HERA
innovation in metals

Manufacturing R&D in NZ: a sob story, a job story or a FOB story?

In partnership with:

MaD Manufacturing and Design New Zealand

0.1 Manufacturing R&D in NZ- how is it performing?

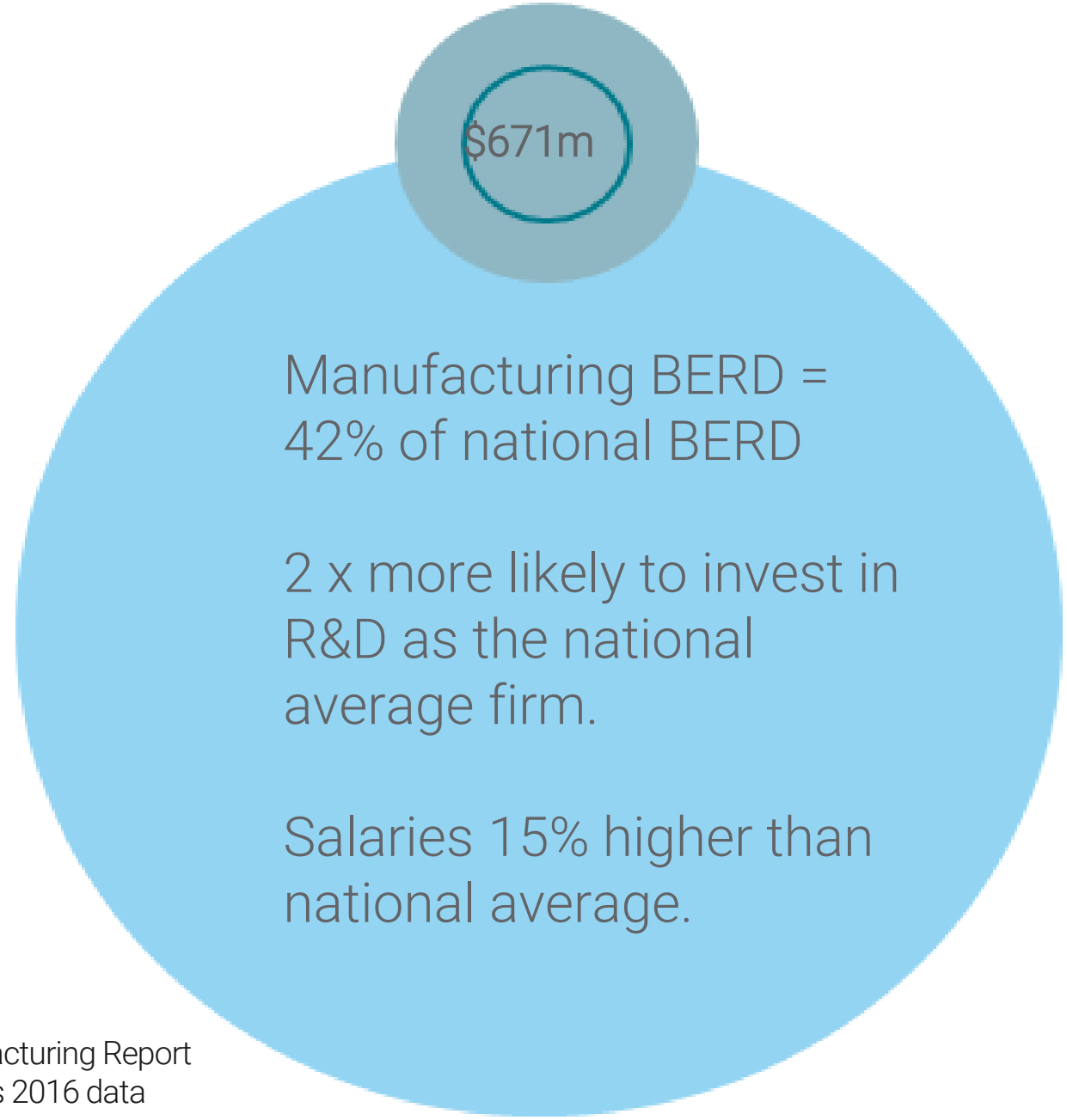
Manufacturing BERD looks great. Manufacturing GERD not so much.

2016 $ million	BERD	GERD	HEERD	Total	%
Manufacturing	478	93	63	635	20
Primary Industries	266	214	58	538	17
Health	139	37	187	362	12
Information and Communication	258	C	C	326	10
Environment	19	223	66	308	10
Total of all research	1,602	654	877	3,133	100

Source: Stats NZ R&D Survey

NEW ZEALAND SECTORS REPORT SERIES

Beyond commodities: Manufacturing into the future



BERD Source: MBIE 2018 Manufacturing Report citing Stats NZ National Accounts 2016 data

Low technology production adds the most value

Low and medium-low technology manufacturing consistently contributes over 80% of New Zealand's manufacturing output (GDP).

The key distinguishing feature in New Zealand manufacturing is the small size (12%) of the medium-high technology sector compared to peers (typically greater than 20%).

More about this later....

0.2 Where do we stand in relation to the rest of the world?

It’s not a good look!

Country	2016 R&D Expenditure %GDP
NZ	1.25
US	2.79
Israel	4.25
OECD average	2.38

Source: Statistics NZ

Competition for a strong manufacturing industry is a global one

Initiatives to promote and advance manufacturing from other governments include Germany's "Industrie 4.0", France's "Industrie du Futur" and China's "Made in China 2025".

America has been the leader, but China is catching up rapidly.

American competitiveness in industrial innovation rests on a powerful base. From 1995 to 2015, the US has invested around $7.1 trillion in total R&D, about 2.5 times as much as China, the next biggest spender.

0.3 What is happening across the ditch?


MANUFACTURING:
A MOMENT OF OPPORTUNITY
BY JIM STANFORD AND TOM SWANN
CENTRE FOR FUTURE WORK AT THE AUSTRALIA INSTITUTE
JUNE 2017
BRIEFING PAPER
FOR THE NATIONAL MANUFACTURING SUMMIT 2017
MANUFACTURING MATTERS
NATIONAL MANUFACTURING SUMMIT 2017
The Australia Institute
Centre for FutureWork

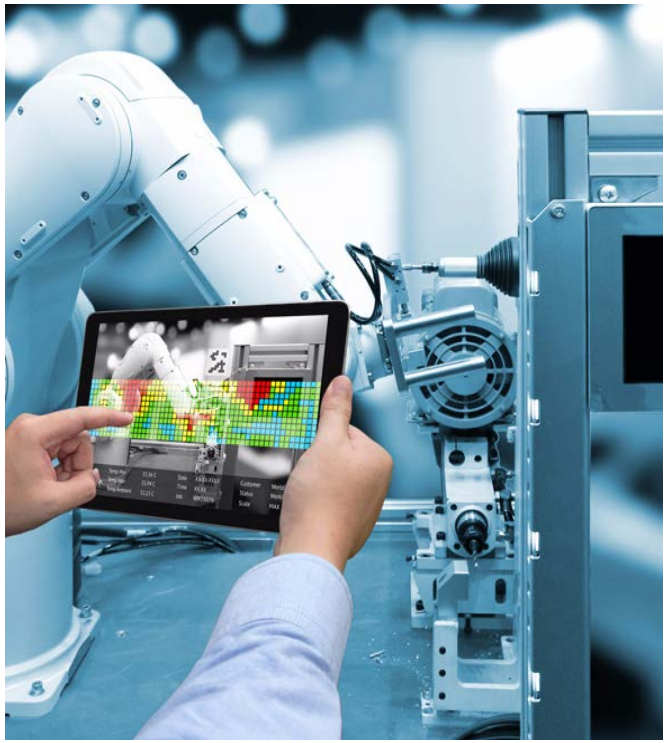
Manufacturing gets quite a bit of love in OZ

- Australian manufacturing jobs have swelled by 40,000 in the past 12 months.
- The majority of voters reject the idea that manufacturing is an outdated industry.
- The sector allocates almost 5% of its sector value-added to new R&D expenditure, more than any other sector - including the scientific and professional services sectors.

Love = financial support for R&D

- $100 million Advanced Manufacturing Fund
- $248 million/6 Advanced Manufacturing Growth Centre
- $40 million Innovative Manufacturing CRC

advancedmanufacturing@industry.gov.au



0.4 Why is manufacturing R&D important?

European Commission

JRC TECHNICAL REPORTS

Manufacturing the future: is the manufacturing sector a driver of R&D, exports and productivity growth?

JRC Working Papers on Corporate R&D and Innovation No 06/2017

Alex Coad, Antonio Vezzani
2017

Manufacturing is a driver of growth

There are three main advantages of a large manufacturing sector:

- it is a source of productivity growth;
- an engine for R&D and innovation; and
- it stimulates trade and internationalisation.

However…

There is a gap in the literature regarding the relationship between manufacturing and innovation.

Manufacturing has been in decline

- A large number of developed countries have experienced a decline in the relative share of their manufacturing sectors in recent years (USA, Denmark, many European countries).
- A longer-term shift towards the service sectors.

“Low Tech” Industries: Innovativeness and Development Perspectives. A Summary of a European Research Project

By Hirsch-Kreinsen, Jacobson and Robertson (2007)

- most growth and employment in OECD countries emanated from low to medium tech industries (LMT).
- growth is primarily based not on the creation of new sectors but on the internal transformation of sectors that already exist.
- *“...in order to ensure contributed future growth prospects of advanced economies, policy-makers need to focus on the processes of innovation and creativity in firms in all sectors, not just high-tech firms”.*

0.5 What is the state of manufacturing R&D in NZ?

Maybe we aren't well prepared for the future?

- Disruption comes from everywhere- not just from competing products *e.g.* oil and gas policy.
- Manufacturing comprises a lot of SMEs who don't have innovation processes in place, or even staff tasked with R&D or innovation management.
- Not enough R&D in the Horizon 3 category?

Maybe we don't have the right policy & support settings?

- It's hard to obtain Government funding in a policy environment that focuses on high margin products and high tech.
- Manufacturing needs greater support in light of its contribution to exports, salaries, BERD and what other Governments are doing internationally.

The typical list of difficulties & their positive corollaries

- The market is too small.
- The market is too small!
- The market is too small!!
- Can't offset R&D costs against revenue.
- Can't get economies of scale.
- Keeps prices high.
- Creates a barrier to imports.
- Enables customer connectedness.
- Creates an ideal Lean Startup test-bed.
- Drives business model innovation.
- Drives production efficiencies.

What is NZ uniquely known for?

- Being a small market.
- Clean, green.
- 100% natural.
- “Kiwi” ingenuity?
- Contribution of “low tech”.

What is the reality?

- A small market.
- Has a range of environmental issues, but trying to live up to its “100% natural” tagline .
- Strong Government support for primary industries research capability.
- Some emerging areas of niche innovation, small number of global hubs.

Where are the opportunities?

Where we know to focus:

- Industry 4.0
- Internet of things
- Robotics
- Additive manufacturing
- Exponential technologies

Where else could we focus:

- Mass customisation
- Biomimicry
- Sustainable products with scale- *e.g.* packaging.

0.6 did we answer the question?

Is it a sob story?

Yes and no- we are not benchmarking well internationally but we are certainly the star national performer.

Is it a job story?

Absolutely- and we need to continue to invest in R&D to ensure job growth.

Is it a FOB story?

We certainly need to tell the story in a better way.