

**Organising Healthcare Innovations**  
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# **Research and innovation in health and social care in the UK: what seems to be the problem?**

Kieran Walshe

Professor of Health Policy and Management

Alliance Manchester Business School

University of Manchester, UK

[kieran.walshe@mbs.ac.uk](mailto:kieran.walshe@mbs.ac.uk)



@kieran\_walshe

# The innovation problem

- Healthcare system financial rules and regulations prevent “disruptive innovation” – affordability and accessibility comes from cost-lowering, simple innovations (Clayton Christensen et al 2009)
- “The NHS is full of talented people with brilliant ideas. But the benefit of this collective creative energy has not been fully realised because these ideas and inventions have not always been systematically and rapidly spread throughout the service as a whole. The UK is particularly slow, relative to other developed economies, in adopting innovative medical technologies.”  
(Department of Health, 2011)

# Innovation health and wealth (DH, 2011)



# The innovation problem

- We spend a lot on health research
- But the rate of innovation in healthcare systems is slow and barriers to innovation seem endemic and problematic
- “Evidence based medicine” movement of 1990s saw this as a problem of clinical practice and behaviour
- “Knowledge mobilisation movement” of 2000s sees this as a problem of implementation
- Research community uses this as an argument for investing more in research and making it easier to do research in healthcare systems

# Overview

- Health research, development and innovation – how it works and what the innovation problem really is
- Comparisons with other sectors and possible lessons from the organisation of research and innovation processes elsewhere
- Some ideas for reform in the healthcare sector
- Conclusions

# The global health R&D picture

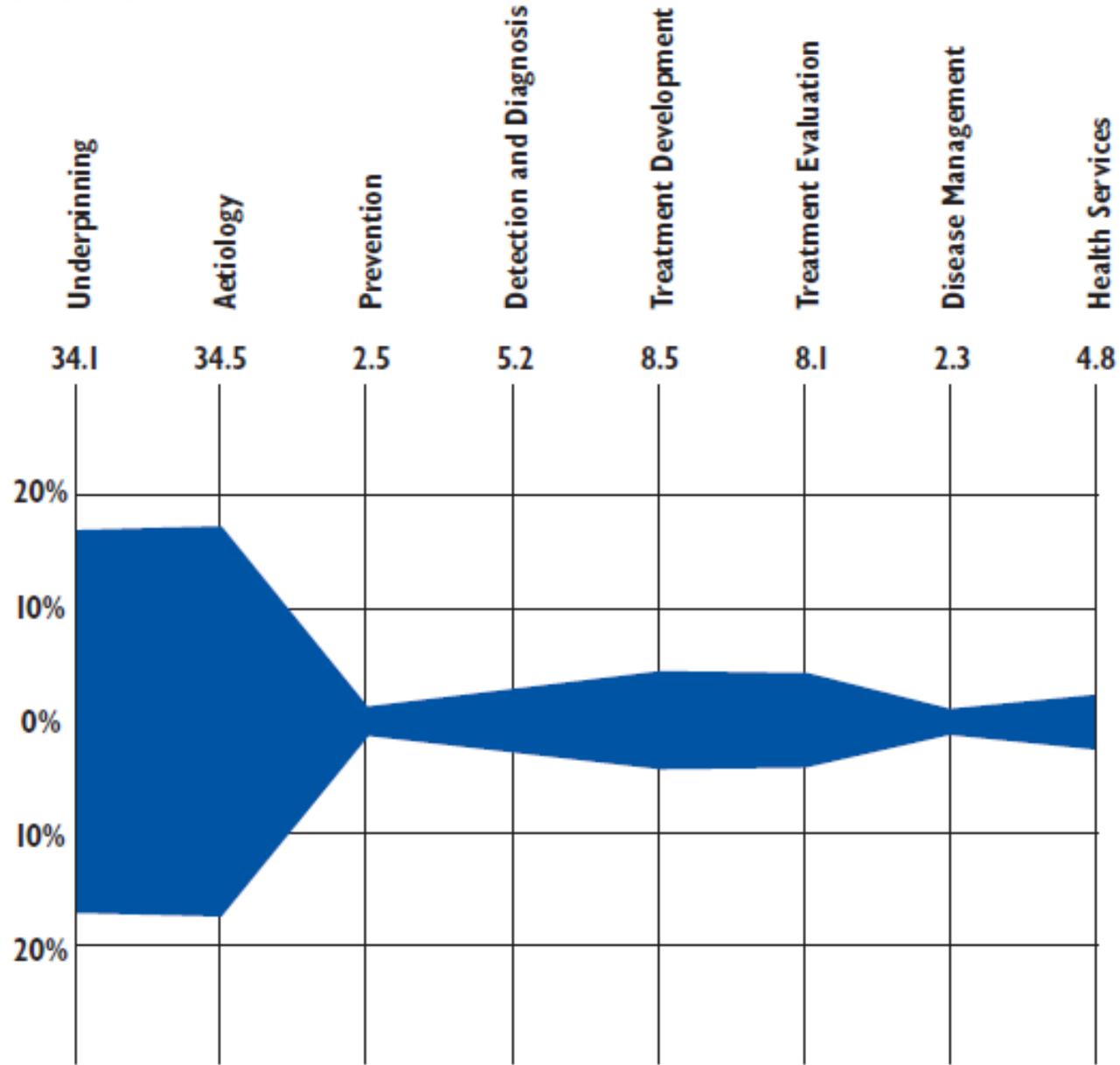
- Annual spend \$240 billion, 90% of it in high income countries, usually about 0.8% of GDP
- Most in a few countries - USA (\$119 billion), Japan (\$18 billion), Germany (\$13 billion), and UK (\$12 billion).
- About 60% from business (pharma), 30% from government, 10% from charities/philanthropy
- “persistent nature of the gap between health R&D needs and the R&D that is presently funded and undertaken”

(Rottingen et al 2013)

# UK health research

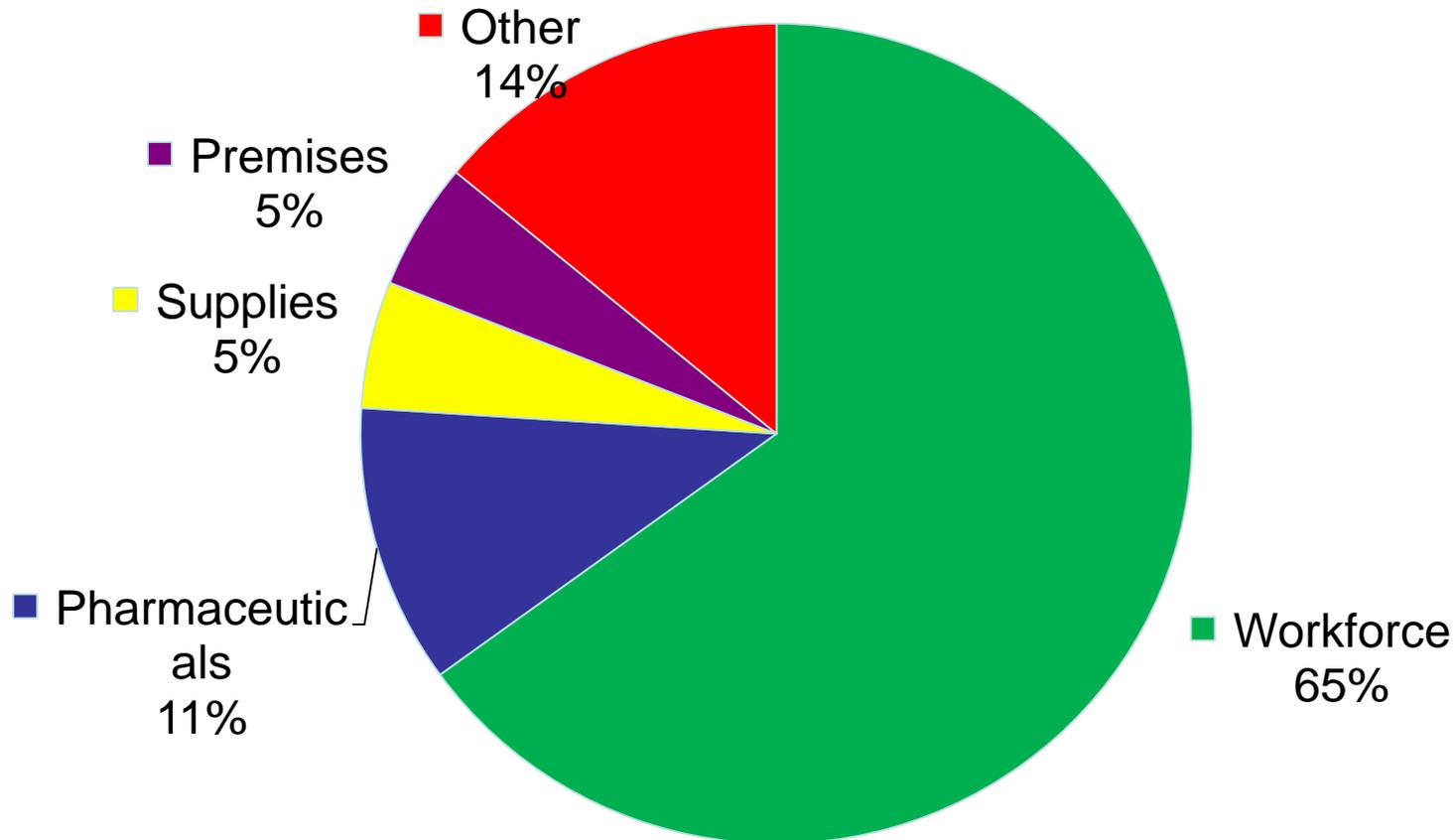
- £8 billion pa – one third of all UK R&D spending
  - £4.5 billion from business – pharma and med tech
  - £2.3 billion from government – Medical Research Council, National Institute of Health Research, university funding
  - £1.2 billion from charities
- 60% on basic science, 19% on treatment evaluations, 7.5% on health services/systems research
- Research producers – pharma companies, universities, larger healthcare providers

(Walshe and Davies 2013)



(Cooksey 2006)

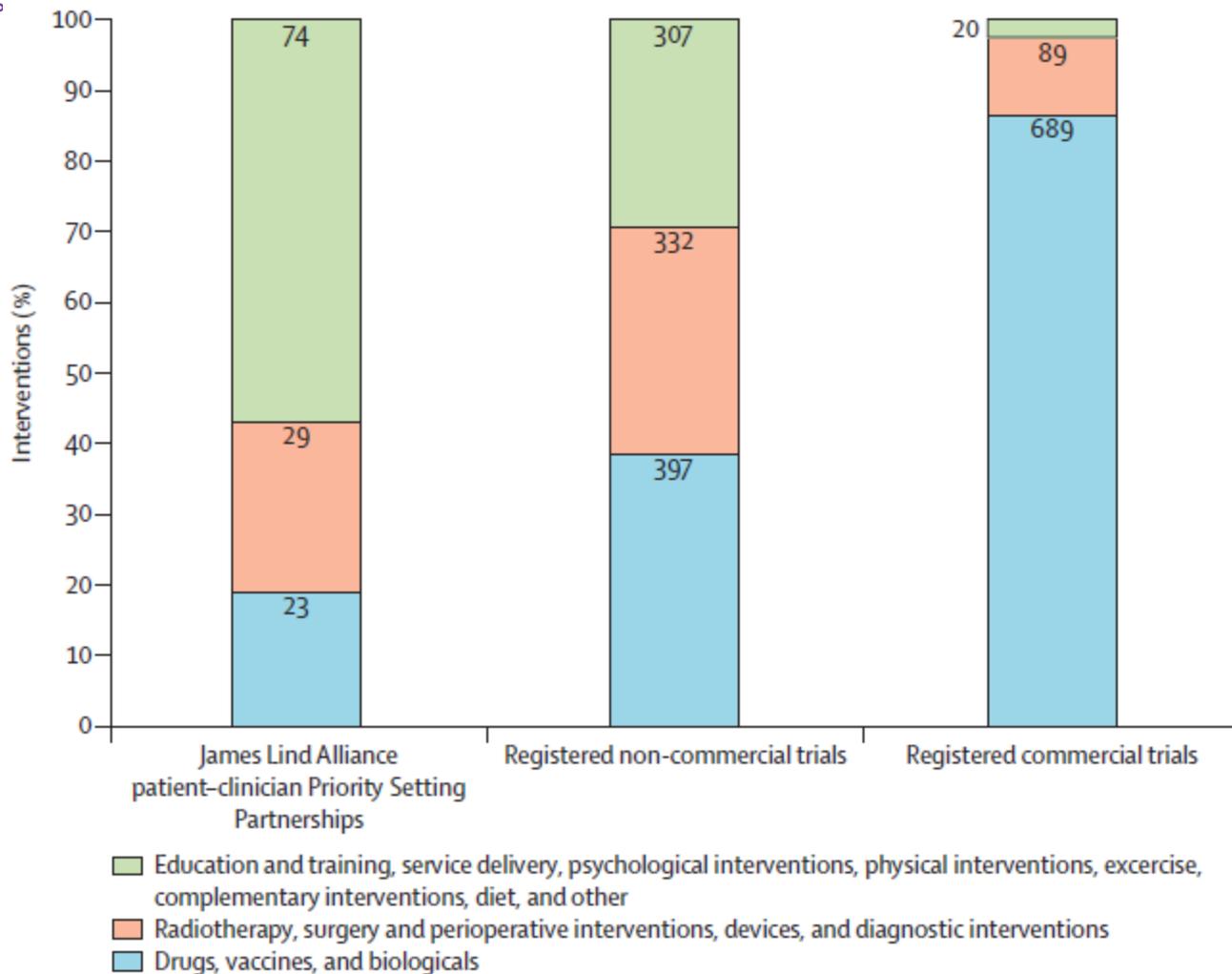
# NHS spending by area, 2012/13



# Avoidable waste in health research

- “Of more than 25 000 reports published in six leading basic-science journals between 1979 and 1983, 101 included confident claims that the new discoveries had clear clinical potential, yet only five had resulted in interventions with licensed clinical use by 2003, and only one led to the development of an intervention used widely”
- Apart from the effect of commercial, political, and academic interests in decisions about what is researched, one obvious reason is that users of research evidence are only rarely involved in the setting of research agendas”

(Chalmers et al 2014)



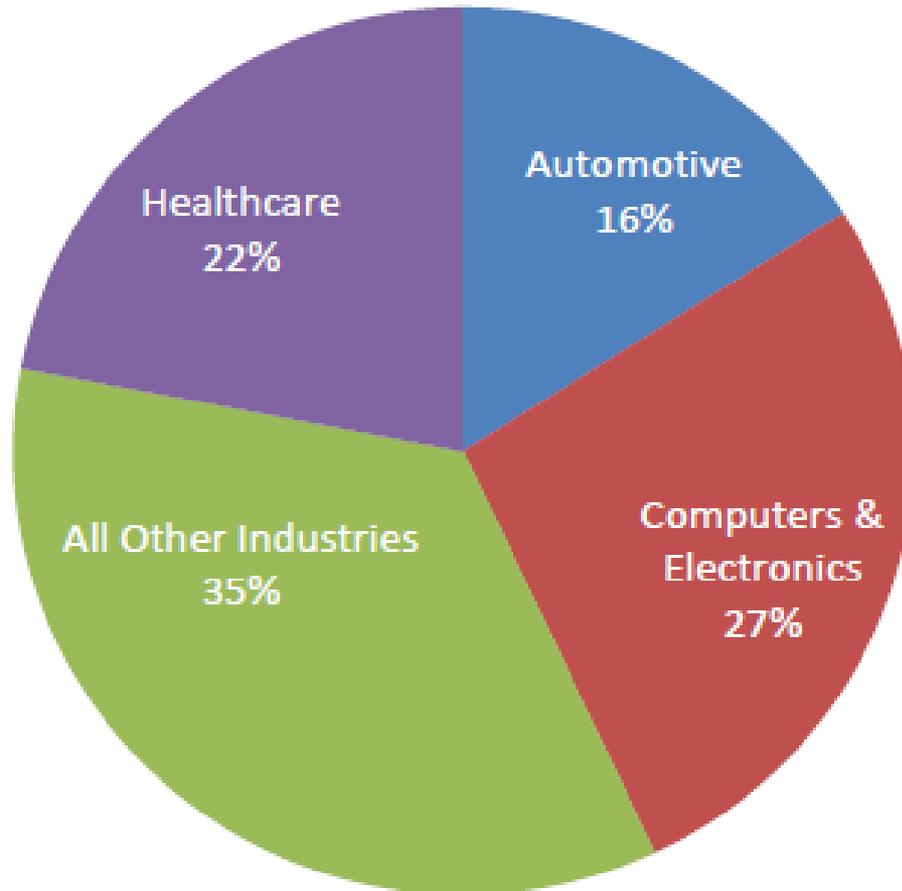
(Chalmers et al 2014)

## UK health research: the issues

- Large investment in health R&D – questions about value for money and impact
- Research policy and strategy – set by and around research interests, disconnected from health systems goals and strategies
- Divergence between health R&D enterprise and the healthcare system/organisations
- Wider context – diminished collectivity, reduced organisational capacity for and interest in R&D

(Walshe and Davies 2013)

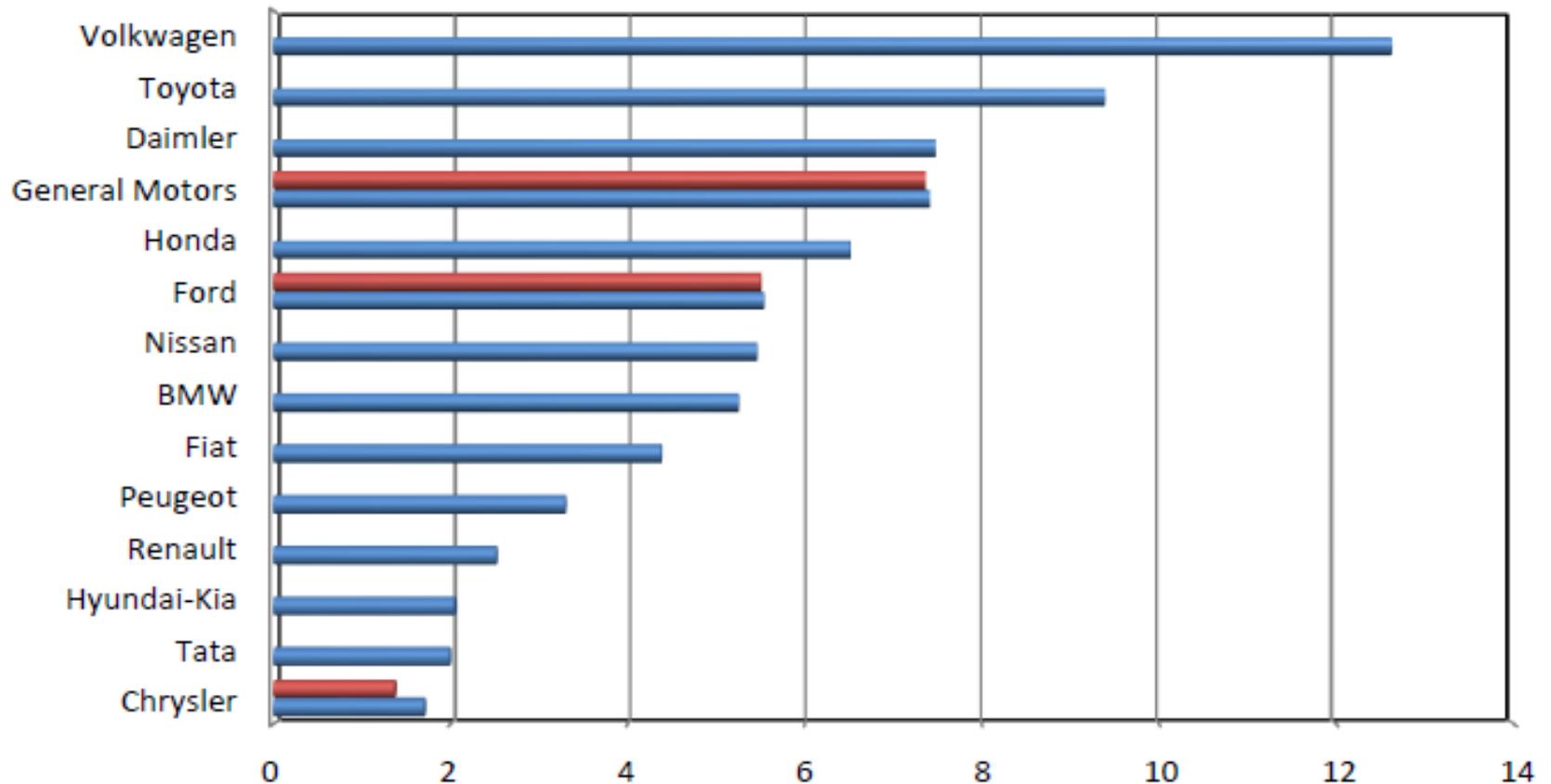
# Global R&D spending by sector, 2013



(CAR 2014)

# Automotive R&D spending by company

(annual, 2013, \$ billions)



(CAR 2014)

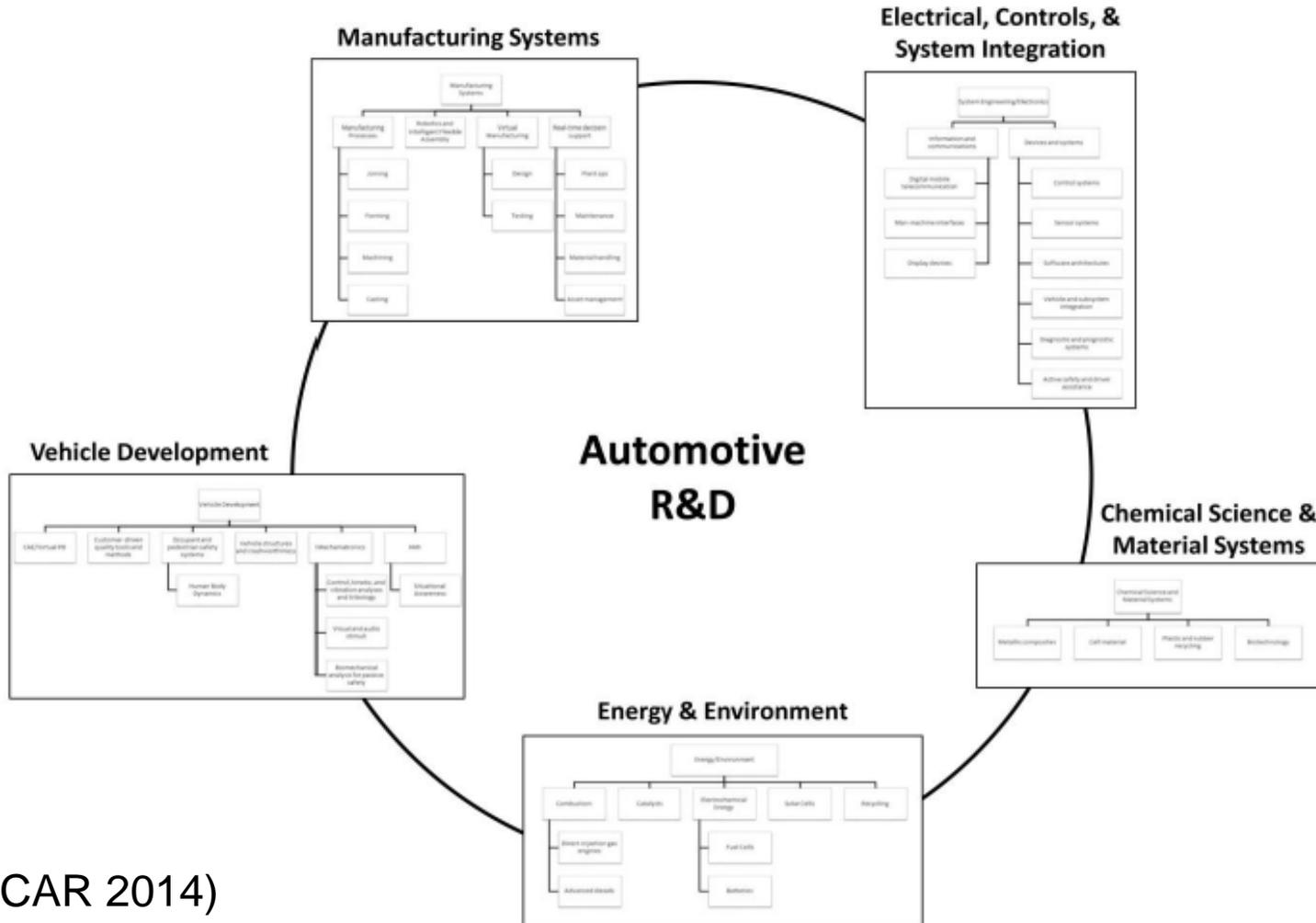
■ Estimated U.S. ■ Estimated Global

## Automotive industry R&D

- About 90% research funded by industry, 10% by government
- Small number of large, global companies all invest heavily in R&D – circa 4% of turnover
- Industry collaboration on basic research prior to exploitation – company partnerships/collaborations
- Most research done in-house; research partnerships with universities, and universities train/educate science and engineering workforce
- Innovation and research vital to competitive advantage

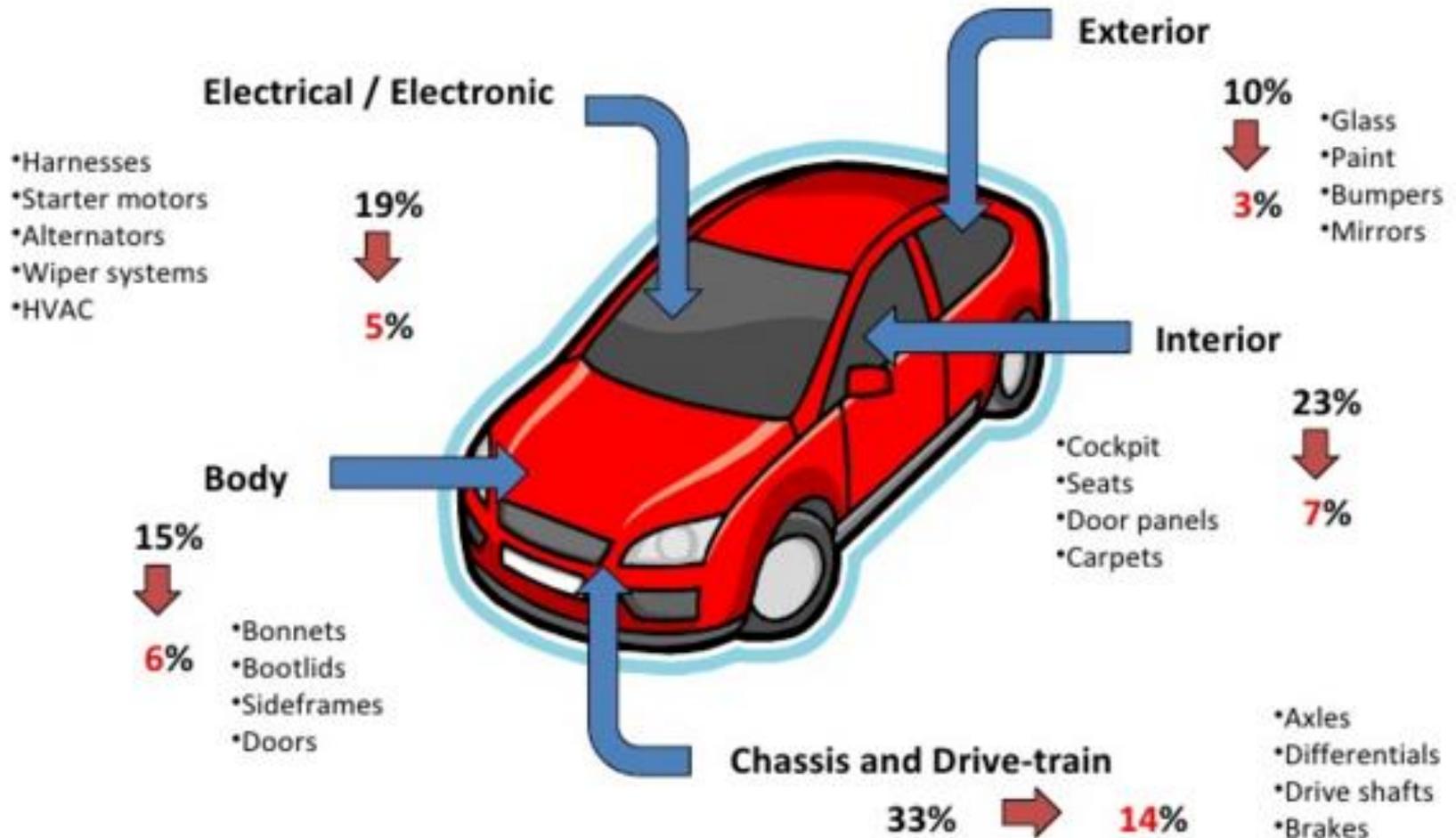
(CAR 2014)

# Typical automotive company R&D structure



(CAR 2014)

# Breakdown of car manufacturing costs (NAACAM, 2009)



# Companies with highest R&D spending

Rank		Company	R&D Spending		
2014	2013		2014 US\$ Billions	Change from 2013	As a % of Sales
1	1	Volkswagen	\$13.5	18.9%	5.2%
2	2	Samsung	\$13.4	28.0%	6.4%
3	4	Intel	\$10.6	4.6%	20.1%
4	5	Microsoft	\$10.4	6.1%	13.4%
5	3	Roche	\$10.0	-1.8%	19.8%
6	7	Novartis	\$9.9	5.6%	17.0%
7	6	Toyota	\$9.1	-7.0%	3.5%
8	10	Johnson & Johnson	\$8.2	6.8%	11.5%
9	12	Google	\$8.0	17.1%	13.3%
10	8	Merck & Co.	\$7.5	-8.1%	17.0%

(Strategy&pwc 2014)

# Companies highest rated for innovation

RANK		Company	R&D Spending		
2014	2013		2014 US\$ bil.	Rank	as % of sales (intensity)
1	1	Apple	\$4.5	32	2.6%
2	2	Google	\$8.0	9	13.3%
3	4	Amazon	\$6.6	14	8.8%
4	3	Samsung	\$13.4	2	6.4%
5	9	Tesla Motors	\$0.2	440	11.5%
6	5	3M	\$1.7	79	5.6%
7	6	GE	\$4.8	30	3.3%
8	7	Microsoft	\$10.4	4	13.4%
9	8	IBM	\$6.2	18	6.2%
10	-	P&G	\$2.0	70	2.4%

(Strategy&pwc 2014)

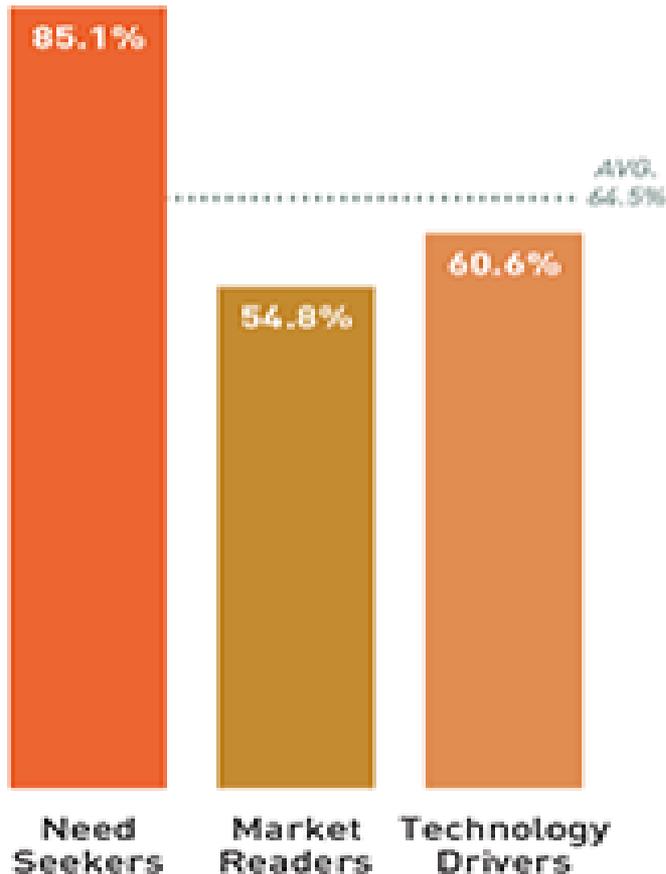
# Approaches to research and innovation

- **Need seekers** – insight from users leads research needs, open cultures for innovation, priority to user focus (Apple, Tesla)
- **Market readers** – market opportunities lead research, culture of incremental innovation and market follower (Samsung, Caterpillar)
- **Technology drivers** – internal tech capabilities lead research, culture of superior tech knowledge (Siemens, Google, Bosch)

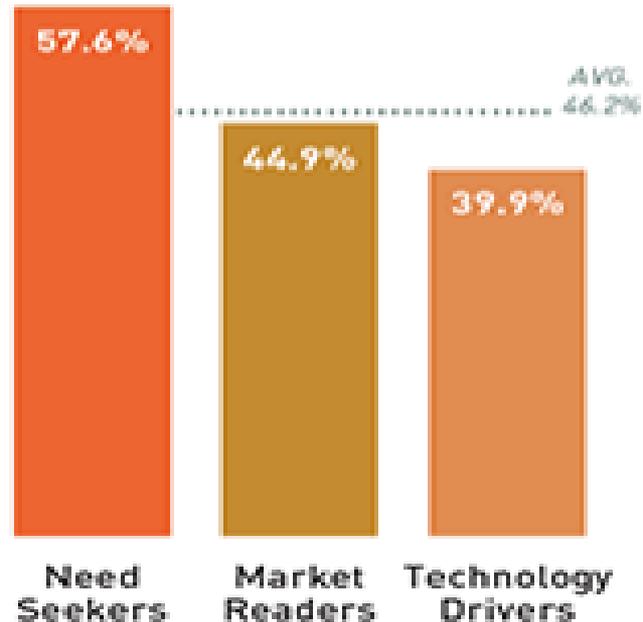
(Strategy&pwc 2014)

# Approaches to research and innovation

Percentage of companies whose  
business and innovation  
strategies are highly aligned



Percentage of companies that  
financially outperform their  
competitors



## R&D intensity (as % of turnover)

High (>5%)	Pharmaceuticals & biotechnology; Health care equipment & services; Technology hardware & equipment; Software & computer services.
Medium (2-5%)	Electronics & electrical equipment; Automobiles & parts; Aerospace & defence; Industrial engineering & machinery; Chemicals; Personal goods; Household goods; General industrials; Support services.
Low (1-2%)	Food producers; Beverages; Travel & leisure; Media; Oil equipment; Electricity; Fixed line telecommunications
Very low (<1%)	Oil & gas producers; Industrial metals; Construction & materials; Food & drug retailers; Transportation; Mining; Tobacco; Multi-utilities; Banking

(European Commission 2012)

# Comparing high and low intensity R&D industries

## High intensity

- Rapid/radical innovation
- Manufacturing/products
- Protected intellectual property – patents etc
- Ease of market entry and competition
- High growth, expanding
- Rising spending

## Low intensity

- Limited innovation
- Services/intangibles
- Little protectable content to innovations
- Barriers to entry, little competition
- Low growth, mature
- Cost constrained

# Lessons for the healthcare sector

- Hybrid industry – pharma/medtech/manufacturing vs service/care delivery – which has consequences for the organisation of R&D
- “Scientific colonisation” of health R&D – control by life sciences, biomedicine and pharma interests external to the health system
- Setting of research priorities disconnected from wider health system strategies and priorities and skewed towards technologies and products
- Production of research outsourced – to universities and others – healthcare organisations as “sites for research”

# Lessons for the healthcare sector

- Inherent paradox of technological innovation and capacity to pay for it – health and wealth agenda vs cost controls
- Healthcare organisations and systems with little internal capacity for R&D and weak or conflicting incentives for innovation
- Boards and leadership with little grasp of the R&D agenda for their organisations, and without skills and knowledge to lead R&D
- Absence of effective research partnerships – between healthcare organisation/systems and with universities

# Reforming healthcare research and development

- Have a needs-led research strategy which is tightly coupled to the system's or organisation's priorities and goals
- Insource research production to the healthcare system, using universities and others as partners where it makes sense to the system/organisation
- Take control of the innovation pathway – from research through piloting and testing to adoption at scale
- Use R&D to drive performance improvement
- Have research-savvy leadership at board level – real engagement and understanding

# Conclusions

- The health research system looks very different from those in other industries/sectors
- Our problems with innovation are probably a product of the disconnected and disengaged research system producing innovations that the healthcare system has neither capacity nor will to implement
- The central paradox of health innovation as economic wealth creation vs health innovation as cost pressure in all healthcare systems can only be resolved through a more integrated approach to R&D