



Pharma Outlook 2030: From evolution to revolution

The pharmaceutical sector at a crossroads – considerations for your company's future operating model

KPMG Global Healthcare & Life Sciences

July 7, 2017

Agenda



Seismic shifts



Emerging playing fields

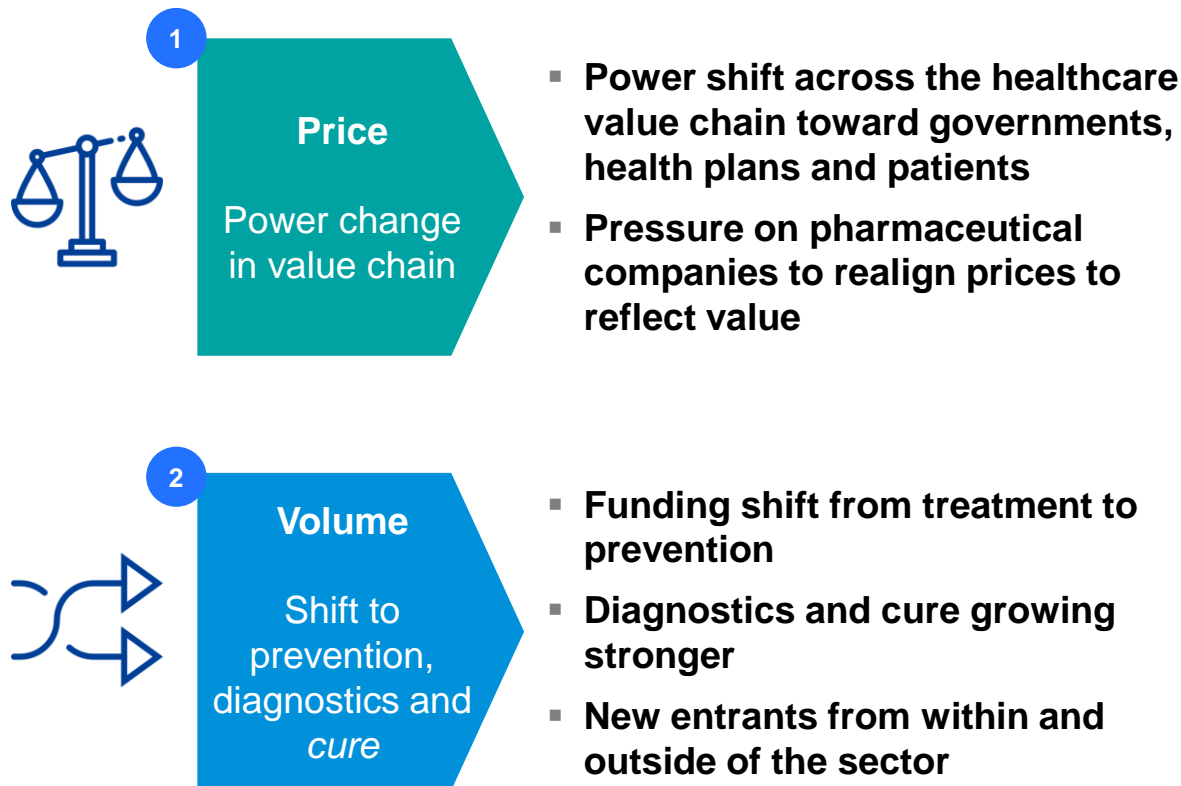


Future archetypes + pathway

Seismic shifts: Unprecedented disruption in the pharmaceutical industry



Two shifts are disturbing the pharmaceutical industry, leading to significant pressure on the traditional business model



Parallels with the automotive industry



- CO₂ emission reduction **UBER**
- Hybrids
- Uber **TESLA**
- Electric cars
- Self-driving cars

The shift of power in the healthcare value chain towards payers is resulting in ongoing price pressure and increase focus on value



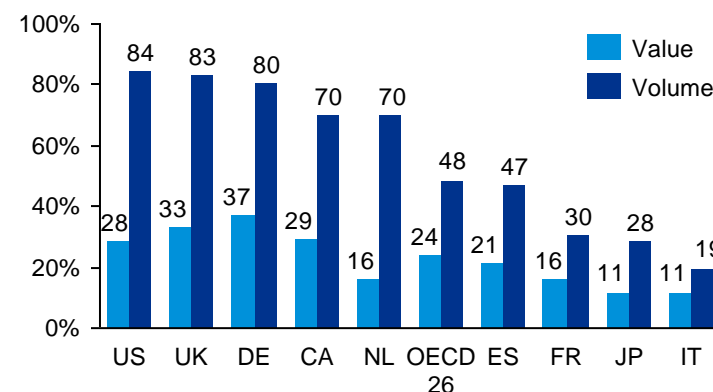
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Power shift in the value chain

- **Downward pricing pressure** driven by rising demand for healthcare and tightening budget constraints:
 - Need **greater transparency** around drug pricing and increasingly push for generic alternatives
- **In the US Market: Value-based pricing (VBP)** models introduced:
 - Cigna in value-based contracts with Sanofi, Regeneron, Amgen
 - Harvard Pilgrim value-based contract with Lilly for diabetes
 - U.S. HC Transformation Task Force shifting 75% of business into contracts based on outcomes, quality and costs by 2020
- **Outside the US: Governments are preparing for VBP** to varying degrees, while others are sticking to volume-based agreements:
 - Nordic countries and Italy are emerging as frontrunners in readiness, due to their extensive VBP experience
 - Price setting markets (e.g. France) are showing limited change

Share of generics in the pharmaceutical market, 2013 (or nearest year)^(a)



Defining value in healthcare^(b)

$$\text{Added value for patients} = \text{Appropriateness} \times \frac{\text{Outcomes}}{\text{Costs over the full cycle of care}}$$

Note: (a) US = United States, UK = United Kingdom, DE = Germany, CA = Canada, NL = the Netherlands, ES = Spain, FR = France, JP = Japan and IT = Italy

(b) Value comes from achieving the highest possible health gains (outcomes) for patients, measured against the total cost of care. The other key component of value is appropriateness, both of choice of product, and of care. Under- or over-use of a treatment, or use in inappropriate conditions, can compromise the value.

New therapies, innovative technology, and patient access to data are likely to shift the focus from treatment to prevention, diagnostics and real cure.



2



Shift from treatment to prevention, diagnostics and real cure

Developments	Current highlights	Enablers
Groundbreaking therapies	Genetics	Gene editing, genotyping, genetic profiling & mapping, gene therapy
	Cellular programming	Stem cell therapy
Technology advances	3D printing	3D printed models, organs, cells
	Nanotechnology	Nanobots, nanoparticles, nanochips
	Bionics	Artificial organs, implants, prosthetics, assistive devices, exoskeletons
	Predictive analytics	Artificial intelligence, big data analytics
Personalized medicine	Patient access to data & technology	Wearable monitoring devices, apps, gamification, digital medicines

Prevention

Diagnostics

Cure

Drivers of prevention, diagnostic and cure solutions



Advances in Prevention

Patient empowerment and predictive analytics



**Nano-
technology**

*Diagnostic nano-
particles via
ingestible pill*



**Patient
empower-
ment**

*Mobile & Internet-
based services to
support patient
self-management
of CVD & diabetes*



**Patient
empower-
ment**

*Apps for improved
heart health*



**Predictive
analytics**

*Use of predictive
algorithms to
prevent hospital
readmissions*

New Diagnostic Capabilities

Enabled by technologic developments



**Patient
empower-
ment**

*Sensory pens for
early Parkinson's
diagnosis*



**Predictive
analytics**

*Sensor-filled
"house" for
personalized
Parkinson's
treatment*



Genetics

*Genotyping for
inherited heart
conditions and
gene editing for
cancer treatment*



**Nano-
technology**

*Use of a DNA-
based nano-bots for
early cancer
diagnosis and
chemotherapy
elimination*

The Real Cure

3D printing, bionics, and genetics



3D printing

*3D-printed heart
valve models for
planning &
execution of
complex surgeries*



3D printing

*Alternative
treatments
including artificial
hearts and protein
patches*



Bionics

*Use of artificial
heart as bridge to
transplant, and
true "artificial
pancreas"*



Genetics

*Gene therapy for
neurological
disorders*

Agenda



Seismic shifts



Emerging playing fields



Future archetypes + pathway

New playing fields are emerging...



Fueled by sector convergence and technologies as solutions to revenue challenges

Emerging playing fields

Key observations

1

Price
Power change in
value chain

Pharma Tech



Pharmaceutical firms increasingly partnering and integrating with technology companies

2

Volume
Move to
prevention,
diagnostics and
cure

Genetics



Quantum leap in genetics via gene editing, which aids both prevention and real cure

Immunotherapy



Immunotherapies being introduced to treat, and ultimately prevent, diseases

Partnerships in the different emerging playing fields are a response to the developments and new solutions



Pharma Tech



- Leading technology company and major Pharma company partnered on “Smart” contact lens for diabetes that can measure glucose levels in tears and transmit data to wireless device for monitoring and prevention of complications

Genetics



- Leading university hospital created testing process to help physicians tailor treatments based on patients’ genetic information
- Three leading Pharma companies established dedicated central nervous system (CNS) genetic research and sequencing units to bolster personalized medicine capabilities and identify genetic biomarkers for use in clinical trials

Immunotherapy



- Leading immunotherapy company and large pharmaceutical company jointly developing immunotherapies to help delay progression of Parkinson’s disease
- U.S.-based company developing immunotherapies to treat and prevent cardiovascular diseases

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Seismic shifts



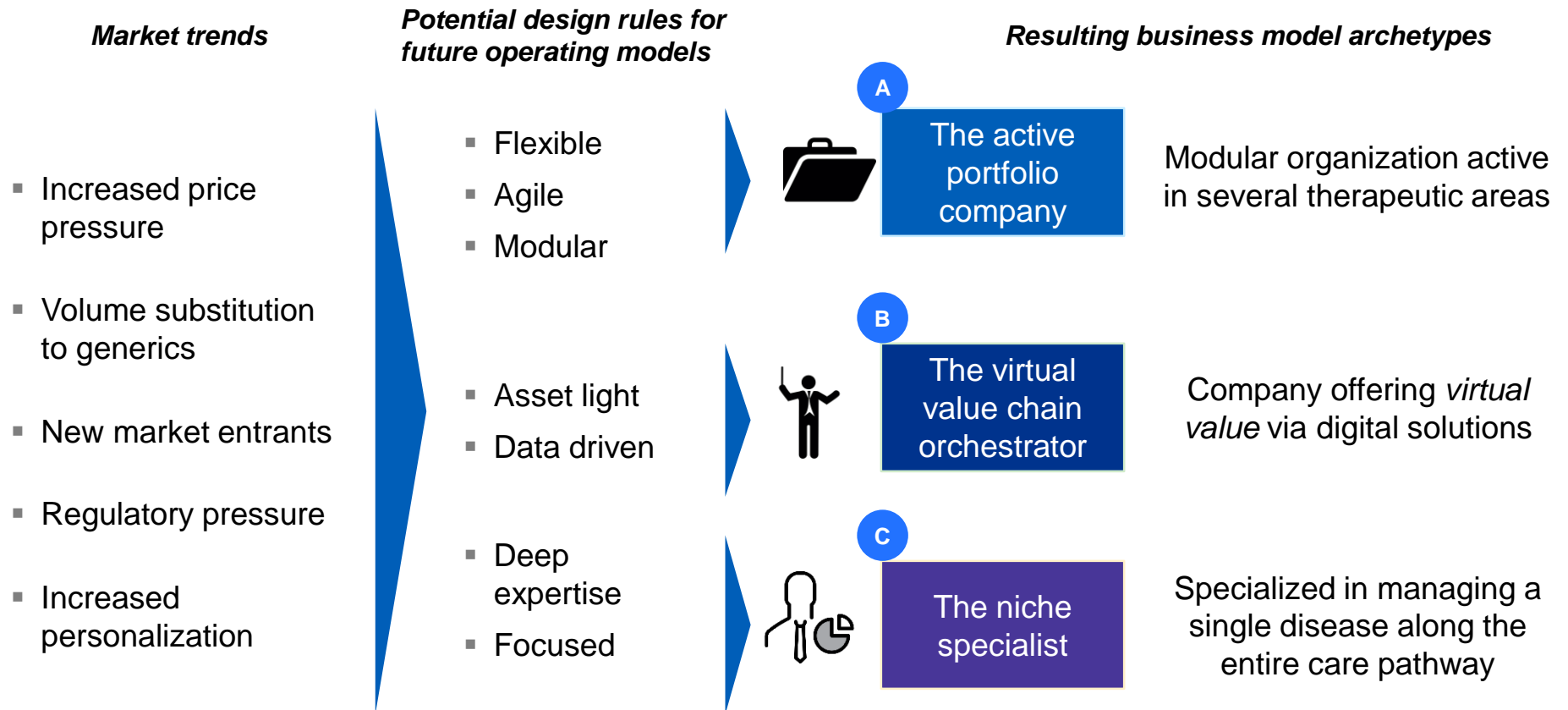
Emerging playing fields



Future archetypes + pathway

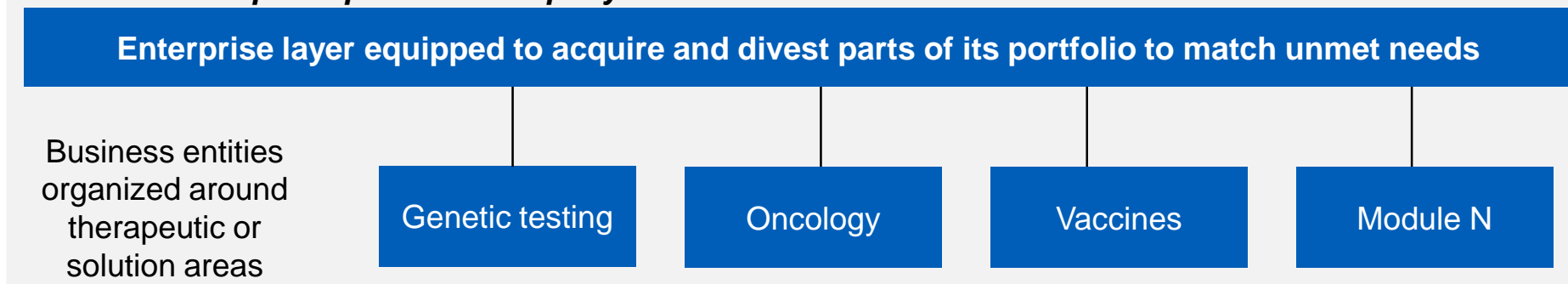


Three operating model archetypes are emerging in response to market trends





Schematic set-up of a portfolio company



Key characteristics

- Focused on various therapeutic areas and looking to expand therapies and solutions
- Portfolio likely to comprise mix of established therapeutic areas and new playing fields
- Active portfolio management -

Competitive differentiators/ benefits

- Flexible and agile, allowing rapid pursuit of new opportunities
- Diversified into several therapeutic areas
- Able to realign business mix easily to match unmet needs

Risk profile

- Reduced risk via various therapeutic and/or solution areas
- Reduced risk via high agility and ability to mitigate disruptive developments



B

The virtual value chain orchestrator

Leverage data to develop and unlock solutions that weren't available before

Potential players

Description and key activities

The *health guider* orchestrating the journey ('Spotify')

- Navigates patients through the complex healthcare world from birth until end of life:
 - DNA test at birth to create personalized patient map
 - Proposes and organizes medical support using information from the patient map
 - Monitors vital characteristics throughout the life of a patient

The virtual *criticaster* orchestrating quality ('TripAdvisor')

- Acts as a platform that continuously evaluates parts of the healthcare value chain:
 - Enables patient interaction on a platform that allows users to make contributions
 - Collects and analyzes data and create valuable insights
 - Sells insights to third parties

The *digital disruptor* orchestrating capacity ('Uber')

- Gains increasing control as the go-to party for access to excess capacity throughout healthcare value chain:
 - Provides (online) manufacturing capacity and ensures support staff (e.g., HR) is readily available
 - Becomes indispensable to current market players by providing increasing market transparency
 - Ensures decisions are based on underlying data and applies data & analytics tools

Schematic set-up of a niche specialist



Key characteristics

- Focused on a single therapeutic area or disease, looking at the entire care pathway from prevention to cure
- Requires wide array of competencies e.g. partnering with start-ups and academia
- Quickly interact with the other archetypes:
 - Fast access to funding; enable provision of combined therapies with portfolio company
 - Connected to a broader client population via the virtual value chain orchestrator

Competitive differentiators/ benefits

- One-stop shop for a single illness
- Better basis for personalized support (e.g., leveraging genetic screening after birth)
- Increases focus on wellness by taking into account lifestyle factors impacting certain diseases

Risk profile

- High risk if not sufficiently aware of disruptive trends
- High risk due to hyper focused client base

C Niche specialist – a diabetes example



Care pathway



Future technologies/ solutions

- | | | | | |
|--|--|--|---|--|
| <ul style="list-style-type: none">• Optical detection technology that detects glucose based on how the eye absorbs a ray of light.• Could detect diabetes at earlier stages. | <ul style="list-style-type: none">• Nanotech-based microchips used to detect diabetes through antibodies.• Will reduce chances of error and can create high-performance measuring devices. | <ul style="list-style-type: none">• 3D bio-printing of islet cells potentially offers a new way to produce cells for transplantation.• Reduces dependence on external insulin and solves problem of donor cell rejection | <p>Stem cell treatment could cure diabetes patients or reduce dependence on frequent insulin and glucose testing</p> | <ul style="list-style-type: none">• Gamifying disease management can help patients track and monitor glucose levels and support them with treatment adherence.• Could potentially reduce costs and increase patient engagement |
|--|--|--|---|--|



Looking to the future

Setting up independent and integrated Pharma 2030 labs could be a way to be prepared, and test and evaluate potential responses



Embracing the most appropriate archetype(s) allows companies to embrace disruption, increase real value to patients, and preserve their futures



**Test new archetypes/
solutions with a tailored
operating & business
model**

Test new archetypes and technologies/solutions that are close to existing capabilities and align with the company's financial objectives



**Match desired archetypes
to existing businesses
(e.g., through
modularization of
organization)**

Evaluate how different (combinations of) archetypes strengthen the business, and, equally important, determine which new organizational capabilities are needed



**Develop an adaptive,
adjustable roadmap**

Develop an adaptive, adjustable, roadmap with separate sections and teams for new and existing businesses

What practical steps should the industry be taking today?



In addition to running well-crated pilots to explore new archetypes, companies can begin taking action to prepare for future market disruption to the top line and bottom lines of their P&Ls

Prepare for Transition of the Top Line



1 Enable New Models for Sharing & Extracting Value



2 Invest in Next Generation Integrated Solutions



3 Engage Beyond Traditional Stakeholders

Prepare for Transition of the Bottom Line



1 Streamline the Innovation Pipeline

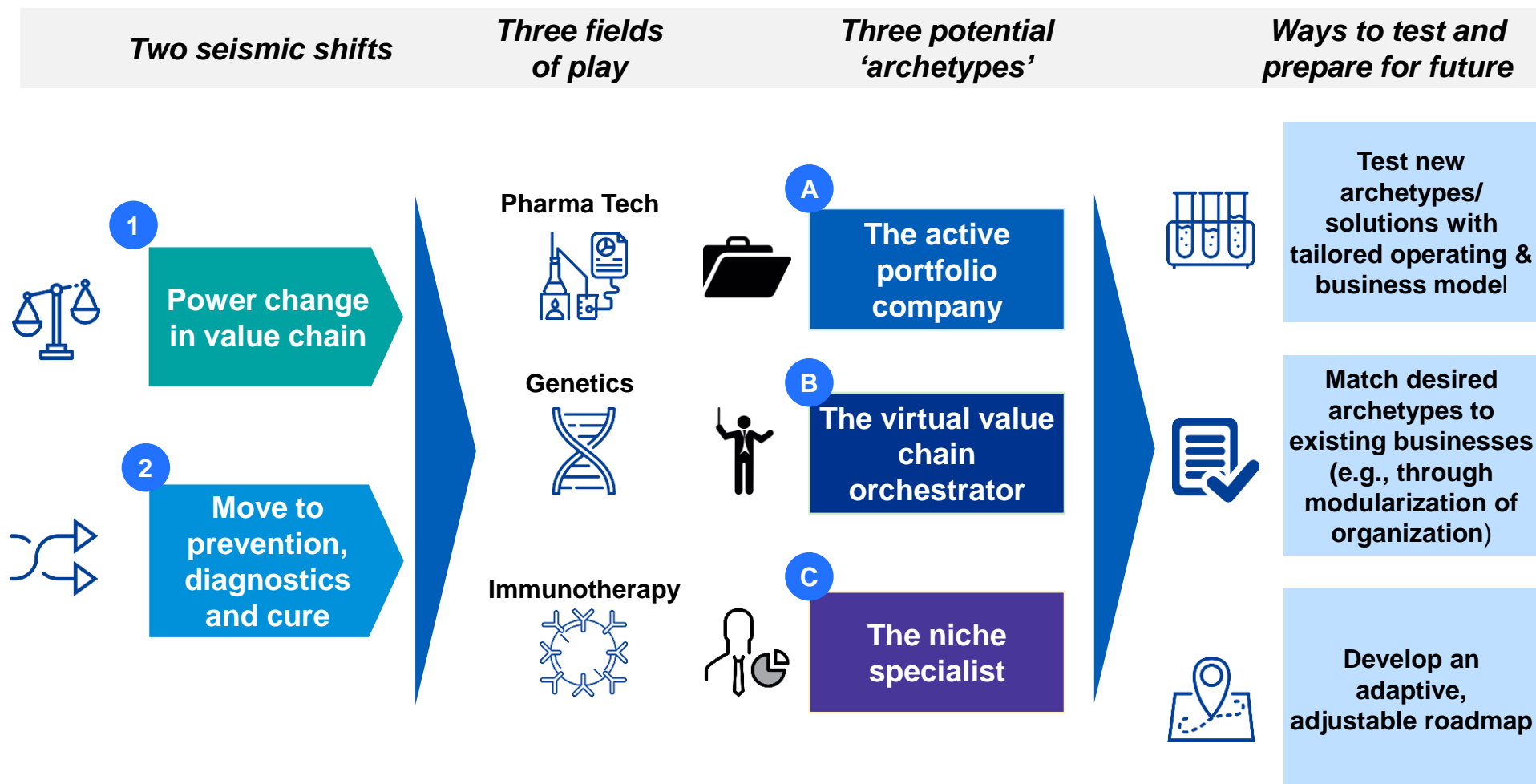


2 Resource the Commercial Engine for the Future



3 Adapt Operations and Supply Chain Models for Competitive Advantage

To summarize





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