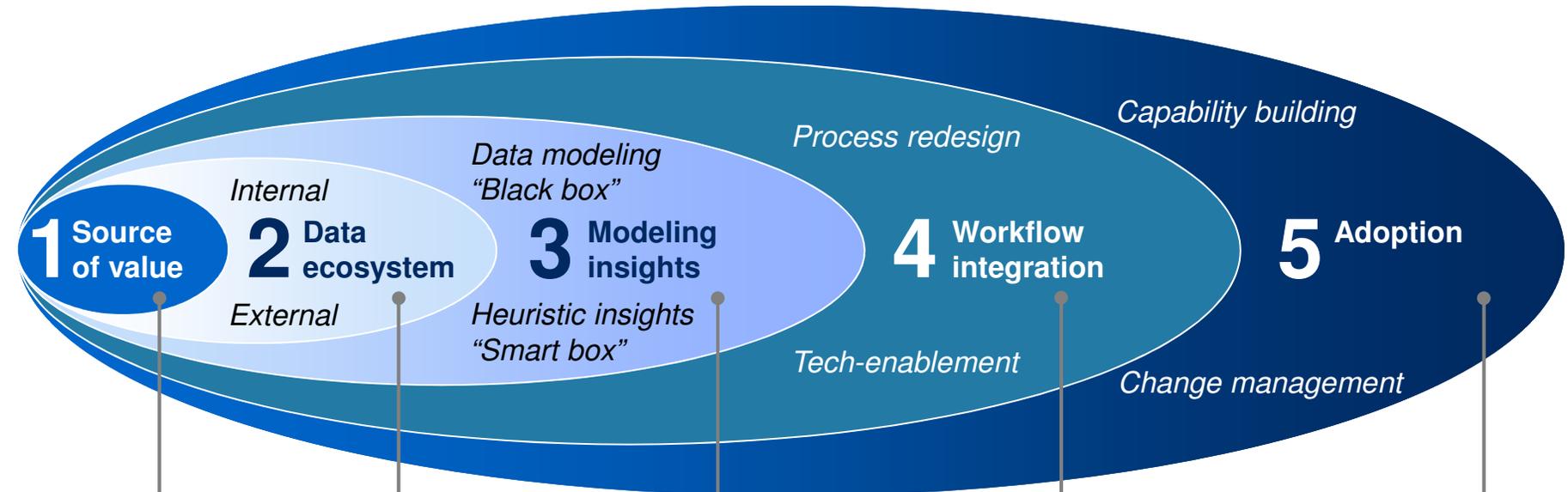
Need for a top-down technology enabled strategy



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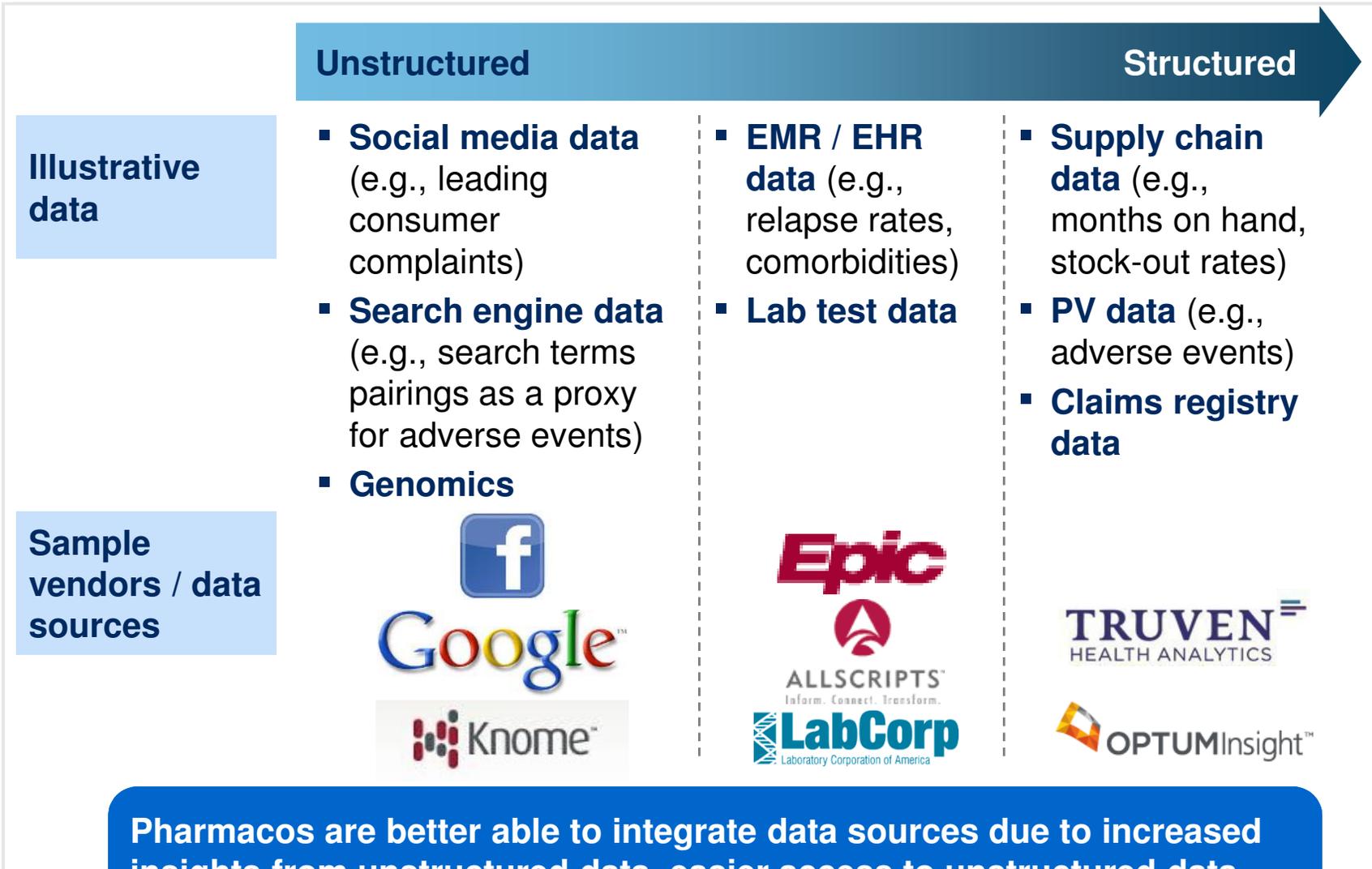
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1 Ensuring business impact from advanced analytics requires covering the five bases



| Source of value | Data ecosystem | Modeling insights | Workflow integration | Adoption |
|---|--|--|---|---|
| <ul style="list-style-type: none"> Clear articulation of the business needs for advanced analytics and assessment of expected impact | <ul style="list-style-type: none"> Management of large pools of internal and external data External strategic partnerships | <ul style="list-style-type: none"> Advanced statistical analysis to drive business insights Codified heuristics dispersed in the organization to enhance analytics | <ul style="list-style-type: none"> Easy-to-use user interface built in the platform Redesigned processes to embed rules in the workflow | <ul style="list-style-type: none"> Developed frontline and management capabilities Proactive change management and tracking of adoption with performance indicators |

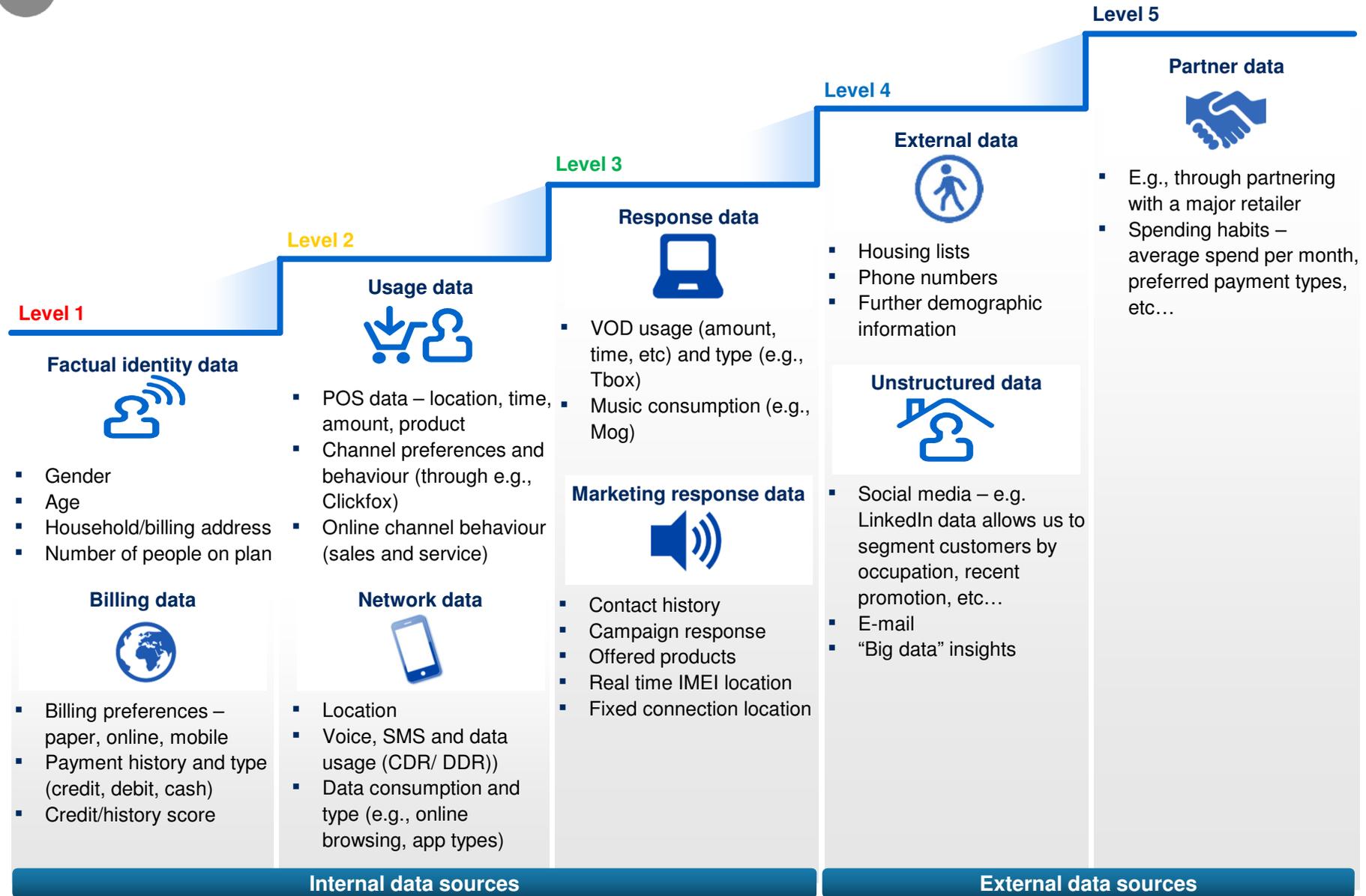
1 Traditionally unstructured data sources are yielding more insights



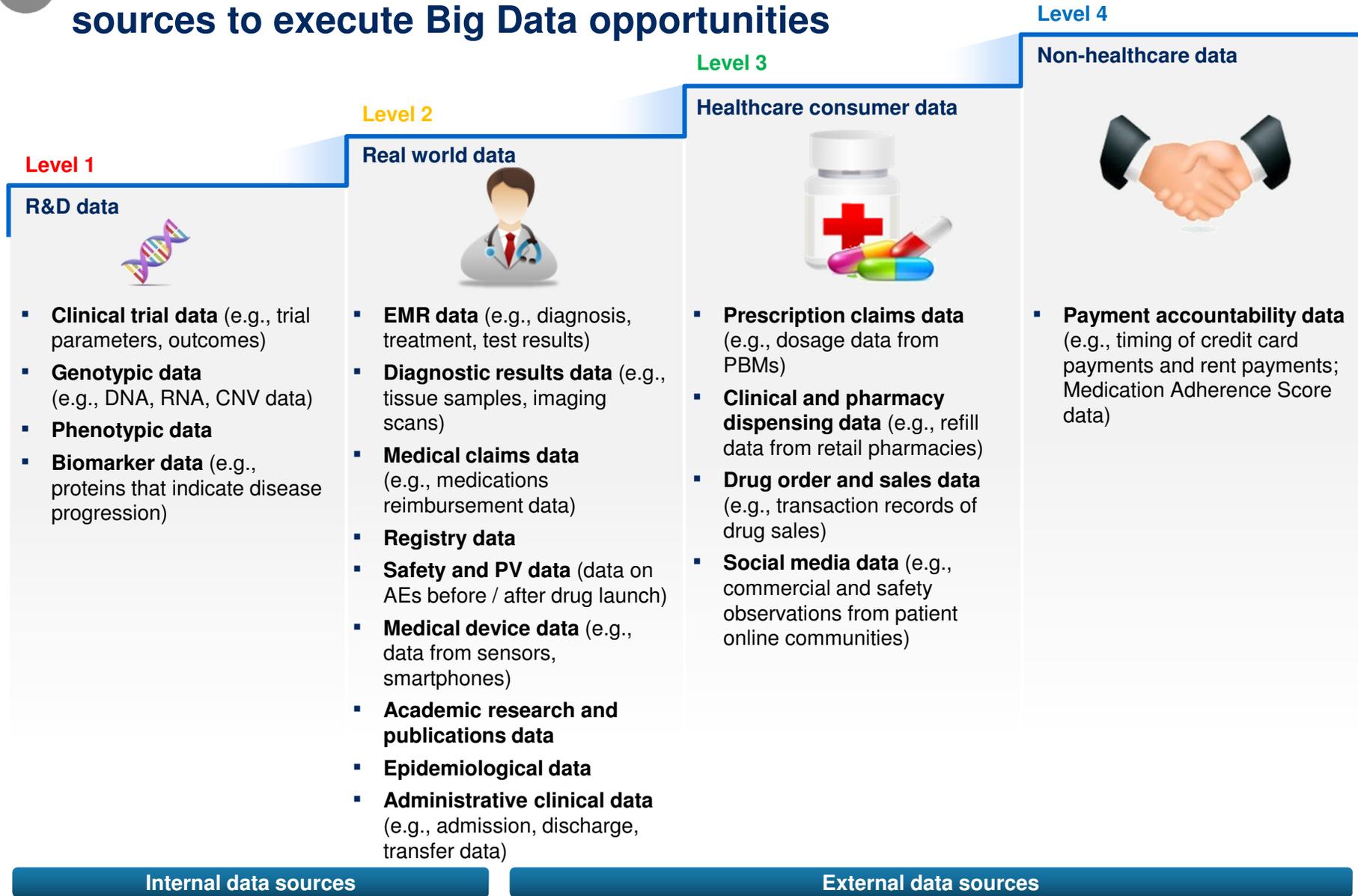
Pharmacos are better able to integrate data sources due to increased insights from unstructured data, easier access to unstructured data, and advanced capabilities to capture value in structured data

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1 Multiple stages along the journey – Telco Example



1 Example – Pharmacos need to integrate internal and external data sources to execute Big Data opportunities



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1 **Lots of confusion and misunderstanding about emerging data technologies and platforms**

“Everyone talks about **Hadoop**, we need one, too!”

“Our technology partner tells us we need to replace our existing DWH with **MPP technology** to catch up”

“Big Data is all about **unstructured data**”

“In-memory makes decisions in **real time**”

“Big Data is for marketing – they have bought **Netezza** to do it”

“We need to integrate **weather data** into our **DWH!**”

“We have bought a **SAP HANA** license, reports will be much faster soon”

“We can outsource all data to **Amazon Web Services**”

“Big Data will **replace my entire data warehouse!**”

“Can we run our financial reporting with MapReduce? I think **Hive** can help”

ORACLE
EXADATA

amazon

web services

Pivotal splunk

TERADATA

MicroStrategy

SAP HANA

Couchbase



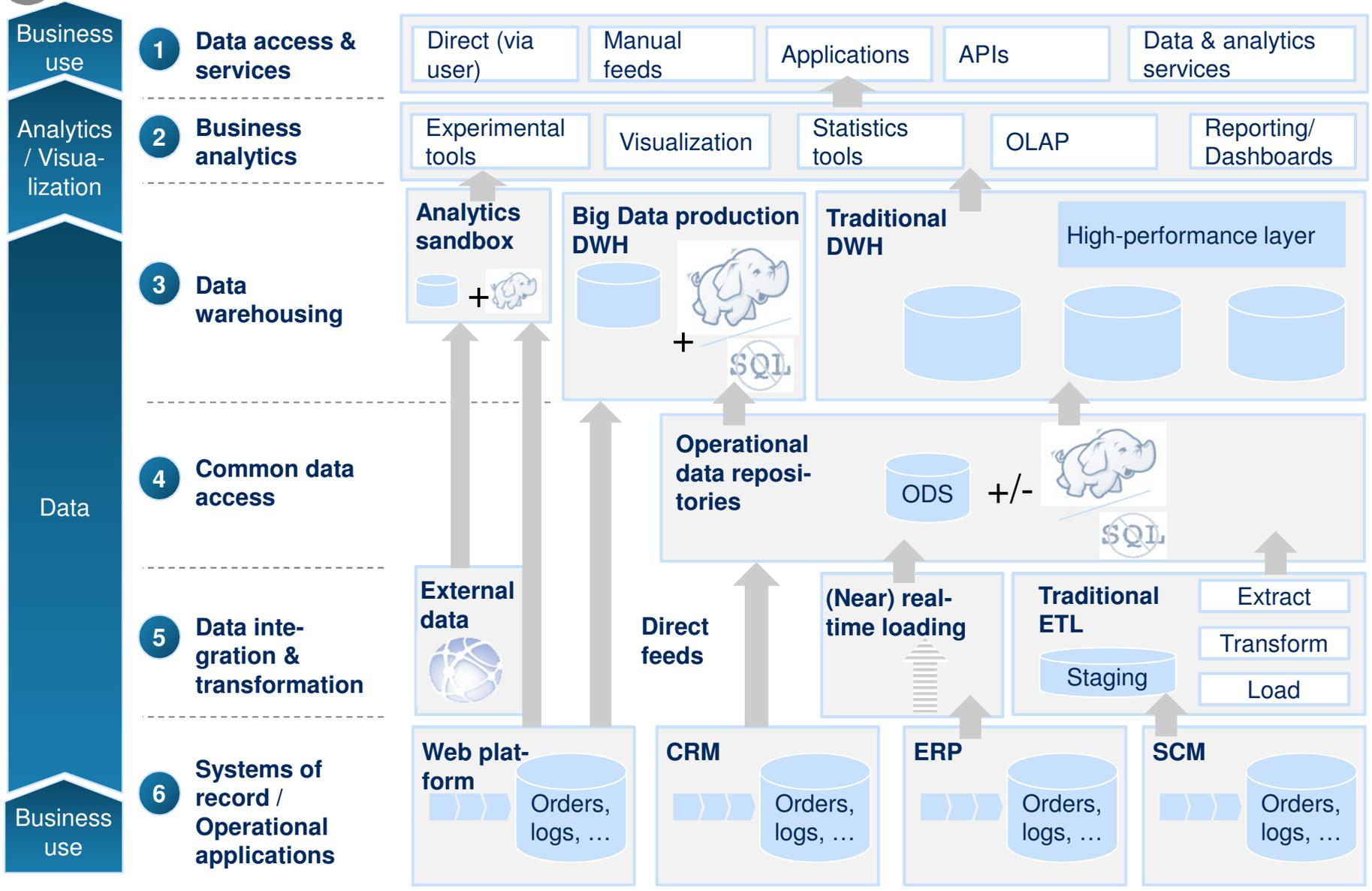
SPSS

Hortonworks



NETEZZA

1 Example "reference architecture"



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1 Data governance is becoming increasingly centralized

Examples from "data-driven" industry leaders

Dedicated leader

Mix of business and technology mindset, vision of where data can drive competitive advantage

*"The new leader was 100% dedicated to data and analytics, and was able to **engage in business-terms and translate under the covers into technology moves.**"*



Demand-driven

Business perspective on where data can drive profit-driving decisions

*"... deep understanding of business drivers and economics created an **heat map of where data could make a real difference.**"*



Org enablement

Global, centralized BI group responsible for insights, engineering, and demand planning

*"We had **one group across the globe to manage all our system instrumentation and data warehousing needs.** They also built our tools and **led advanced analytics.**"*



Talent

Specialists of predictive analytics, machine learning, data visualization skills

*"The BI team was **full of PhDs and 'super-brains'**. These guys were at the cutting-edge."*



1 Many organizations have created leadership positions focused on data and insights



John Bottega

- **At Bank of America:** Chief Data Officer. Responsible for the banks data management strategy, policy and governance. He reports to Bank of America's CIO, Marc Gordon.
- **Prior to this role:**
 - CDO at Citigroup
 - VP and Chief Data Officer, Federal Reserve Bank of New York



Eugene Kolker

- **At Seattle Children's:** Chief Data Officer. Responsible for data analytics to identify methods for more efficient and effective management of patients with complex diseases, like diabetes.
- **Prior to this role:**
 - Affiliate Associate Professor, Department of Biomedical Informatics, University of Washington School of Medicine
 - Founder and President, the BIATECH Center



Eric Schadt

- **At Mount Sinai:** Director, Icahn Institute for Genomics and Multiscale Biology. Oversees generation and integration of large-scale molecular profiling and clinical data for constructing molecular networks.
- **Prior to this role:**
 - Chief Scientific Officer at Pacific Biosciences
 - Executive Scientific Director of Genetics at Rosetta Inpharmatics



Sally Hinds

- **At Thomson Reuters:** Global Head of Enterprise Data Management. Runs the Thomson Reuters Enterprise Platform for Data Management (TREP DM) business line.
- **Prior to this role:**
 - HSBC, head of global market data team, Global Head of Enterprise Data Mgmt.
 - Credit Suisse, program manager on reference data management

2 Opportunity now to evolve the pharma commercial model



2

Digital customer engagement is an example of how big data insights can be used to create impact

ILLUSTRATIVE

Integrate data from multiple sources to create a 360° view of the patient

Company proprietary data

- Co-pay card data
- Call center / speech analytics
- Clickstream / Online browsing

Purchase behaviors

Social

Decision Journey

Health data

Ethnographies

3rd party payments

Algorithms identify pain points to target for interventions

- Needle phobia
- Lack of early efficacy
- Financial hardship

Tailor interventions at most effective points in the customer journey

Personalized webpages based on search history

Targeted YouTube videos

Optimized nurse call center

Customized app with reminders and resources

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2

Kaiser Permanente has used integrated software and data solutions to improve services and outcomes



- Using advanced analytics of members to design tailored services
- Quantifies the member's risk of serious conditions (e.g., heart attack, stroke, cancer, onset and complications of diabetes),
- Prioritizes actions the member can take to reduce their risk based on their preferences
- Activates the patient and improves adherence
- Used for innovative disease modelling

Meaningful impact on risk and adherence

5yr Cardiovascular risk

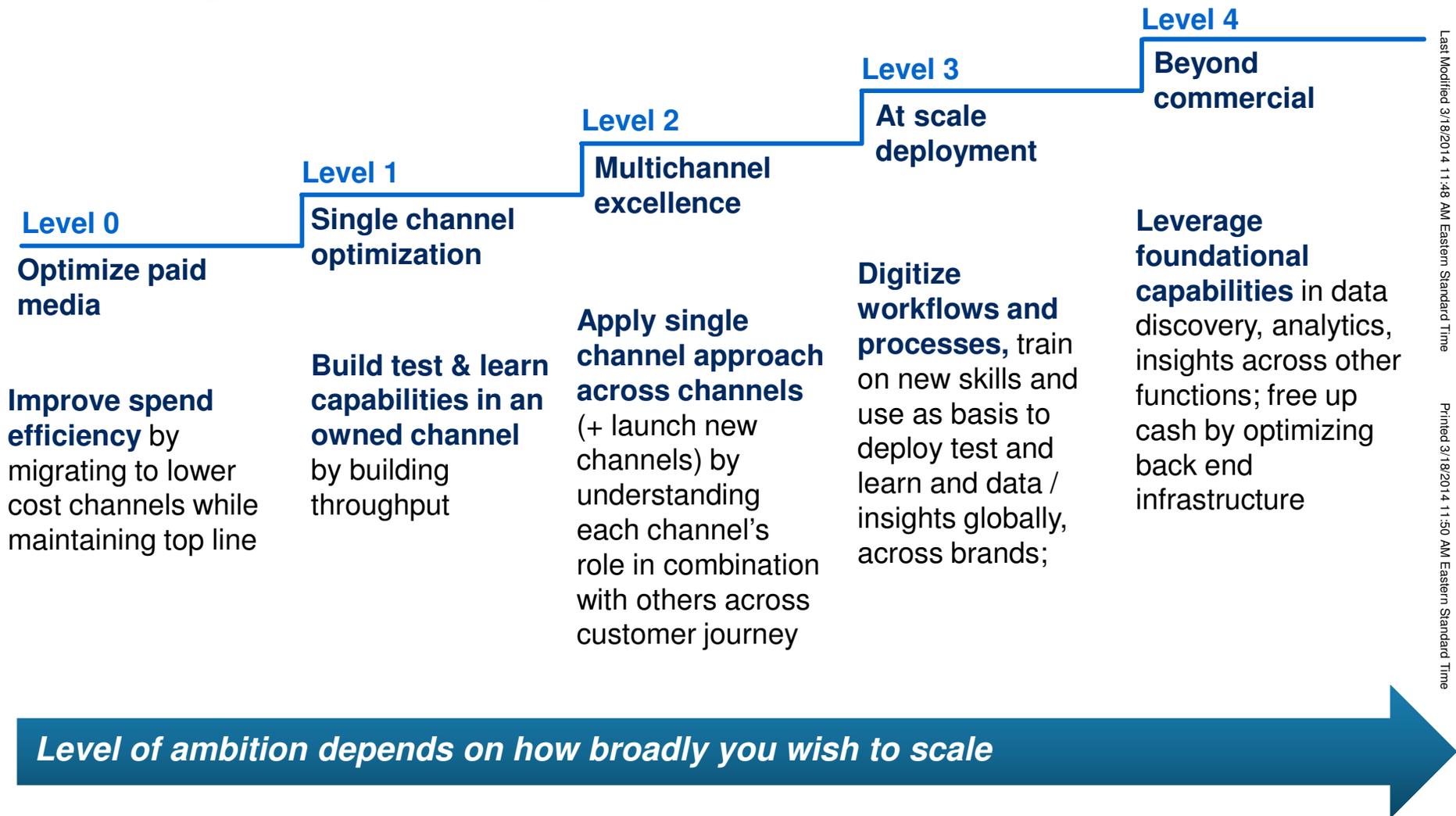
-13%

Statin Rx Fill rate

X 6



2 A pharmano's customer transformation journey depends on your starting point and the organization's ambition



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3 Leading practices for building a “Digital Enterprise”

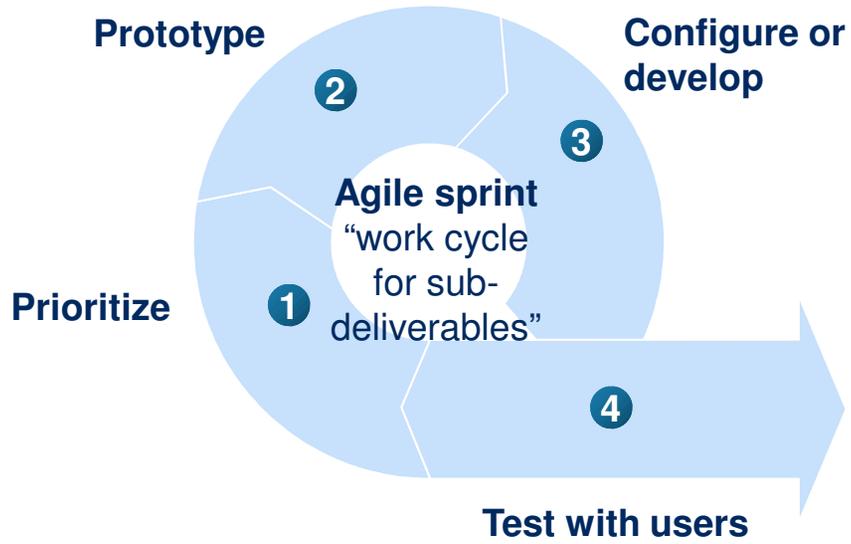
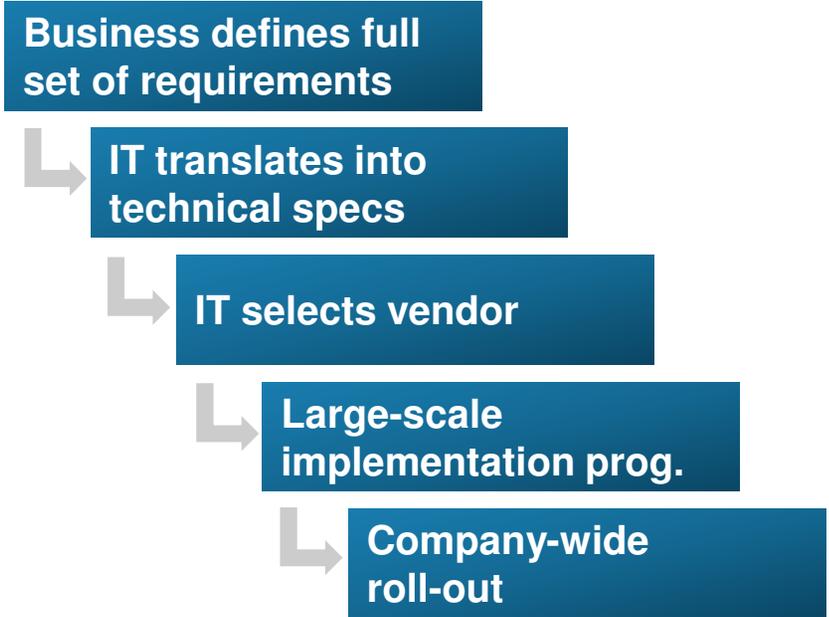
| | Traditional transformation | ‘Digital’ transformation |
|---------------------|--|--|
| Approach | Conduct analysis; identify and size the opportunity | ACTION FIRST – Embed strong bias to action and operational orientation to capture impact |
| Analytics | Analysis based on looking at only a limited set of information | DATA IMMERSION – Attain full data access to enable holistic analytics and capability building |
| End-products | Application of tried and true tools and frameworks to deliver insights | INTERACTIVE TOOLS – Bring insights to life through interactive, digital end products to change behavior |
| Scaling | Milestones including traditional progress reviews and workshops | FULL IMPLEMENTATION – Scale solutions and create organizational stickiness and maximum impact |
| Agenda | 2-3 Strategy Agenda or Functional areas | ACROSS VALUE CHAIN – Apply deep analytics and functional expertise across the value chain |

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3 Driving a successful digital enterprise is fundamentally different from typical 'IT' business transformations

How IT projects are typically run ... **VS.** How industry leaders drive Digital ...



- Over-engineered specs
- Late or very late delivery
- Operating model implications discovered late
- "Not what the business wanted"

This means teams will need to work very differently together

- Business, IT, partners on same team
- Hypothesis-led thinking
- Fail fast, fail often
- Build capabilities iteratively

3 Redesigning and digitizing key processes underpins : banking examples

Example



Allied Irish Bank

- **End-to-end redesign and digitization of the mortgage application process:**
 - **From-scratch** design of a new “end-to-end” process
 - **Reiterations/improvement** of the manual process in the work cell
 - **Agile development** of the IT solution (iPad), successive versions immediately tested on staff and customers, and improved

Impact

Processing time for applications **15 min**

- 75%** service take-up rate, showing **very high satisfaction** among pilot customers
- 80%** **loan applications** are fully **handled by the program**
- 70%** **cost reduction**



- **Digital optimization of relationship initiation process:**
 - Application of **end-to-end digital optimization techniques**: reducing the number of documents, simplifying flows, etc.
 - Definition of new **performance indicators** and **dashboard**

- 30% - 50%** capacity freed up in the teams concerned
- 50%** reduction in conversion times
- Visibility achieved throughout the operational chain, with indicators, directly usable for strategic control

Which core pharma processes could benefit?

3 P&G harnesses large and real-time data for technologically enabled decision making

Context: P&G utilise real-time/ continuous data in their daily decision making



The “Business Sphere”
(high-tech conference room)

“All of this comes with our strategy of being the most digitally enabled company in the world”

Robert McDonald, former CEO

What’s the innovation

- Every employee has a ‘cockpit interface’ on their computer – important metrics are tracked real time and they’re alerted to respond/ make decisions when go out of tolerance range
- Weekly meetings (virtual and physical) with leadership team around the world to **make business decisions harnessing real-time and continuous data**

IBM's 'Beehive' enables employees to network in an interactive format

The screenshot shows the IBM Beehive profile page for Werner Geyer. The interface is yellow and features a navigation bar with options like 'home', 'profile', 'people', 'photos', 'hive5s', and 'events'. A search bar is located in the top right. The profile includes a photo of Werner Geyer, his name, and a bio: 'Research Staff Member - Beehive Cambridge, MA US'. It also lists contact information and dates. Key features include 'featured' posts, 'connections' (78), 'hive5s' (6), and 'the buzz' section with recent activity. A box at the bottom left states 'This profile has been viewed 676 times'.

- “Status update” and “about me” feature allows personalization of content
- Top 5 lists (hive fives) allow users to outline ideas and invite colleague comment
- Event pages publicize and create buzz around upcoming events
- Users rise in status when networks are deeper and wider

“Beyond the desire to share with colleagues on a personal level, we also found Beehive was used to network with those who can assist in career goals within IBM”

How some leading pharmacos have started their journeys

- Top level commitment
- Investing in data, analytics and digital
- Actively shape the immature ecosystem (e.g., data vendors, tech companies)
- Building capabilities around next-gen infrastructure (i.e. cloud)
- Developing new measures of economic impact and measures of success
- Aggressively pursuing talent
- Launching change management programs to educate and convert brand teams, TA heads, researchers and senior management



Thought-starter questions

- **What changes in the Healthcare ecosystem most impact your business?**
- **What are your areas of strategic focus?**
- **What is your innovation agenda – partnerships/ new offerings?**
- **What steps have you taken to build flexibility and agility into your platforms?**