

The Business of Revolutionizing Healthcare

Innovation Opportunities and Challenges

4 December 2009



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*The future is already here. It's just not
very evenly distributed.*

William Gibson

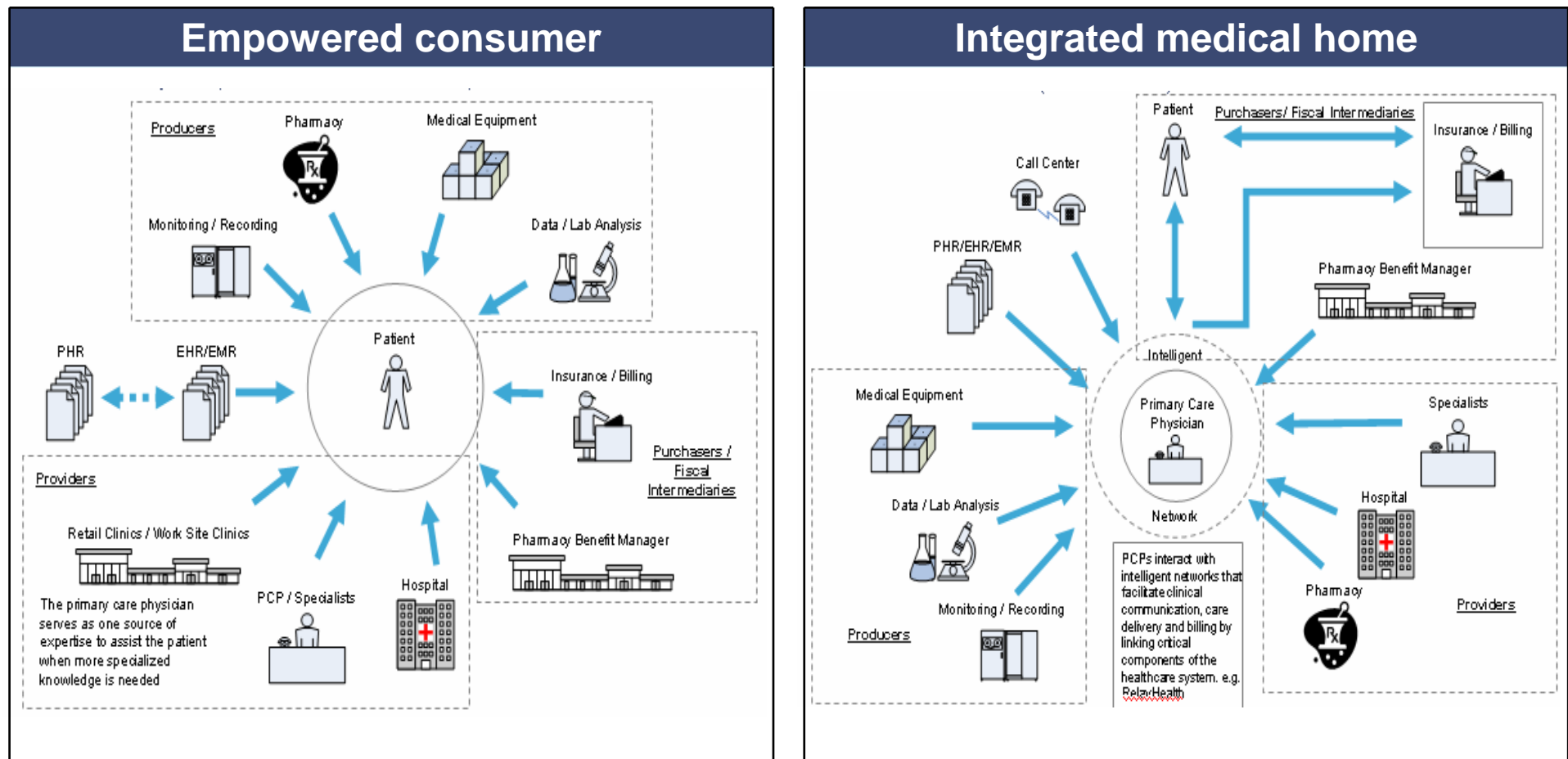
Section 1

Three Primary Forces are Driving Innovation in Healthcare

Three forces appear predetermined to drive the transformation of the healthcare industry towards convergence

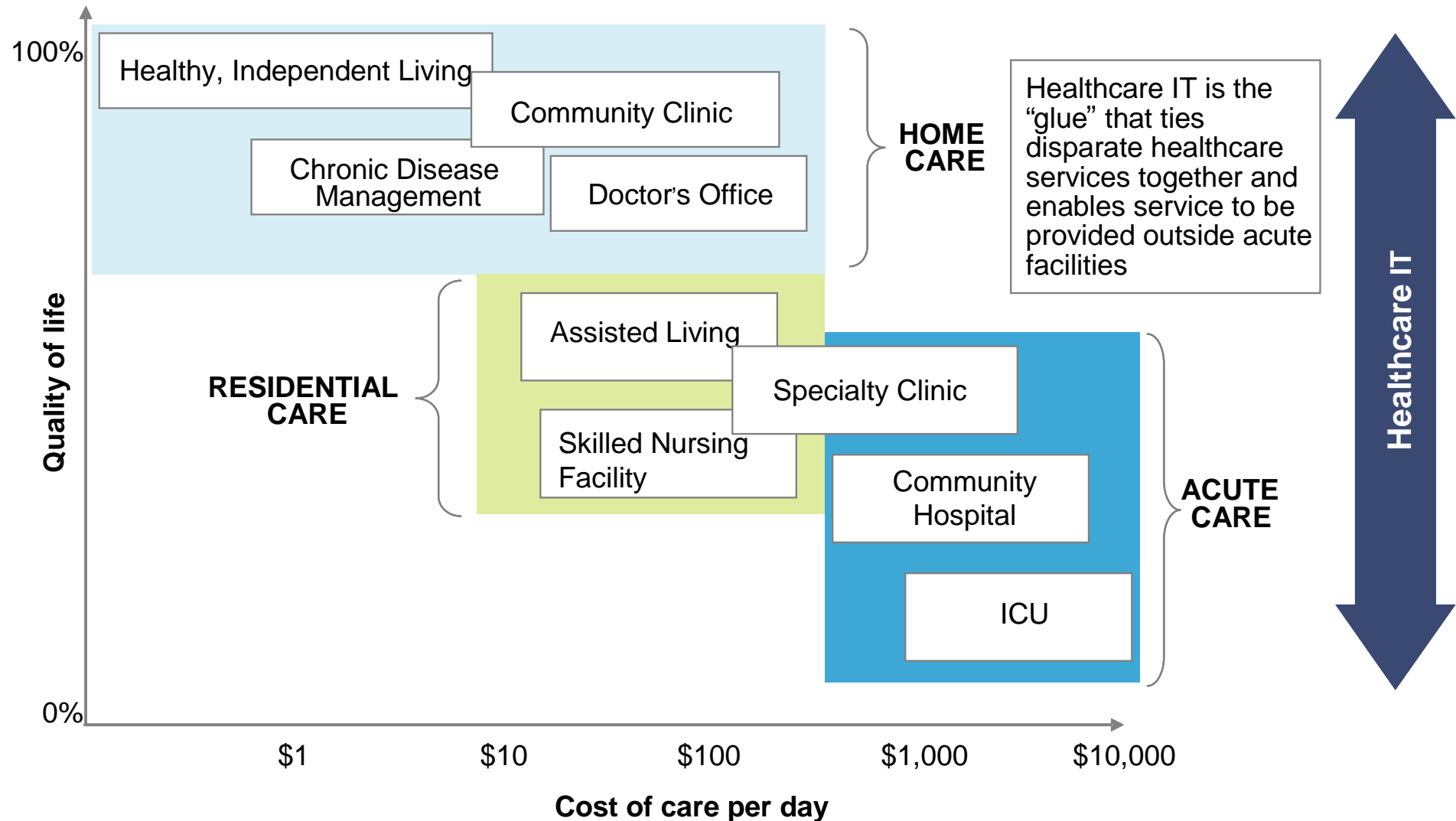
Forces driving convergence	Key issue/question
1 Technology is driving a revolution in healthcare delivery	<ul style="list-style-type: none">• Are you placing the patient (as opposed to the provider, product, physician, or payer) at the nexus of all technology solutions through M2M medicine?
2 Regulatory reform is transforming industry structure	<ul style="list-style-type: none">• Are you providing innovative technology solutions for high volume, low margin healthcare in the M2M model?
3 Personalized medicine is disrupting the practice of medicine	<ul style="list-style-type: none">• Are you linking payments and value to personalized, preventative, predictive and participatory care?

Two models of consumer interaction with healthcare are emerging – both demand significant increases in HIT and M2M medicine



Source: PwC analysis

80% of healthcare is currently provided in the home – technology will continue to push care delivery in this direction



Source: Intel Corp. 2006

EMRs and HIEs provide the infrastructure to move the system away from a utilization paradigm and towards a value paradigm

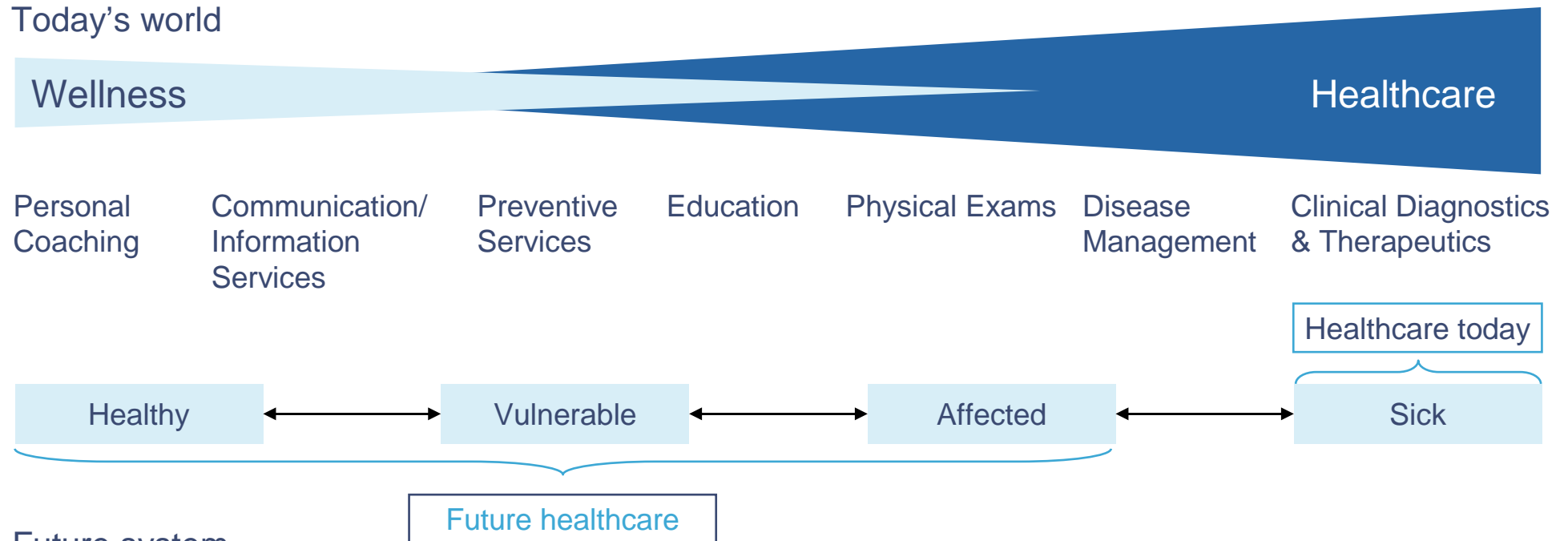
Current state of EMR		Likely future state (5-10 years)	
17	Percent of US physicians that use computerized records	90	Percent of physicians will use EHRs that populate PHRs & claims data
1.5	Percent of US hospitals that have a comprehensive EHR system (i.e. present in all clinical units)		
7.6	Percent of US hospitals that have a basic system (i.e. present in at least one clinical unit)		
Current state of Payment Models		Likely future state (5-10 years)	
80	Percent of Massachusetts physicians paid under fee for service models	85+	Reimbursement will require healthcare outcomes (P4P), will be bundled, and non-fee for service
279	Percent growth in P4P programs between 2003 and 2007		
26	Compounded Annual Growth Rate (CAGR) of P4P programs between 2003 and 2009		
		Is the current IT infrastructure sufficient to track outcomes for a pay for performance system?	

Source: NEJM (2008), IDC (2007)

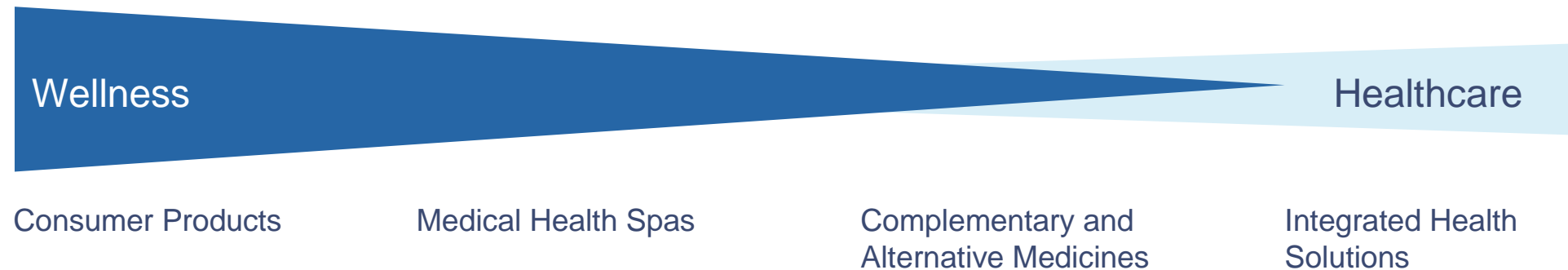
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Wellness is a key area for increased focus, and is driving a shift from remedial to personalized, predictive and preventative care

Today's world



Future system



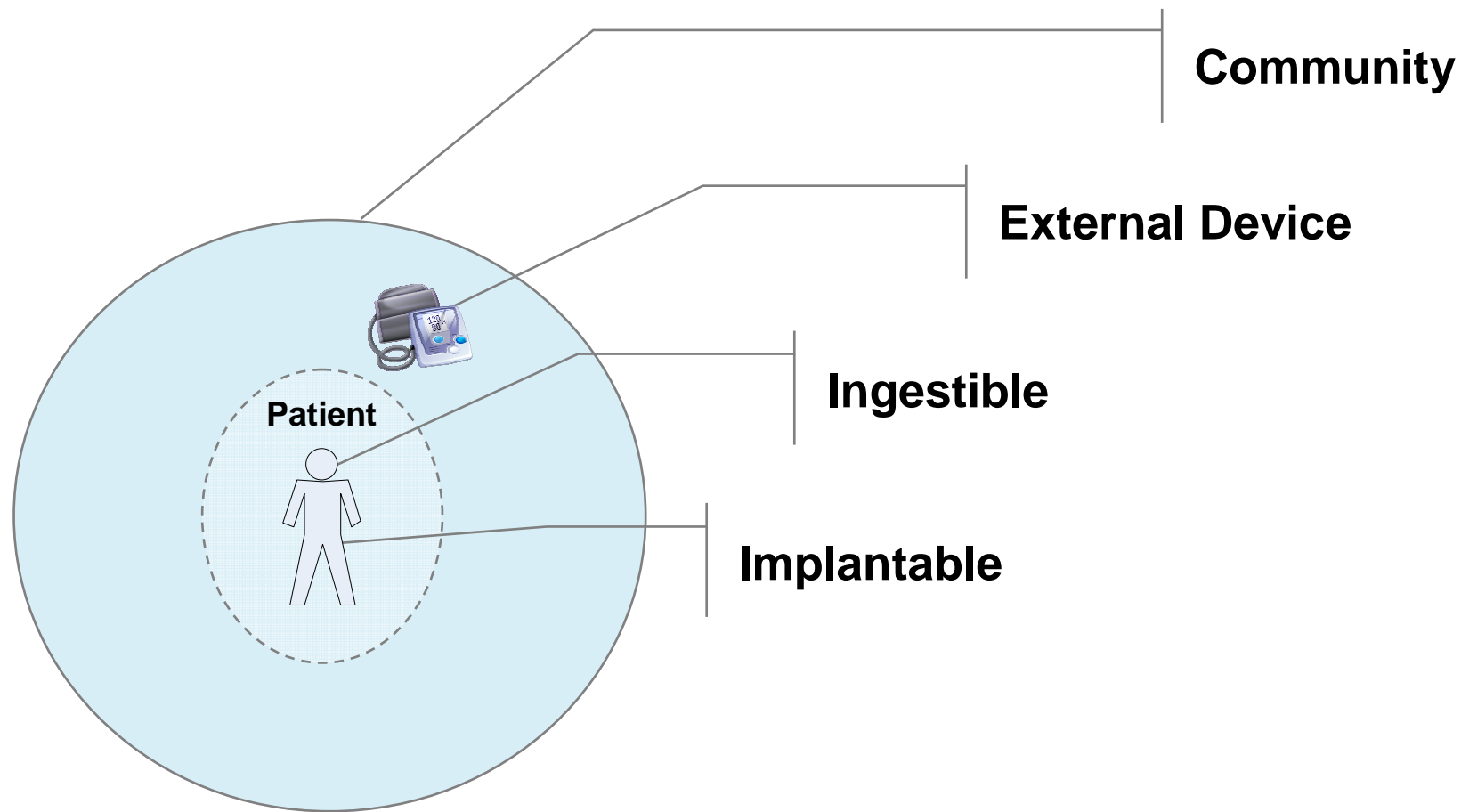
Source: CDC, PwC analysis

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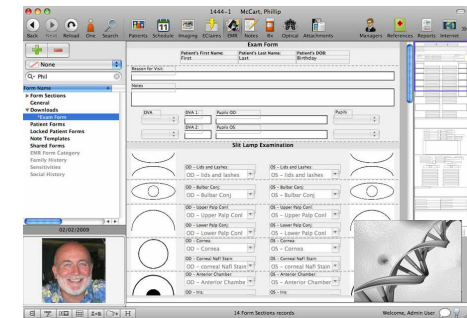
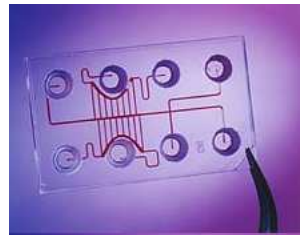
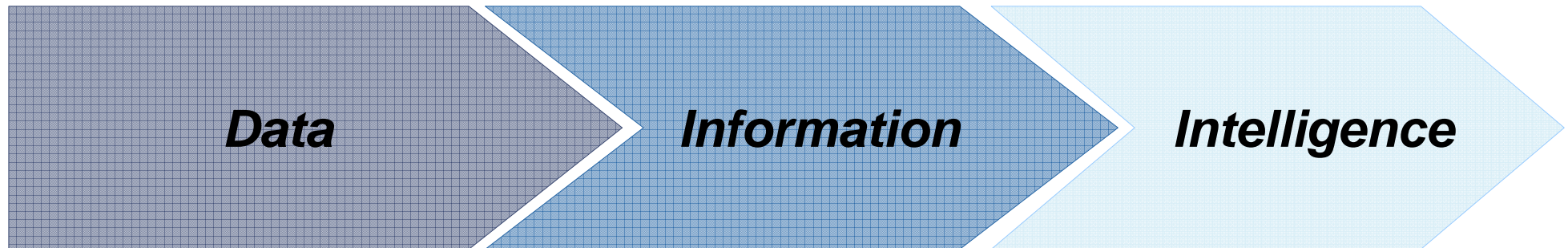
Section 2

Focus at the IT intersection in the Healthcare Innovation Ecosystem

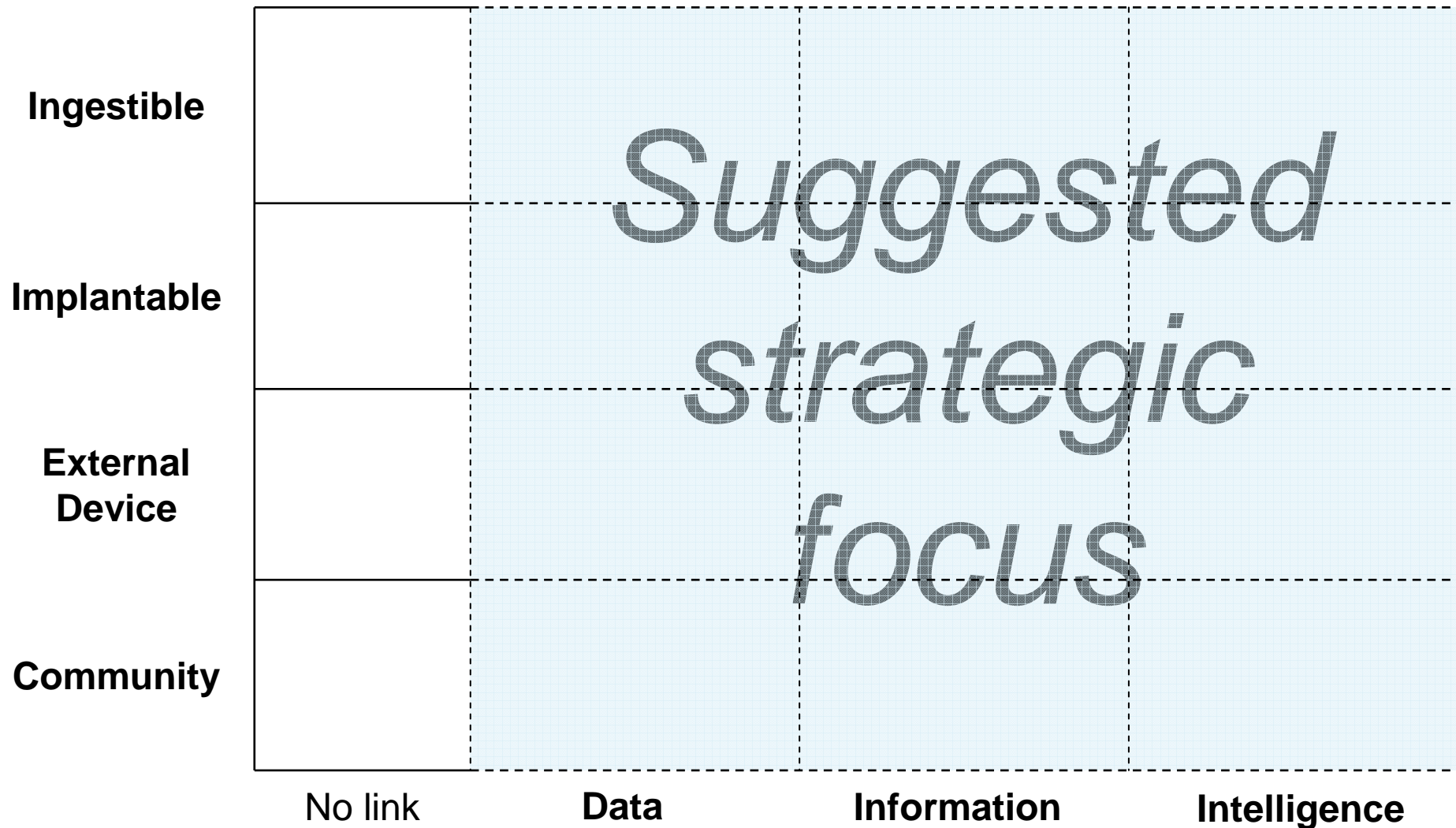
The healthcare innovation ecosystem extends from internal patient care all the way through the external environment



Healthcare has become an information technology driven industry reflected in much of the innovation



Providers have rich opportunities to integrate innovations at the intersection of IT and the innovation ecosystem



Case Study: Focus Areas vs. Opportunity Areas for Large Healthcare Provider

Illustrative

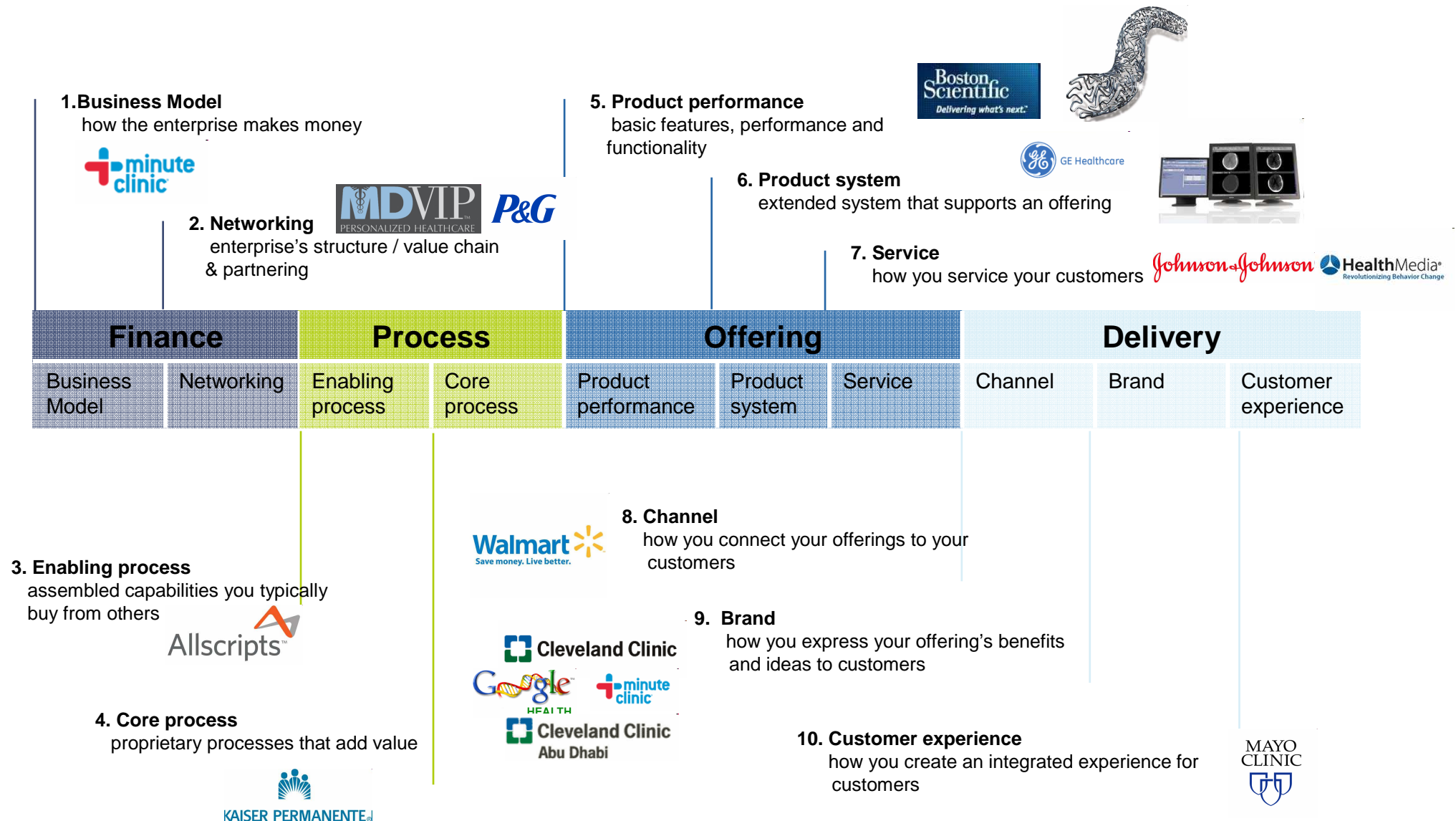
- Opportunity presented in previous slides
- Area where Client has a presence
- Key area for Smartphone application integration

Ingestible			Sensors	● ● ● ●	
Implantable	Devices	● ● ●	Devices	●	
External Device	Imaging	●	Imaging	● ●	
	Treatment	● ● ●	Treatment	● ●	
	Monitoring	● ● ● ●	Monitoring	● ● ● ● ● ● ● ●	Monitoring ●
			Genetic Testing	● ● ●	Genetic Testing ● ●
			Surgical	● ●	
Community	Environment of Care	● ●	Environment of Care	● ● ● ● ●	Environment of Care ● ●
	Health Information Systems	● ● ● ●	Health Information Systems	● ● ● ● ● ●	Health Information Systems ●
			Health 2.0	● ● ● ●	
Data			Information		Intelligence

Section 3

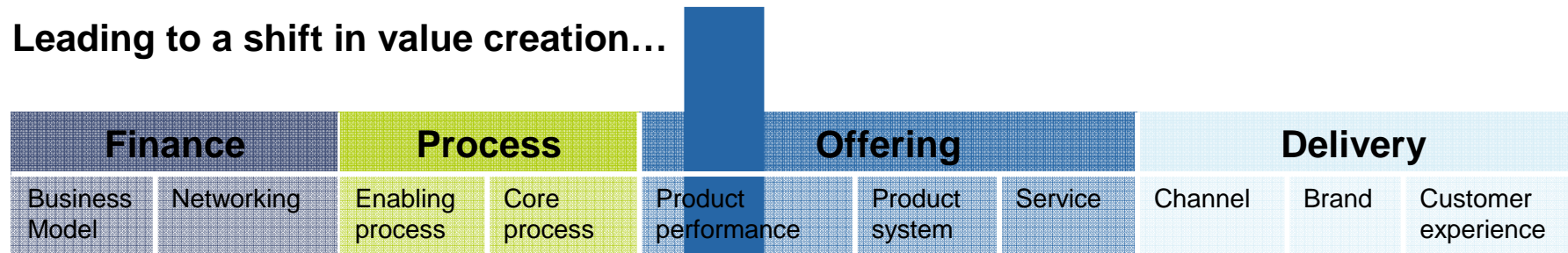
Innovation Focus Should be in Areas of the Greatest Value Potential

Ten Types of Innovation – look across the entire value chain

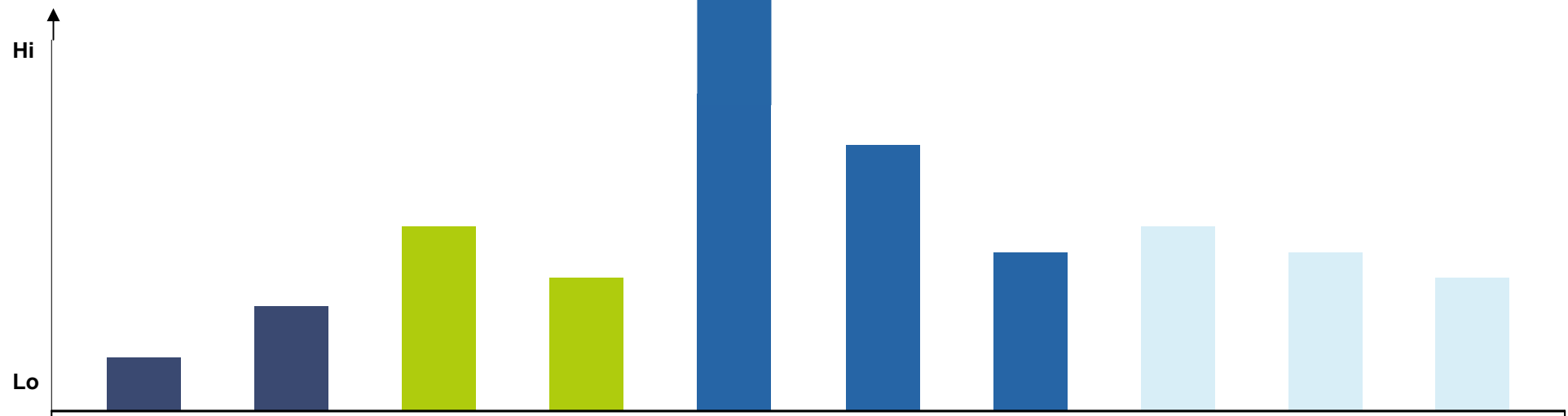


The vast majority of innovations, as measured by volume, occurs in the area of products

Leading to a shift in value creation...



Volume of Innovation Efforts
Last 10 Years



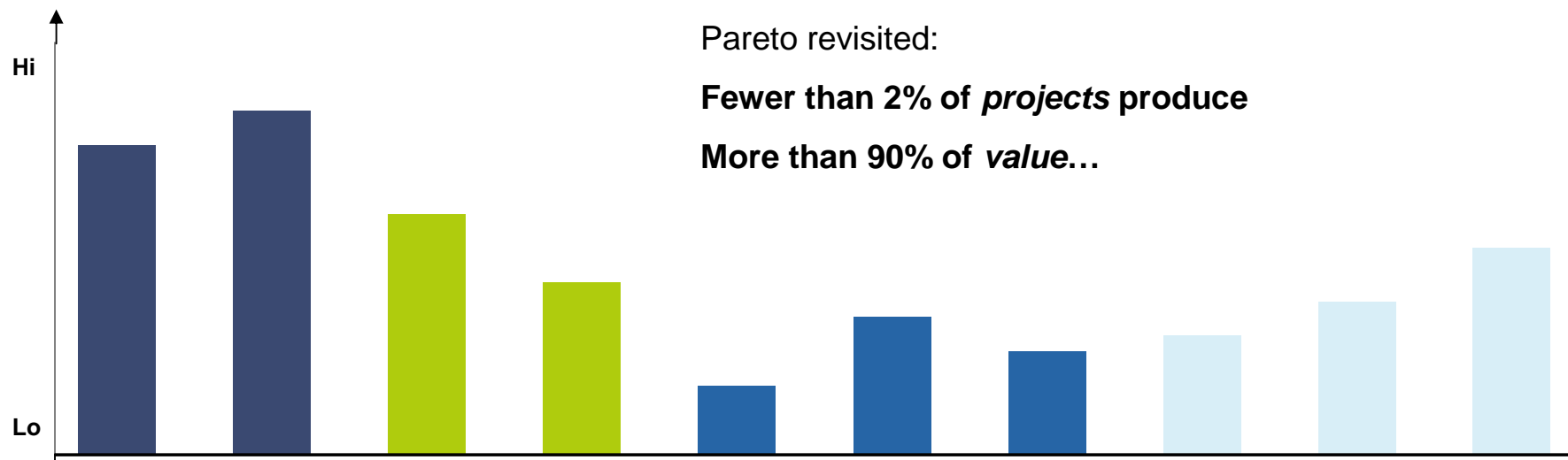
Source: Doblin analysis

Few innovations create the most value, and those in the product segments of the value chain produce the lowest yield

Leading to a shift in value creation...

Finance		Process		Offering			Delivery		
Business Model	Networking	Enabling process	Core process	Product performance	Product system	Service	Channel	Brand	Customer experience

Cumulative Value Creation
Last 10 Years



Source: Dublin analysis

Section 4

Overcoming Barriers to the Adoption of Innovation Presents Challenges

The US healthcare industry is the most innovative in the world, but obstacles have made remaining problems difficult to overcome

Problem

- The US represents the **most innovative** healthcare industry in the world

- Most patents
- Most new drugs
- Most new devices
- Most clinical trials
- Most new ventures

- However, **failure to implement** innovations to improve quality of care and decrease costs has limited success

- Most expensive healthcare
- Spend 50-100% more on healthcare per capita
- Lowest life expectancy
- Highest infant mortality
- Poor coordination of care
- Lack of universal coverage

Source: Nembhard, Alexander, Hoff, Ramanujam: "Why Does the Quality of Health Care Continue to Lag? Insights from Management Research" (2009)

There has been significant spending in healthcare innovation, but four obstacles have made the successful implementation of innovation difficult to achieve

Reasons

- Over past 10 years, leading pharma, biotech, device companies, VCs and angel investors spent over \$1 trillion on innovation
- \$250 billion spent over 50 years verifying effectiveness of innovations in healthcare

- However, **four obstacles** have made innovation success difficult to achieve:
 - 1) Nature of the work
 - 2) The workforce
 - 3) Leadership-workforce relations
 - 4) Performance measurement and control systems

Source: Nemhard, Alexander, Hoff, Ramanujam: "Why Does the Quality of Health Care Continue to Lag? Insights from Management Research" (2009)

National healthcare companies have been unsuccessful in realizing their innovation goals, showing only a 1.5% increase in 15 quality measures since 2000

Obstacle #1: Nature of Work

Obstacles	Description	Case Study
<ul style="list-style-type: none"> ▪ High procedural variance ▪ Clinician discretion central ▪ Risk aversion to patient harm 	<ul style="list-style-type: none"> ▪ Healthcare professionals are reluctant to change because of high risks and degree of uncertainty in diagnosing patients ▪ Innovations often come with learning curve that can cost lives and reduce quality of care 	<p>Cedars-Sinai Medical Center:</p> <ul style="list-style-type: none"> ▪ Multi-million dollar computerized physician order entry program was cancelled after 3 months when staff protested <ul style="list-style-type: none"> – IT director concluded that program was introduced too quickly for staff to acclimate

Source: The National Healthcare Quality Report (2007), Nembhard, Alexander, Hoff, Ramanujam: "Why Does the Quality of Health Care Continue to Lag? Insights from Management Research" (2009), Fiercehealthcare.com, The Commonwealth Fund (2009)

National healthcare companies have been unsuccessful in realizing their innovation goals, showing only a 1.5% increase in 15 quality measures since 2000

Obstacle #2: Workforce

Obstacles	Description	Case Study
<ul style="list-style-type: none"> ▪ Strong professional identification/weak organizational orientation ▪ Professional hierarchy of healthcare employees 	<ul style="list-style-type: none"> ▪ Physicians feel only loose tie with employing company and are reluctant to collaborate with others for organizational growth ▪ Opinions of healthcare employees with lesser credentials are often stifled 	<p>Children's Hospital Boston:</p> <ul style="list-style-type: none"> ▪ In 2003, a 5 year-old boy died, having received no care, because his physicians never communicated with each other <ul style="list-style-type: none"> – Each falsely assumed another was in charge

Source: The National Healthcare Quality Report (2007), Nembhard, Alexander, Hoff, Ramanujam: "Why Does the Quality of Health Care Continue to Lag? Insights from Management Research" (2009), Fiercehealthcare.com, The Commonwealth Fund (2009)

National healthcare companies have been unsuccessful in realizing their innovation goals, showing only a 1.5% increase in 15 quality measures since 2000

Obstacle #3: Leader-Staff Relations

Obstacles	Description	Case Study
<ul style="list-style-type: none"> ▪ Transactional nature of relationship ▪ Perceived discrepancy in goals 	<ul style="list-style-type: none"> ▪ Disjointed nature of transactional relationship often involves trade-offs, which prevents unified growth ▪ Lack of shared goals creates maladaptive tensions 	<p>Carilion Health System:</p> <ul style="list-style-type: none"> ▪ In 2006 a group of physicians resisted the \$100 million plan to reorganize operations, which included new facilities and increased employment <ul style="list-style-type: none"> – Physicians were skeptical of plan's impact on care

Source: The National Healthcare Quality Report (2007), Nembhard, Alexander, Hoff, Ramanujam: "Why Does the Quality of Health Care Continue to Lag? Insights from Management Research" (2009), Fiercehealthcare.com, The Commonwealth Fund (2009)

National healthcare companies have been unsuccessful in realizing their innovation goals, showing only a 1.5% increase in 15 quality measures since 2000

Obstacle #4: Performance Measurements

Obstacles	Description	Case Study
<ul style="list-style-type: none"> ▪ System underdeveloped ▪ Compliance not rewarded ▪ Relationship based on action, not trust 	<ul style="list-style-type: none"> ▪ Current performance measurements lack adaptations to specific needs of leaders and staff ▪ Current systems fail to cultivate organizational unity 	<p>St. Mary's Health Center, MT:</p> <ul style="list-style-type: none"> ▪ Medical staff viewed new performance guidelines as "extra" and "imposed" and were reluctant to comply <ul style="list-style-type: none"> – Physicians who achieved positive results without new guidelines felt justified in their resistance

Source: The National Healthcare Quality Report (2007), Nembhard, Alexander, Hoff, Ramanujam: "Why Does the Quality of Health Care Continue to Lag? Insights from Management Research" (2009), Fiercehealthcare.com, The Commonwealth Fund (2009)

Given these obstacles, six solutions can be implemented to prevent innovation failure, motivate success, and foster growth

Solutions

1 Create opportunities for staff experimentation and innovation adaptation

2 Frame innovation implementation as a learning challenge

3 Promote organizational identification

4 Use transformational leadership processes



5 Involve the workforce in performance measurement and system development

6 Measure and reward implementation efforts

Six solutions can be used to create innovation implementation success

1



Create opportunities for staff experimentation and innovation adaptation

Case Study	Obstacle Avoided	Solution
	<ul style="list-style-type: none"> Frequently changing nursing staff via agency or float pool was disorganized and expensive 	<ul style="list-style-type: none"> Hospital and nurses agreed that nurses would self-organize staffing 24 hours/day with 10% added pay in place of overtime
	<ul style="list-style-type: none"> Doctors felt constricted by guidelines, while management feared variation 	<ul style="list-style-type: none"> Allowed doctors to deviate from guidelines if they documented procedures in order to enhance organizational learning

Six solutions can be used to create innovation implementation success

2



Frame Innovation Implementation as a Learning Challenge

Case Study	Obstacle Avoided	Solution
	<ul style="list-style-type: none"> Development exercises may feel burdensome to employees who may be skeptical of job losses resulting from low performance 	<ul style="list-style-type: none"> Development exercises framed as “Continued Education” and use an interactive TV-like medium via the internet
	<ul style="list-style-type: none"> Researchers may be risk averse to avoid failure, which can prevent innovation 	<ul style="list-style-type: none"> Lilly’s CSO instituted “failure parties”, honoring hard work that ultimately fails, thereby cultivating a learning environment

Six solutions can be used to create innovation implementation success

3

Promote Organizational Identification

Case Study	Obstacle Avoided	Solution
	<ul style="list-style-type: none"> ▪ Difficulty creating organizational identification as physician offices are separate and remote 	<ul style="list-style-type: none"> ▪ MDVIP is a self acclaimed <i>“fraternity of individual physicians... inherently linked.”</i> - Company website
	<ul style="list-style-type: none"> ▪ Difficulty creating organizational identification between employees from different focus areas (e.g. managers, IT and healthcare staff) 	<ul style="list-style-type: none"> ▪ The HMI “walking challenge” creates company unity by encouraging employee socializing, while using company’s product


Source: Nembhard, Alexander, Hoff, Ramanujam: "Why Does the Quality of Health Care Continue to Lag? Insights from Management Research" (2009),
Delos Cosgrove "The innovation imperative", The Journal of Thoracic and Cardiovascular Surgery (2000), Company websites

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Six solutions can be used to create innovation implementation success

4


Use Transformational Leadership Processes

Case Study	Obstacle Avoided	Solution
 Cleveland Clinic	<ul style="list-style-type: none"> Transformational leadership is essential to company growth, but difficult to cultivate/train in current leadership 	<ul style="list-style-type: none"> <i>Our specialty has been and should be one of constant innovation.... Changes must be viewed as opportunity.”</i> - Delos “Toby” Cosgrove, CEO

Six solutions can be used to create innovation implementation success

5

Involve the Workforce in Performance Measurement and System Development

Case Study	Obstacle Avoided	Solution
	<ul style="list-style-type: none">Organization members can be apprehensive and distrustful of performance measurement being controlled only by senior management	<ul style="list-style-type: none">A peer-to-peer review system for nurse practitioners and physician assistants allows employees to learn from each other and share ideas for improved care

Six solutions can be used to create innovation implementation success

6

Measure and Reward Implementation Efforts

Case Study	Obstacle Avoided	Solution
GEISINGER	<ul style="list-style-type: none"> Staff members' disinterest in implementing healthcare innovations due to lack of incentives 	<ul style="list-style-type: none"> Provided financial rewards for staff member groups and individuals for uptake of a Patient-Centered Medical Home model. Admissions fell 20% and costs were cut 7%
<i>North Shore-Long Island Jewish Health System</i>	<ul style="list-style-type: none"> Affiliated network members' disinterest in implementing EMRs 	<ul style="list-style-type: none"> Provided financial rewards, \$40K over 5 years to 7000 affiliated network physicians to contribute to their EMR, receive subsidize between 50% - 85% of costs

How do you use technological innovation to increase your Patient Value Ratio (patient satisfaction/quality outcome)?

Are you an iPhone or a BlackBerry?

iPhone provides simple, easy to use, fully integrated products and solutions because the iPhone is a consumer electronic device (not a phone) that has many apps, one of which is a phone.

Are you configurable or one-size fits all?

Do you force your patients to do business with you on your terms, based upon your structure and your workflow?

Do you leverage personalized medicine?

Are you a concierge or a silo?

Do you provide the patient with a point person that can solve all their problems?

Do you provide online concierges?

Do you anticipate patient needs and push?

Reconceptualize your basic business model

Allow mass customization

Provide seamless integrated delivery

*Technological progress is like an axe
in the hands of a pathological criminal
... because ... everything has
changed, except the way we think.*

Albert Einstein

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Chris Wasden is a managing director and leader in our Strategy and Innovation practice. He advises private equity firms, venture capital, governments, and corporate clients on strategic and commercial risks, uncertainties and opportunities associated with their growth and innovation strategies including: mergers and acquisitions, divestitures, corporate venturing, entrepreneurial ventures, and new product and business development.

Chris has a rich and diverse background of experience that gives him a unique perspective when assisting clients on their strategic initiatives. He spent nearly a decade on Wall Street as an investment banker doing M&A and corporate finance work around the world for JP Morgan and Union Bank of Switzerland where he executed over \$12 billion in transactions. He spent several years in C-level positions with multi-billion dollar private and public companies leading their corporate finance and strategic initiatives. Prior to joining PwC, he spent nearly a decade as a medical technology entrepreneur starting four separate companies, becoming a named inventor on 20 issued and pending patents, evaluating over 100 different medical technologies, raising over \$50 million in angel and venture capital commitments, being named by *Inc. Magazine* as a runner up in their annual *Entrepreneur of the Year* competition, and taking new ventures to liquidity events.

He is a highly sought after public speaker and university lecturer on strategy, entrepreneurship, and innovation, and he has taught undergraduate and graduate courses on these topics at several universities. His proprietary strategy and innovation framework, referred to as ***Innovation Lifecycle Management***, represent the foundation of his practice and enables organizations and leaders to transform maladaptive tension into creative and adaptive ones to accelerate innovation and growth. He successfully leads and advises both small teams and large organizations to achieve strategic growth and innovation objectives through organic, de novo, new venture, and M&A strategies and tactics.

Chris holds a doctorate (EdD, abd) in organizational strategy from the George Washington University, as well as an MBA in finance and strategy from the Anderson School at UCLA, and a BA in Asian Studies and a BS in Accounting from Brigham Young University.