



Science For A Better Life



Bayer's Contribution to a Healthier Society

12th Japan-Germany Industry Forum in Tokyo

Dec. 1st, 2016 / Hans-Dieter Hausner, President and Senior Bayer Representative at Bayer Holding Ltd.



Science For A Better Life



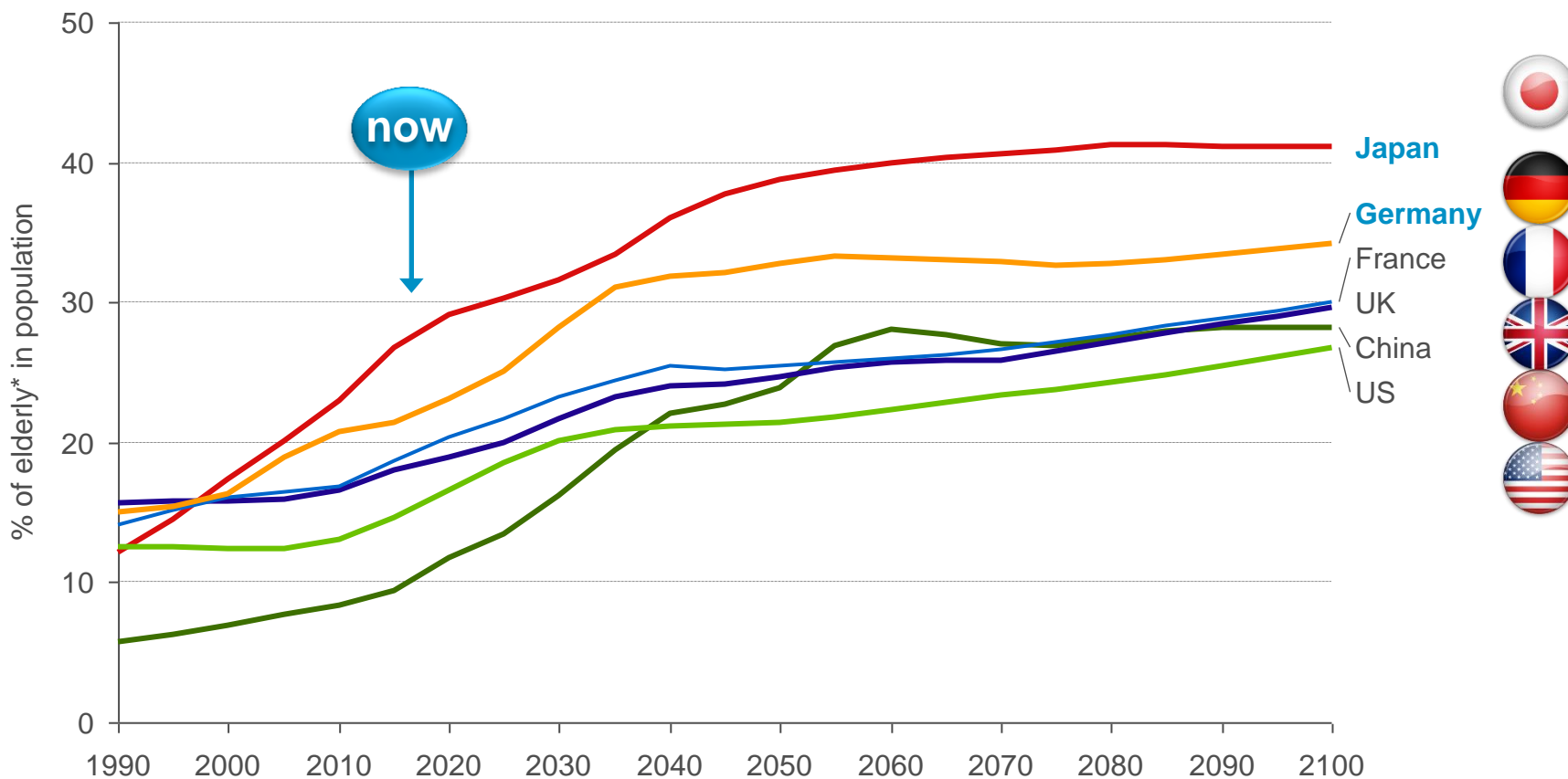
Agenda

- **Market trends in Japan and Germany**
- Bayer
- Open Innovation



With Japan and Germany's rapidly aging societies, demand for innovative pharmaceuticals continues to increase

Ratio of elderly over age 65 by major country



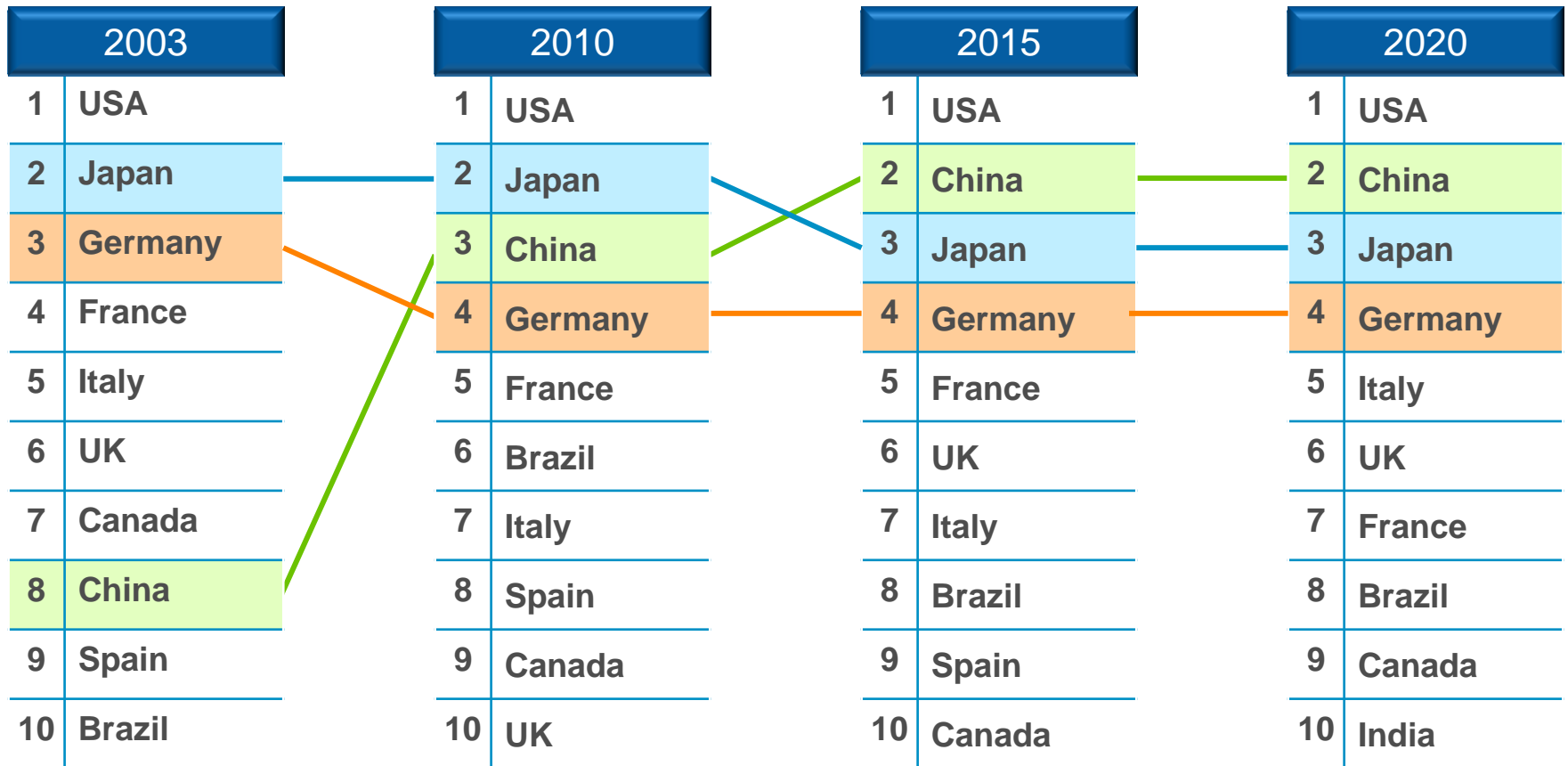
Elderly > Age 65

Source: UN Statistics, The 2010 Revision, Japan; National institute of population and social security research

Japan and Germany are still ranked #3 and #4 in the global pharma market



Leading country ranking



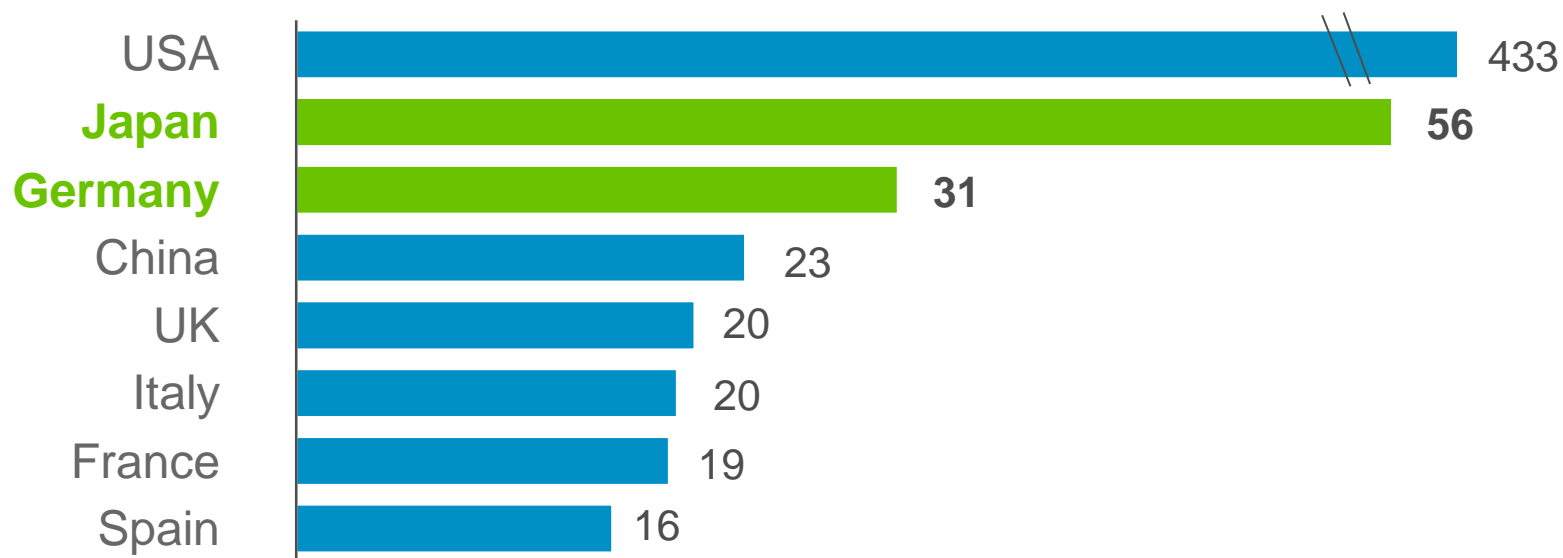
Source: ©2016 QuintilesIMS, Developed by Bayer Yakuhin based on IMS Japan 2014 Strategic Management Review, IMS Market Prognosis May 2016, Reprinted with permission



However, both countries remain the #2 and #3 markets for innovative pharmaceuticals

Global innovator¹ market sales

bn€, 2020E



1 Excludes Generics and Others

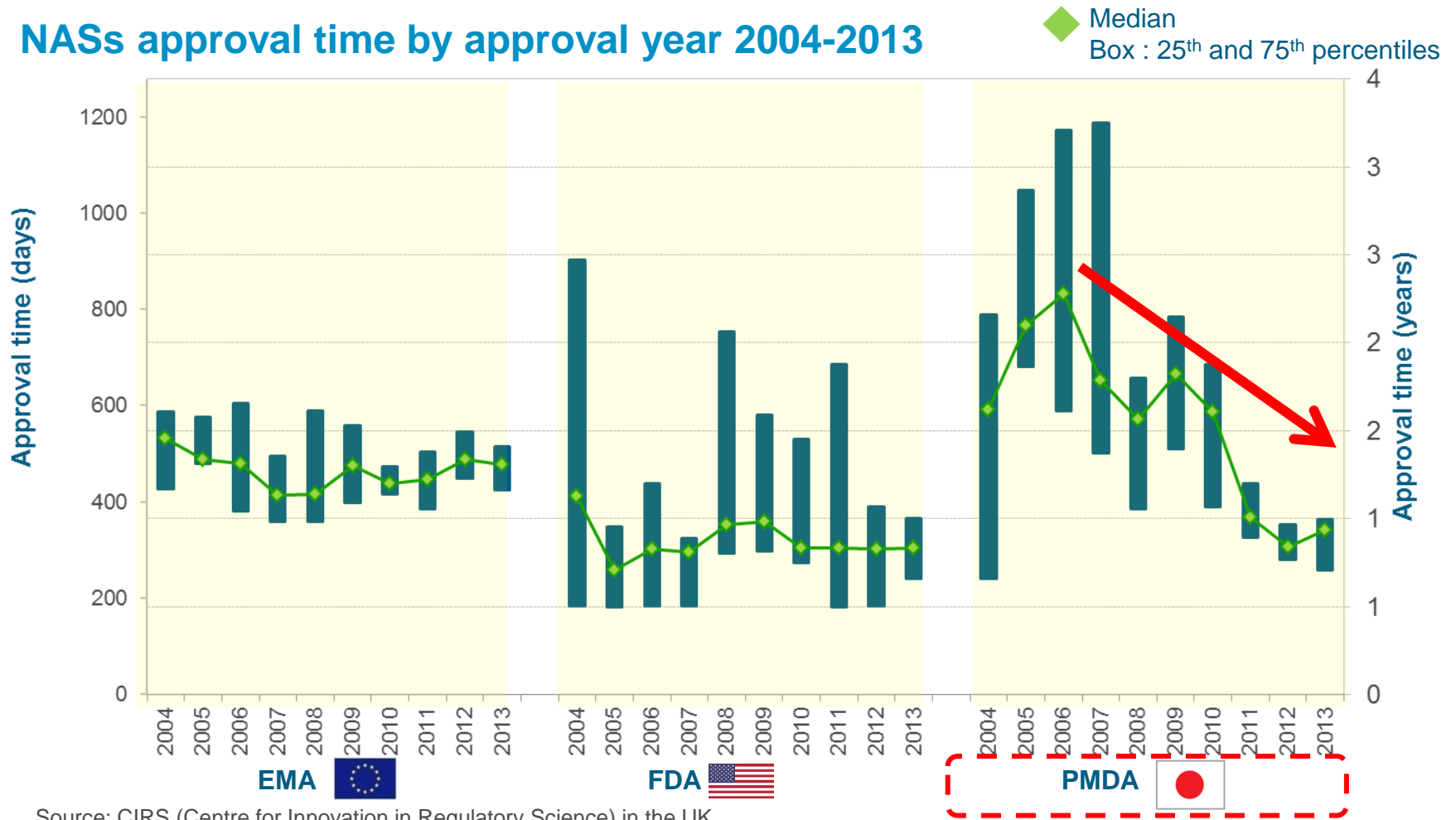
2 Note: Exchange rate 1.053\$/€

Source: ©2016 QuintilesIMS, Developed by Bayer Yakuhin based on IMS Market Prognosis, September 2016, Reprinted with permission

PMDA has demonstrated strong and innovative leadership by eliminating the drug lag in Japan



NASs approval time by approval year 2004-2013



Despite uncertainties Japan continues to be an important market for innovative pharmaceuticals

- Large aging population
- ‘Sakigake’ & Innovation premium
- Fast regulatory approval
- Biennial price revision rates predictable
- Access secured despite HTA introduction

+

- HTA introduction
- 80% Generics usage by 2020 (2018)
- ‘Huge-seller’ re-pricing rule (impact >800m€)
- “Optimal Use” guidelines may excessively limit the use of new drugs
- Less predictable interpretation of pricing rules for new products
- Out-of-cycle price revisions

-

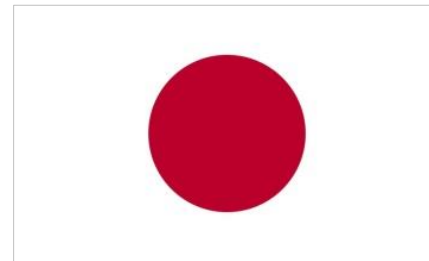
Cross-learning between EU and Japan

Lessons learned from EU



- Largest public-private collaboration in pharma: the Innovative Medicines Initiative (IMI)
- Involvement of private sector in pricing discussions

Lessons learned from Japan



- Reward for innovation (especially 2010-2015)
- HTA for post-launch products (not for new launches)



Agenda

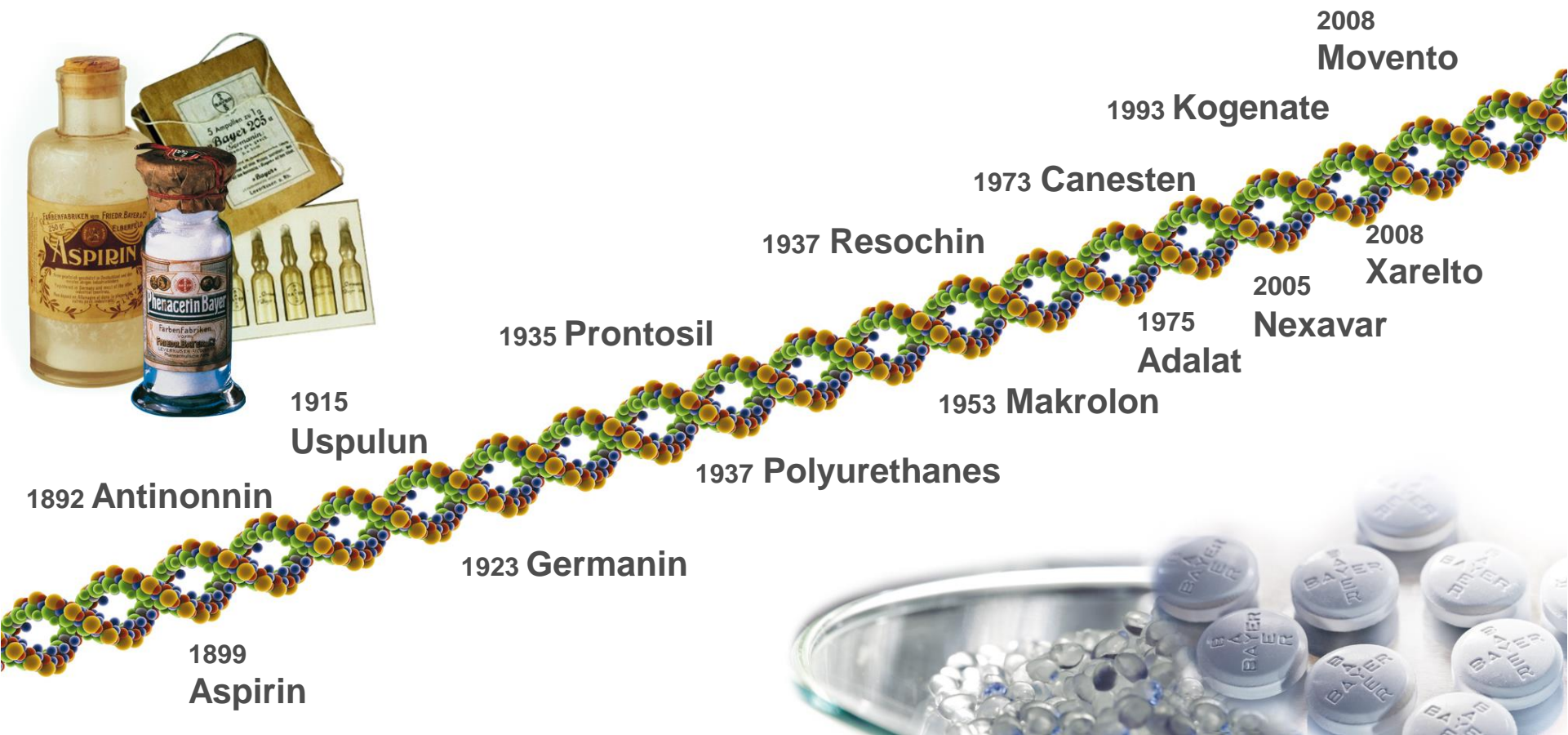
- Market trends in Japan and Germany
- **Bayer**
- Open Innovation

Our history: in 1863, Bayer and Weskott established a small dyestuffs factory





Bayer's history is defined by key contributions to mankind





Today, Bayer is a world leading Life Science company



Pharmaceuticals



Consumer Health



Crop Science



Bayer provides solutions for longer, healthier lives



- Protection for Patients with *Atrial Fibrillation (AF)* from the devastating impact of stroke
- Since approval, more than 23 million patients prescribed worldwide*



- Now a standard of care for *wet Age-related Macular Degeneration (wAMD)* allowing patients to maintain or improve vision
- About 11 million doses of Eylea have been administered globally*



- First approved drug for the orphan disease of *Chronic Thromboembolic Pulmonary hypertension (CTEPH)***



- Significantly improves overall survival in *Castration Resistant Prostate Cancer (CRPC)* patients with bone metastases

Source: In-house data;

*Xarelto and Eylea also has various indications aside from the one shown above (varying by country); the figure above includes cases for all indications

** Adempas also has indication for Pulmonary Arterial Hypertension in Japan

**ALMOST 1 IN 3 PEOPLE
DIE FROM
CARDIOVASCULAR DISEASE** | **OUR SCIENTISTS
WON'T
ACCEPT THAT**





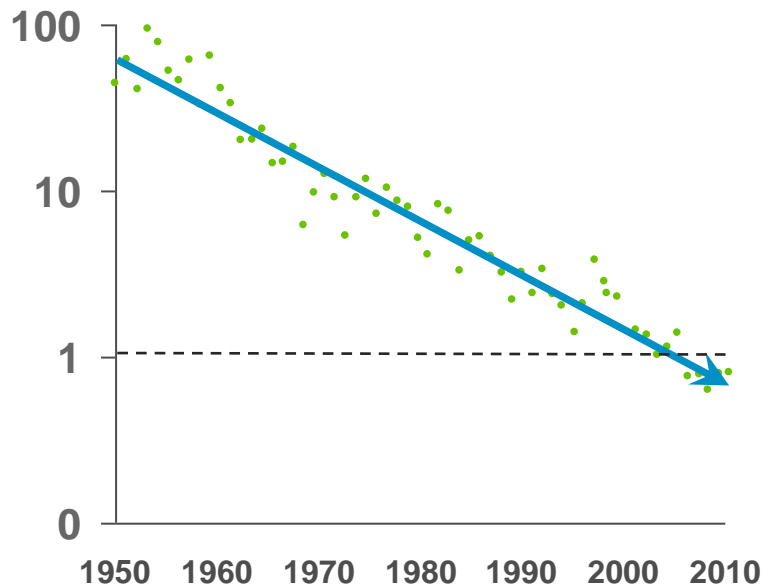
Agenda

- Market trends in Japan and Germany
- Bayer
- **Open Innovation**

Globally, R&D is changing ...becoming more external and collaboration driven

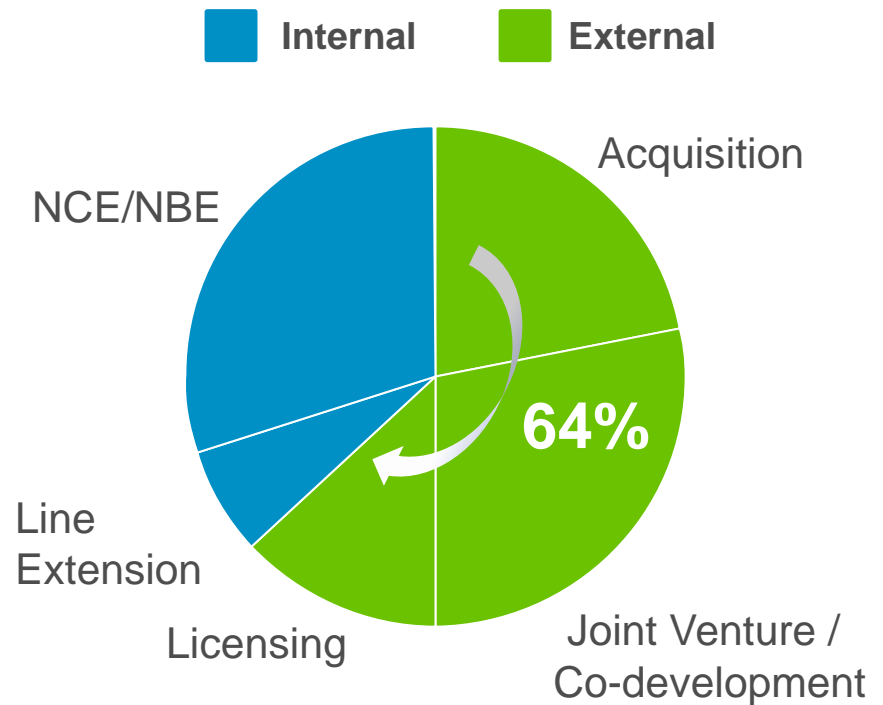


Fewer new drugs per \$1 billion of R&D expenditure



After inflation adjustment

Origin of late stage pipeline

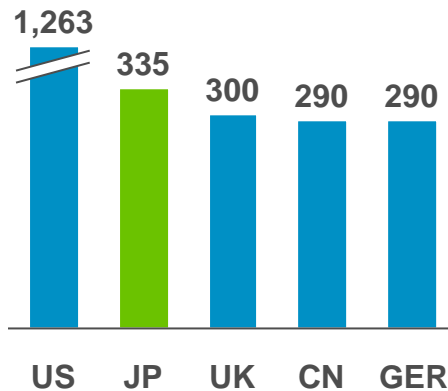


2010 to 2013 risk adjusted peak sales projection

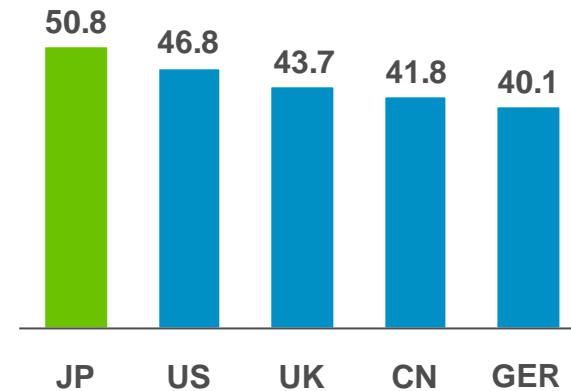
Source : Nature Rev. Drug Discov. 11, 191 (2012), Deloitte Consulting LLP, Thomson Reuters research, Japan Patent Office

Japan is strong in science and technology

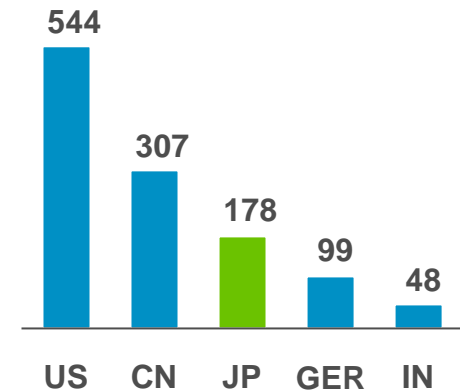
of Publications¹
(1996~2013, top 5 countries)



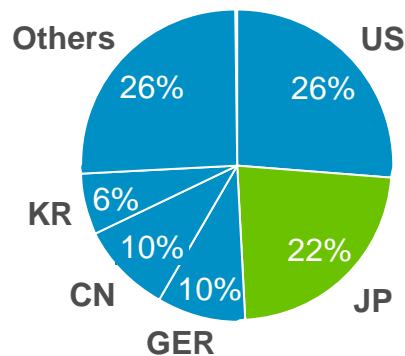
of Researchers per 10,000 pop.²
(2014, top 5 countries amongst G8)



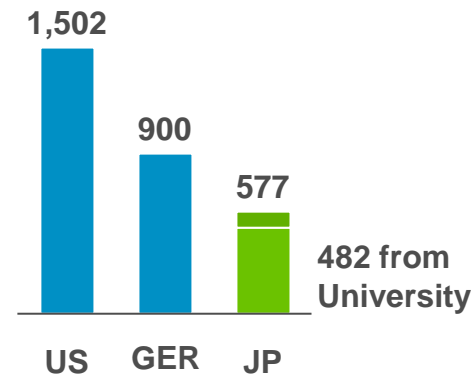
R&D spending, bn€³
(2014, top 5 countries)



Share of Patent applications⁴ (2012)



of Bio ventures⁵ (2007)

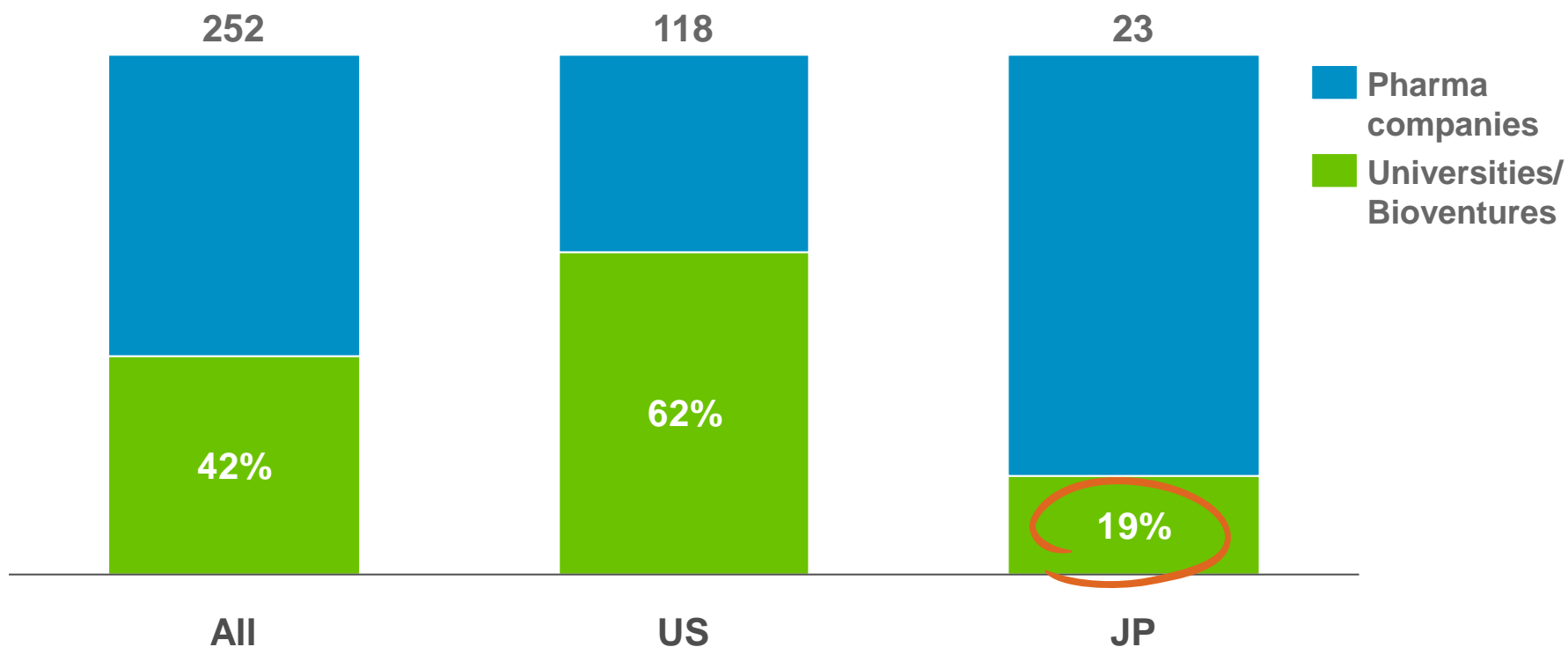


Source1) Scopus®, 2) JETRO report, 3) Battelle and R&D Magazine, 4) Life science cluster report, 5) Nature Reviews Drug Discovery



...but external innovation is currently not a Japanese strength due to weakness in biotech and tech transfer

Origin of NMEs (1998~2007)

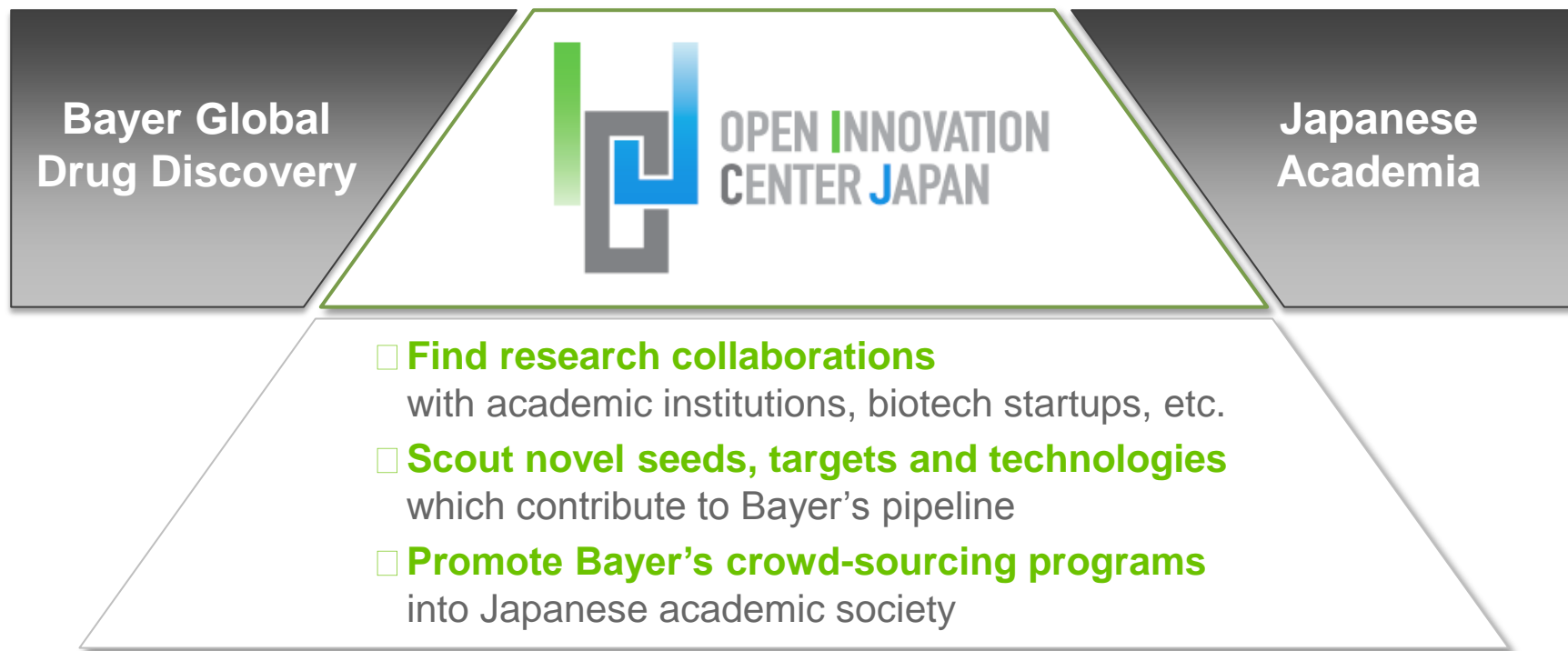


Source : Cabinet office, Japan patent office, MEXT, Nature Reviews Drug Discovery

Bayer Open Innovation Center Japan (ICJ)

ICJ Mission

Contribute to the health and well-being of society through bioscience innovation and bioscience research in Japan



Bayer ICJ has collaborated with Kyoto University since 2014

Collaboration Agreement (2 years)



Objectives

- Identify innovative ideas and concepts and find collaborative projects which can impact on Bayer's pipeline

“AGORA Bayer” meeting

- KU researchers and professors introduce research results and technologies based on Bayer's interest and requests

Bayer satellite office in KU campus

- Opened an on-campus office in May 2015
- Objective: strengthen the relationship between KU researchers and Bayer ICJ / scientists





Bayer ICJ uses crowdsourcing to uncover innovative solutions

Grants4Targets®

Funding to validate your novel pharmaceutical target



Dr. Manabe, Chiba University

Potential indication:

*Chronic Heart Failure,
Chronic kidney disease*



Dr. Hattori, Toyama University

Potential indication:

Acute respiratory distress syndrome



Dr. Hirota, University of Tokyo

Potential indication:

Adenomyosis / endometriosis

Grants4Apps®

Advance your digital health startup with Bayer

- 1st Program (~Jun):
Digital solution for drug adherence
- 2nd Program (Sep~):
Monitoring solutions for a Better Life



Bayer ICJ is part of Bayer's global network of innovation centers to enable partnerships across indications





Science For A Better Life



Thank you!