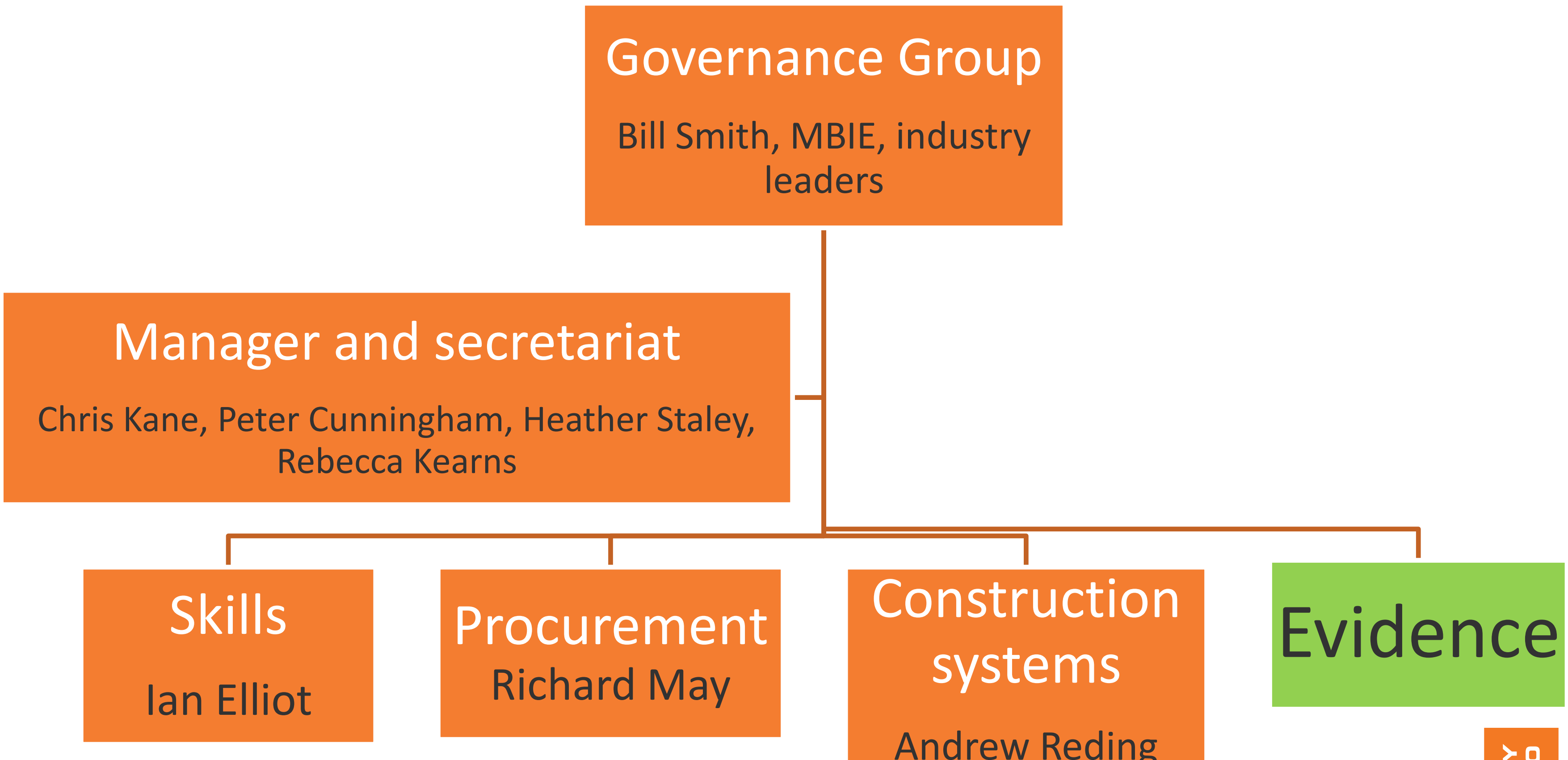
Is our construction sector a cot case?

and what does the research tell us to do about it?

Helen Anderson, Suzanne Wilkinson, John Tookey, Jeff Seadon, Brett Lineham, Ian Page, Wayne Sharman, Richard Capie, Ruth Berry, Andrew Reding, Adrian Bennett, Peter Cunningham, Chris Kane, Amanda Warren, Pam Bell, Kevin Golding, Derek Baxter, Brendan Mai

CCG Breakfast meeting Christchurch 13 November 2013

What is the Productivity Partnership?



Definitions matter

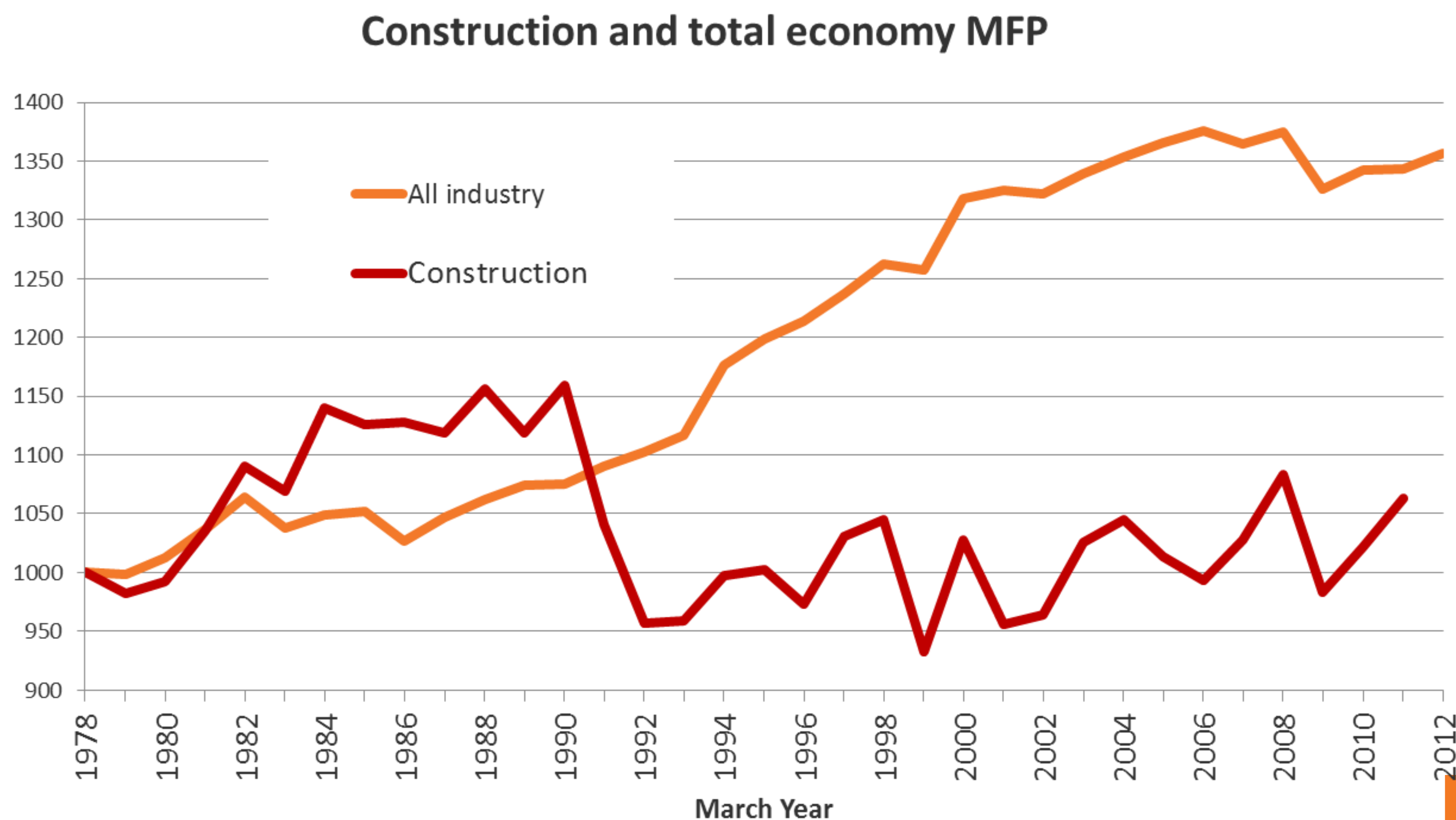
Productivity will improve when

we get the right people with the right tools doing the right stuff

we use a lot of low skill labour, don’t use our capital wisely and quality isn’t a key driver

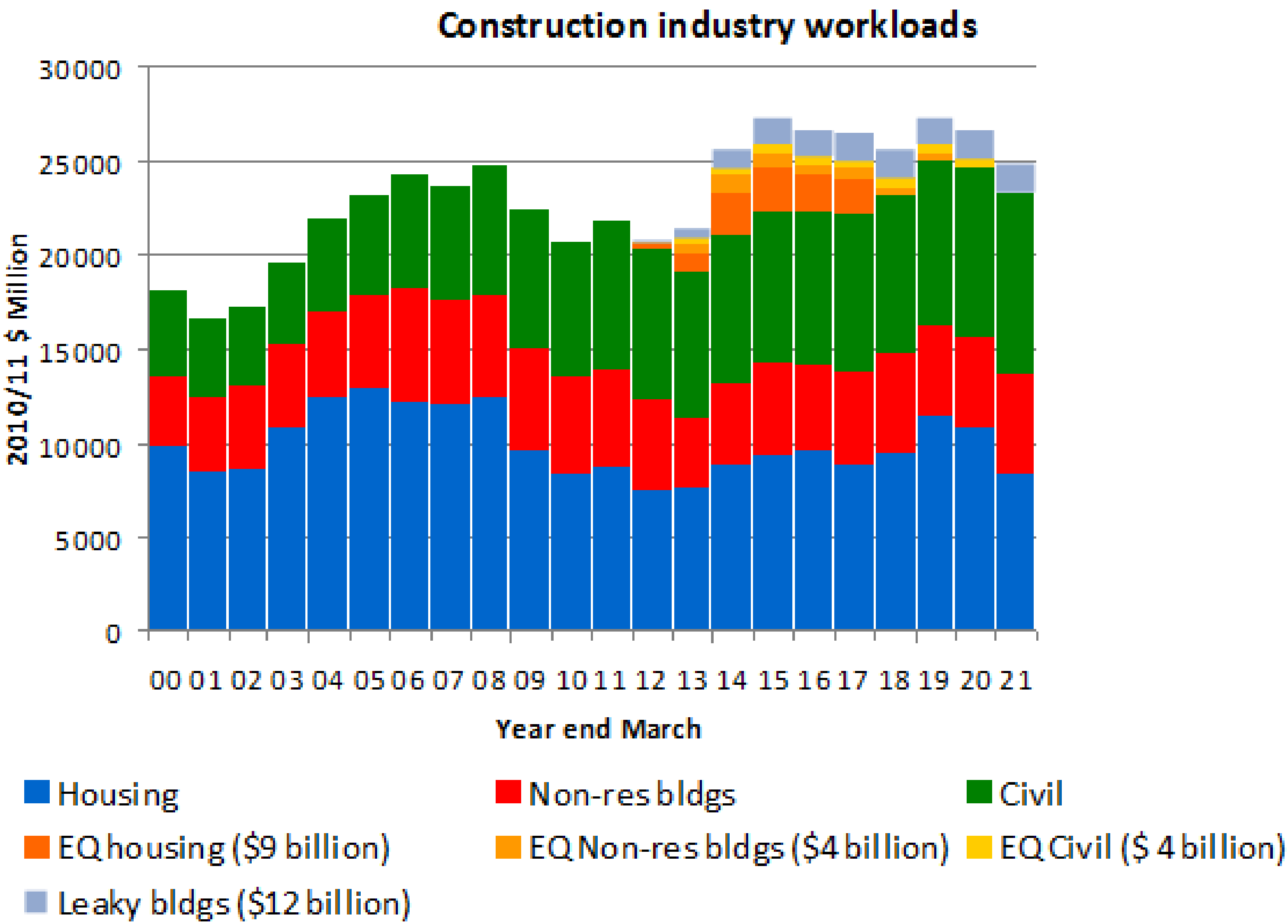
Industry leader’s definition, 2011

Economists think differently



Data source: Statistics NZ,
Ian Page, BRANZ

The wall of work is coming



Ian Page, BRANZ

One size does not fit all

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Residential		Non-Residential		
SMEs	Group Builders	Light Commercial and Non-Commercial <NZD10m	Commercial and Non-Commercial >NZD10m	Infrastructure Light and Large <$10m > $10m

- Sole Traders
- Sub-Contractors

- Franchise Arrangements

- Private companies

- Public companies
- Commercial J.V's
- PPP's

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SMEs dominate residential

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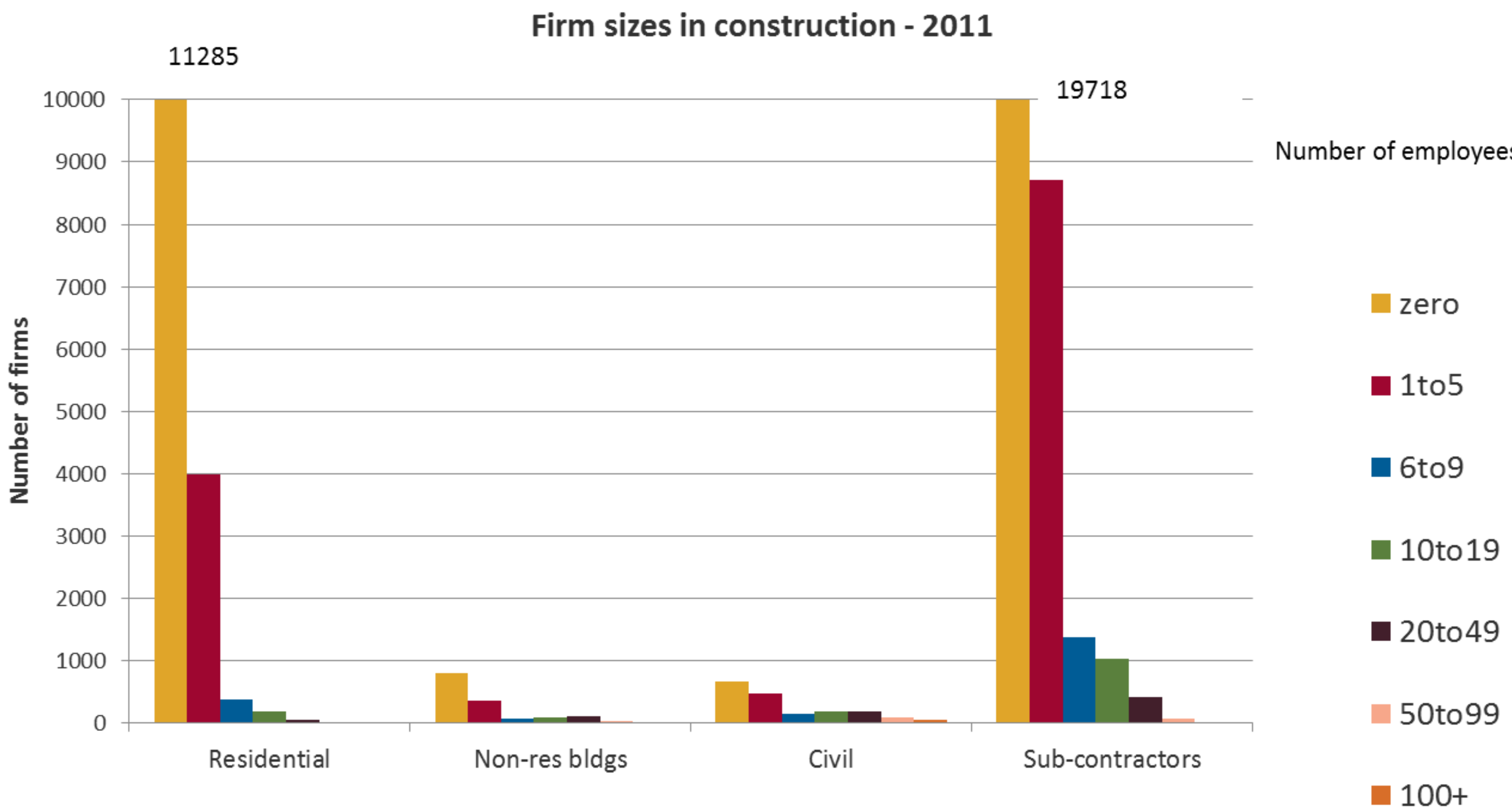

Source: Statistics NZ Business Demographics Survey

96% of firms have 5 employees or fewer

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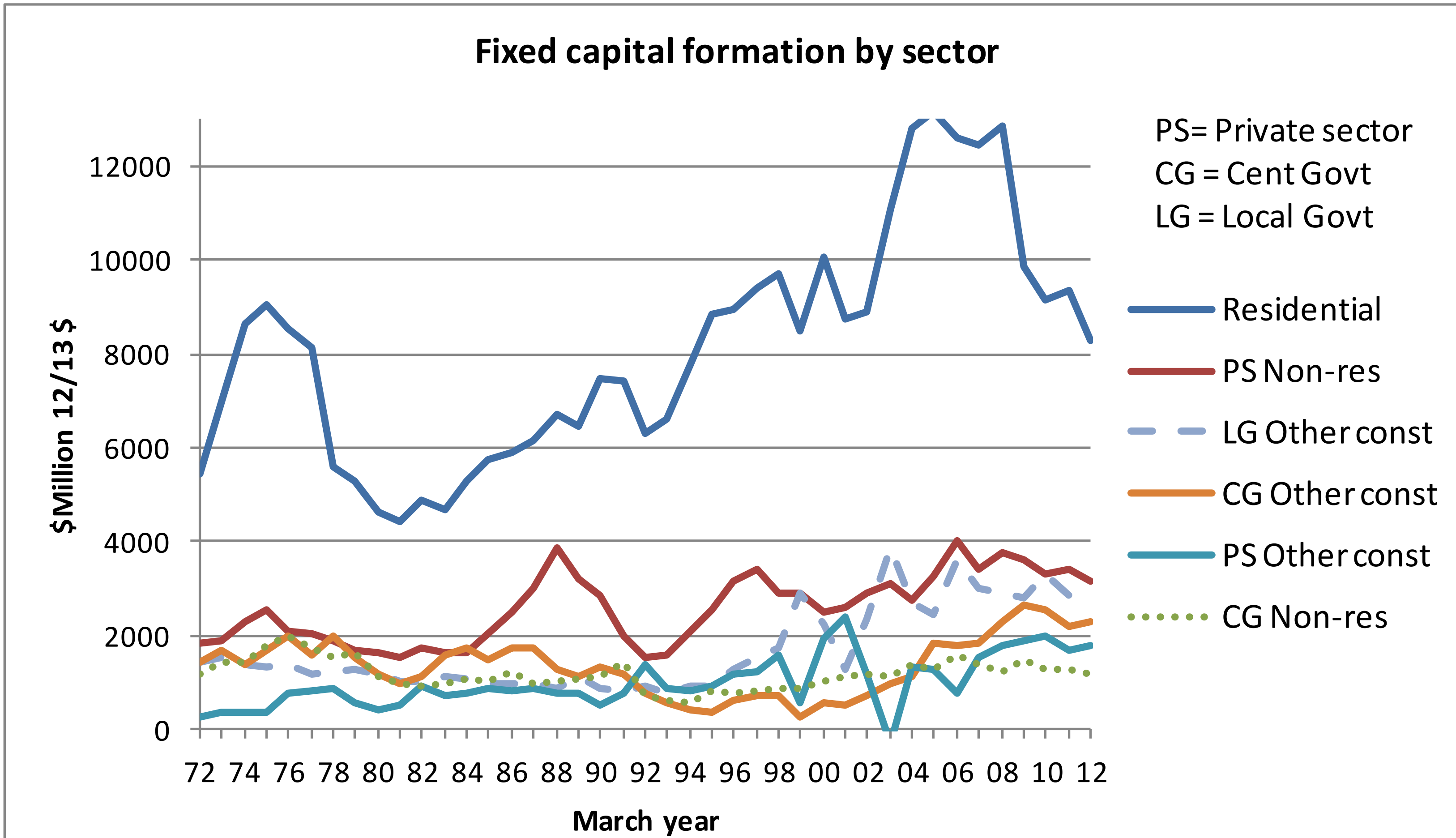
Residential is high volume and value



Source: Ian Page, BRANZ

Productivity Partnership

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Mud on the boots research

- Systems mapping
- Case studies
- Focus groups
- Detailed statistics

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Systems mapping – a life cycle approach

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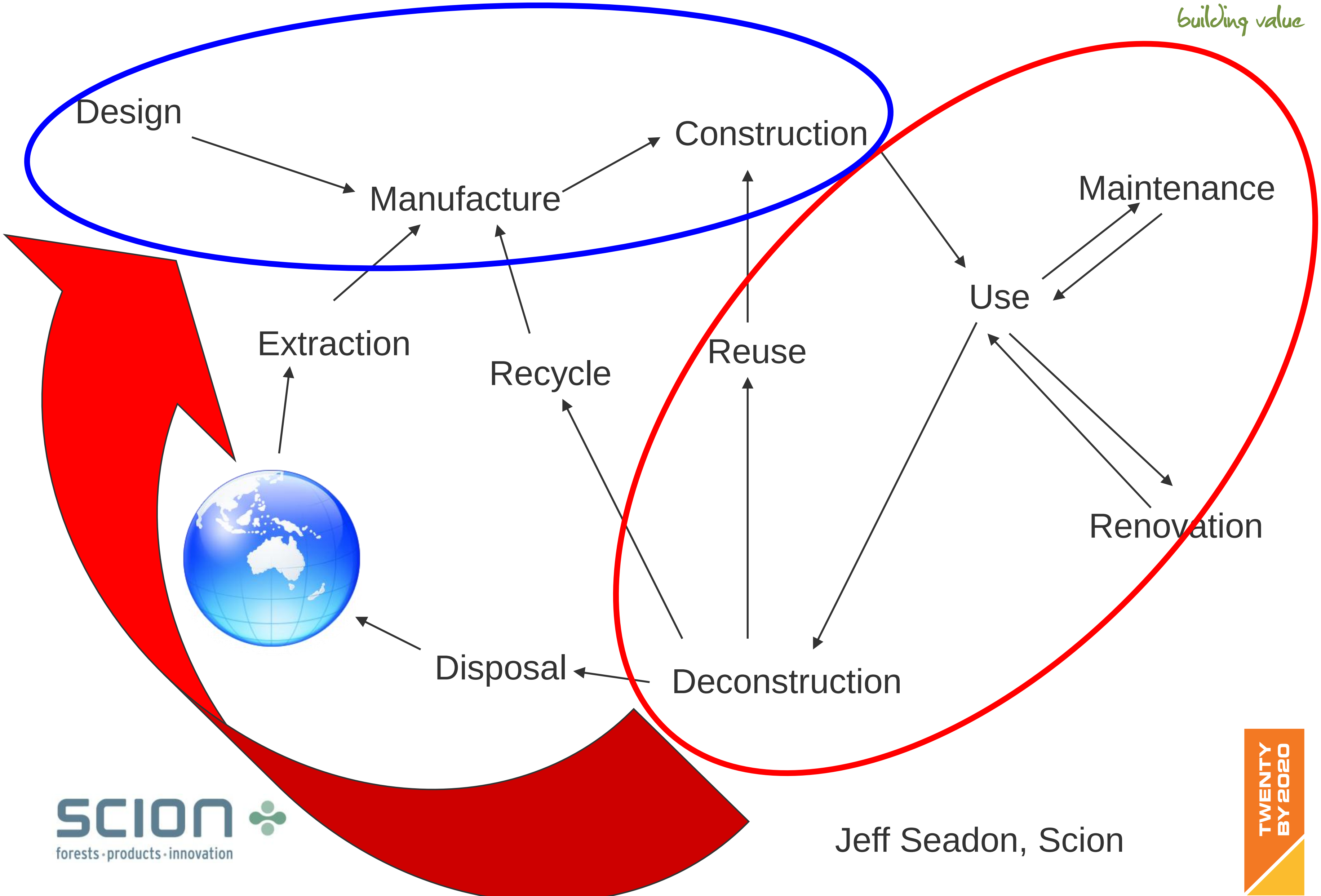

Jeff Seadon, Scion

SCION forests·products·innovation

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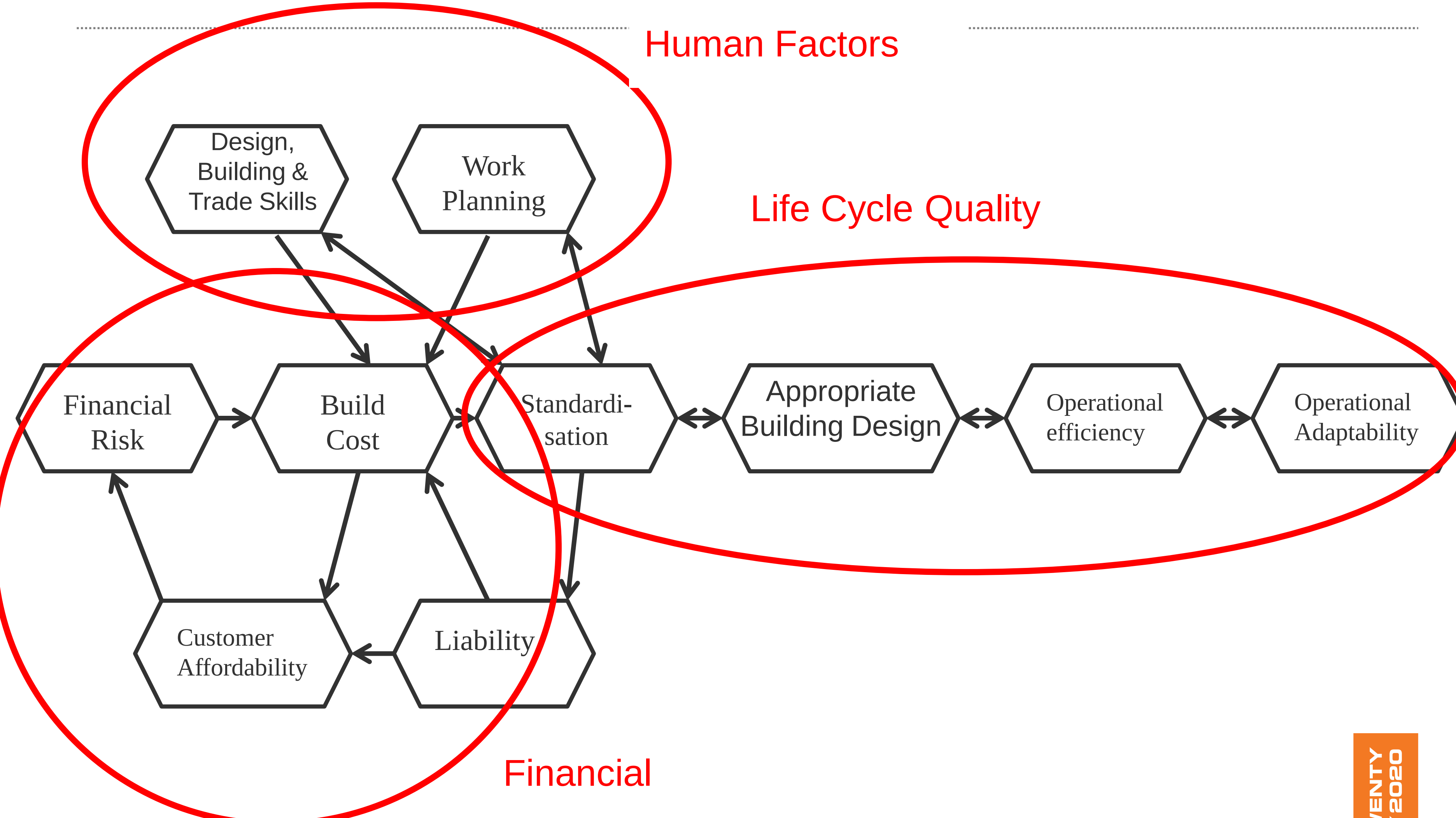
Nodal points



Jeff Seadon, Scion

Where's the waste?

Using Value Stream Mapping with Small Builders to understand where waste in the building process is..

Andrew Reding, Ruth Berry

Where's the waste?

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Four most significant targets for reducing waste and increasing productivity

1: Client Skill Level (Knowledge and Communication)
Maximum potential saving through reduced iterations in finalising design – from 25 weeks down to 10 weeks.

2: Consenting and Tendering Process
Up to 20 working days could be saved from the up to 40 days elapsed time spent in consent submission. More might be possible as online consenting is implemented.

3: Project Management/Project Planning
Maximum potential saving in actual build time – from 15 weeks down to 9 weeks

4: Reduced Weather Delays (Technical Solutions)
The potential savings, while likely to be significant, will be a function of regional climatic conditions and the nature of the technical solutions.

Andrew Reding, Ruth Berry

What's the potential savings?

Average time to build a house is **49** weeks from the idea to handover

Focussing on 4 areas of greatest waste could reduce this to **28** weeks

A savings of >$100m pa

Andrew Reding, Ruth Berry

What can we learn from the big guys?

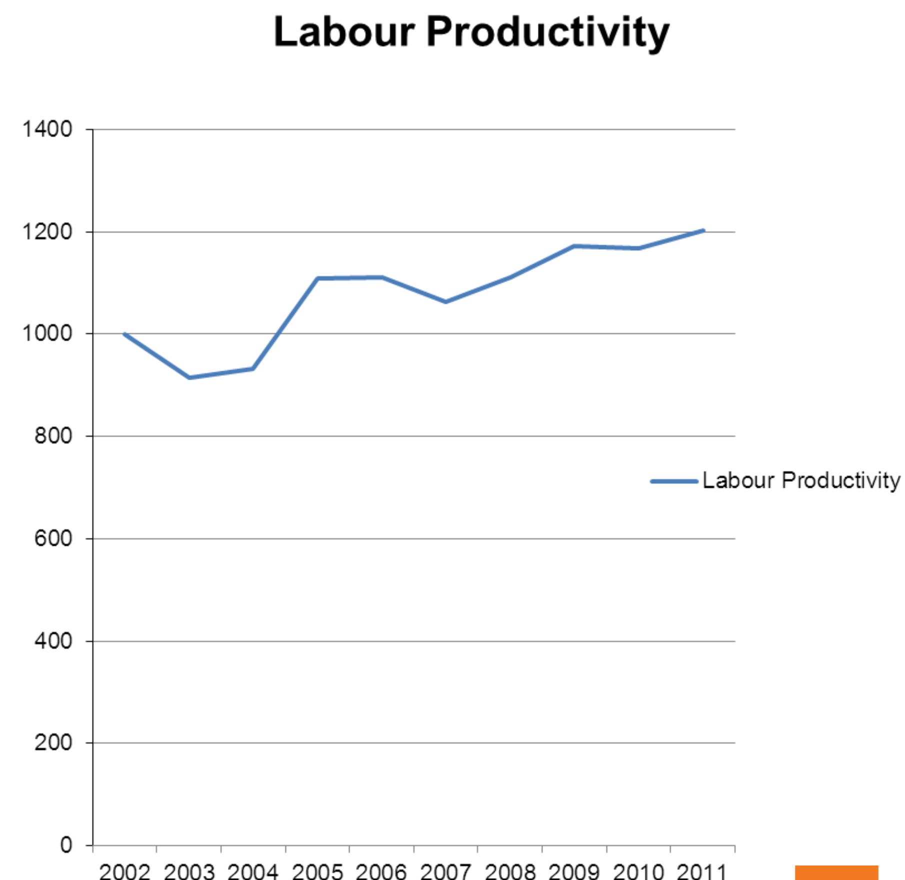
10 firms build 18% of new housing
20 build 24%

60% of firms build <7 houses/year

Volume builders – a case study

"What gets measured gets done"

- 10 years construction cost data, all elemental costs recorded
- Productivity growth circa 3% year on year (taking out 2002)
- Hours to build
  - 2003: 976hrs
  - 2011: 743hrs
- Costs of Compliance
  - Blueprints / royalties: +1410%
  - Consents: +361%
- Time to build 200m² house:
  - Stonewood: 12-14 weeks
  - Industry norm: 18 weeks plus



Labour productivity constructed from real cost data

John Tookey, AUT

Opportunities for policy change

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Stonewood Homes' data on house inspections

- 16 separate inspections for 2 storey house
- Worst case is 3 weeks of lost production – work can't occur with inspections taking place.
- Larger builders can 'work around' this inspection delay by redeploying workers to other productive activities on the same site. Smaller builders disproportionately negatively affected as a consequence.
- Council response time guarantee of 19 days becomes a target rather than a worst case – substantial additional time in processing queries
- Great variability in booking inspections – hard for scheduling
- Self inspection implications? Council liability vs contractor liability

Regulatory cost can be quantified

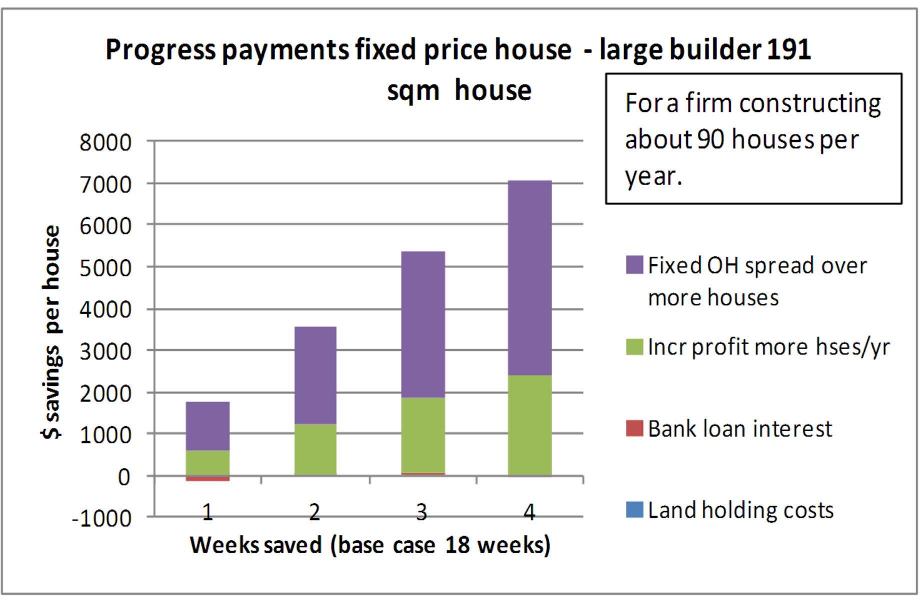
2011 vs 2002	$000	% of total
Total	72	100%
General inflation	44	62%
Specification	22	31%
Compliance	9	12%
Sector specific inflation	-3	-5%

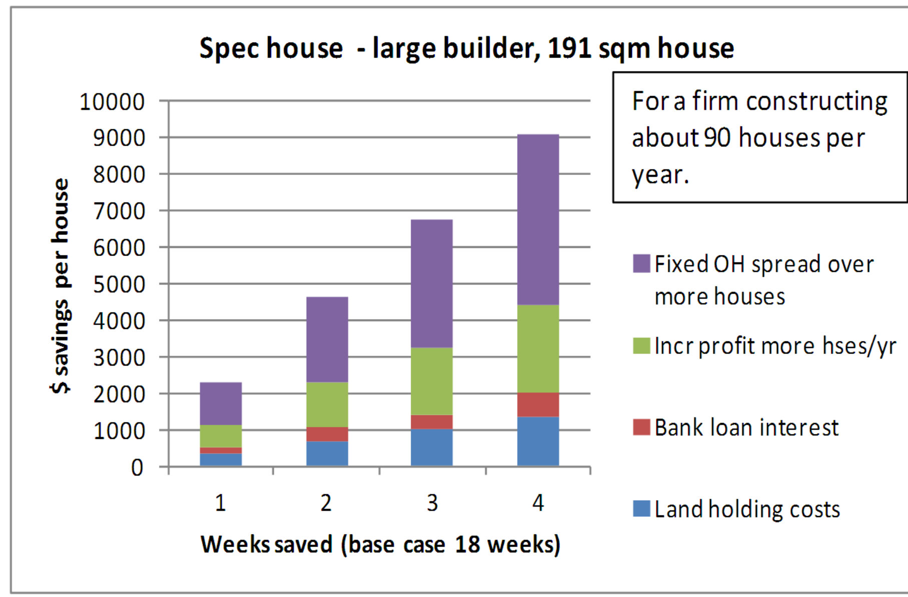
Specification changes and compliance have been 43% of the house price increase in 9 years

Source: NZIER Data: John Tookey, Stonewood Homes

Targeting messages to SMEs

Lifting Residential construction productivity is worth a lot: By taking 4 weeks out of a typical 18 week build period a large builder could save $7,000 - $9,000 per house:





Source: Ian Page, BRANZ

Non- residential

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different challenges

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Case studies of successful projects

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Broad range of "Pathfinder" projects
- from schools, bridges to a clock tower

12 Case studies covering:

- Construction processes
- Management, technical and employee capabilities
- Procurement influences
- Supply chain relationships
- Influence of Regulation
- Production techniques and lean construction
- Training and skills development

Suzanne Wilkinson (University of Auckland), Constructing Excellence

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Case studies of successful projects

Suzanne Wilkinson (University of Auckland), Constructing Excellence

We are not a cot case

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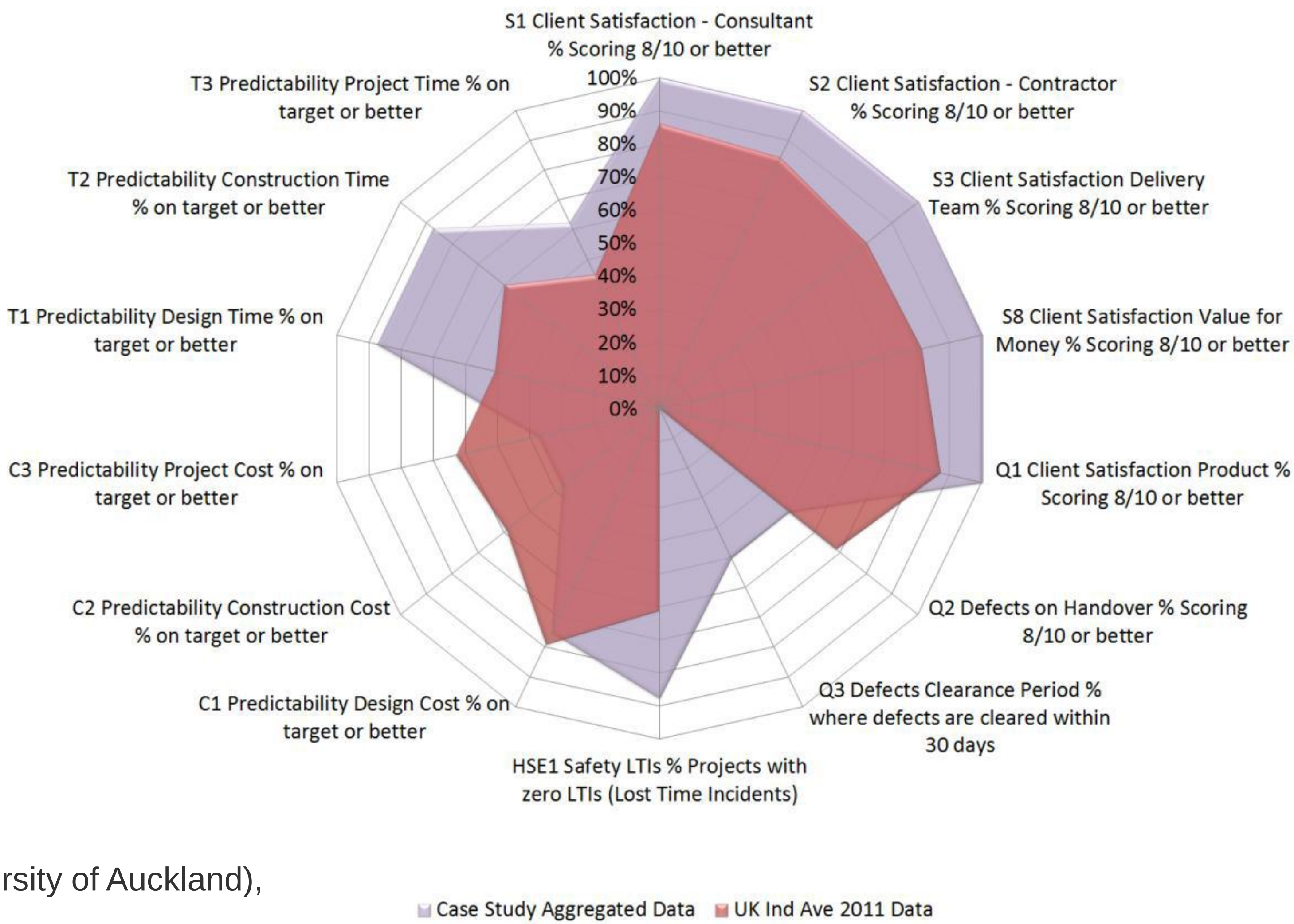
12 Successful Projects – Benchmarked against UK

Many KPIs outperformed UK Projects



Suzanne Wilkinson (University of Auckland), Constructing Excellence

Christchurch – a special case

PrefabNZ HIVE

Stuff.co.nz

Construction Resourcing and Productivity

Organisations currently trying:

- Improving brand and reputation
- Developing productive workforce
- Enhancing efficiency and staff morale
- Improving skill levels (In-house training)
- Investment in overseas recruitment
- Salary rises

Intensified resource competition is likely to add further uncertainties to the time and cost of the rebuild.

http://www.resorgs.org.nz

Suzanne Wilkinson, Alice Chang, Resilient Organisations and University of Auckland

Christchurch KPI Study

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The collection, use and analysis of KPI data varies between organisations.

Non-conformity makes it difficult to analyse data across the construction sector.

In order to achieve 20% improvement by 2020, an industry baseline is required

Companies need to develop improvement strategies to tackle under performance

Suzanne Wilkinson, Trevor Kempton, Aly Gleeson

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Summary

There is no silver bullet.

Some summary observations

Residential	Non-residential	Christchurch
There's lots of opportunity to reduce time and cost waste in SMEs	Predictability of forward workload for major projects allows for better cross industry planning and more efficient investment	The rebuild process is following a pattern similar to other post-disaster rebuilds overseas
Client skills levels need to be improved to enable them to contribute more effectively to the design and production planning of their properties	Current tendering processes are very costly	There is some innovation in terms of procurement and relationship management
Consenting and tendering processes have risen considerably since 2004 and add time and labour costs to construction projects	More sophisticated "partnership" procurement processes, especially by government, can produce long term benefits	There's an opportunity to fast track some innovative design, planning and construction techniques
Project management and other planning skills need improving in SMEs	Better and more timely skills training is needed for project and HR management	The contribution of management and project skills training needs to be emphasised as the rebuild
Offsite manufacturing can improve quality, heath and safety outcomes and can significantly reduce build time	KPI monitoring is sporadic and there's an opportunity to provide better benchmarking	Auckland is much easier – it's more predictable and insurance issues aren't of anything like the same magnitude
Boom/bust is a disincentive to investing in new technology	More companies are using offsite manufacturing but it is capital intensive	
Opportunities for peer-peer learning of, and on the job training in new technology and processes, are limited	The use of BIM is growing but there is opportunity for better skills and use	

What could be done next?

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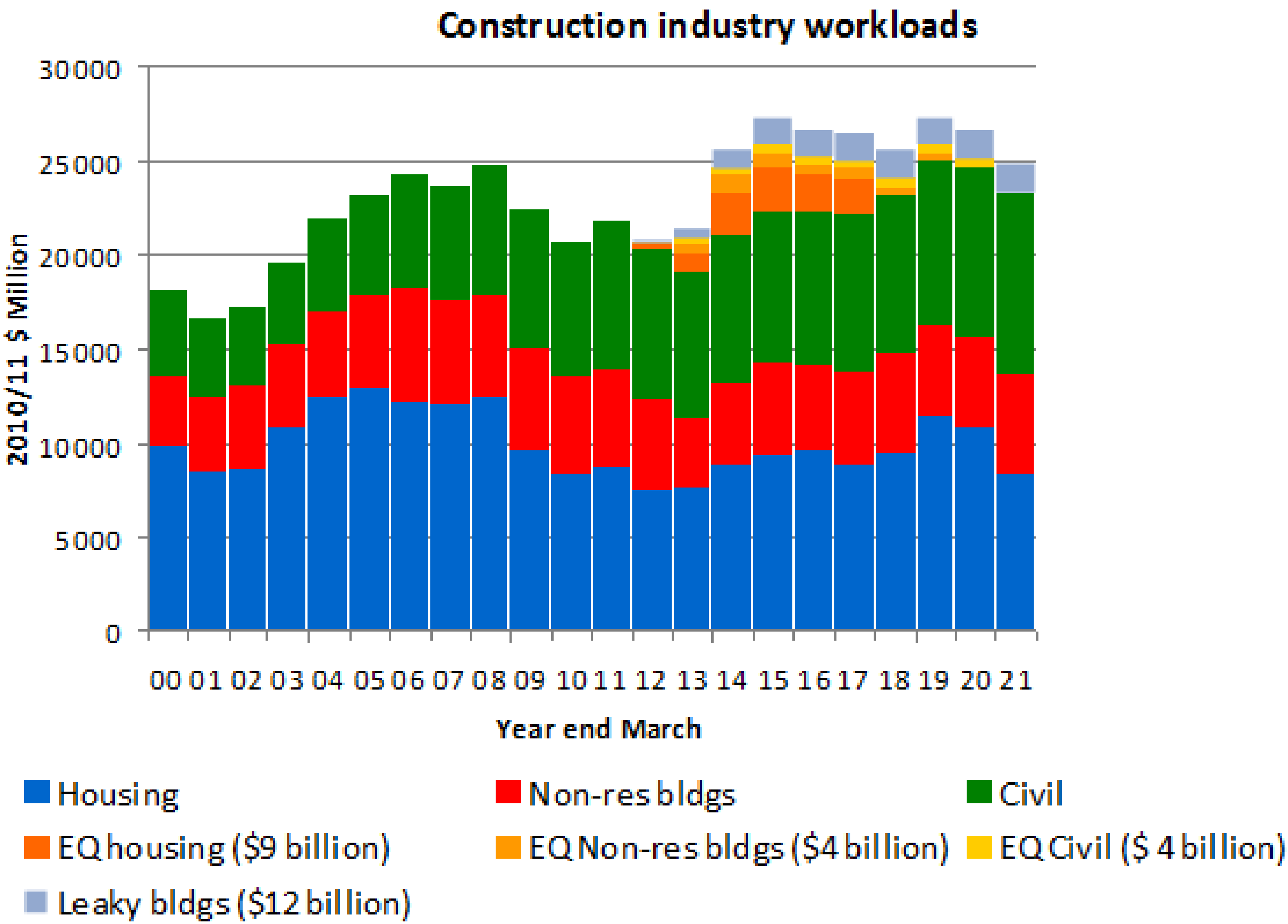
This time it's different



Ian Page, BRANZ

The wall of work or the productivity crash?

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adrian, acediscovery

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More information

All research papers and relevant summaries are available at:

www.buildingvalue.co.nz

We lag Australia

Source: NZIER (2013) Data: Statistics New Zealand, ABS, NZIER estimates for 2012 and 2013

We still lose a lot of people to Oz

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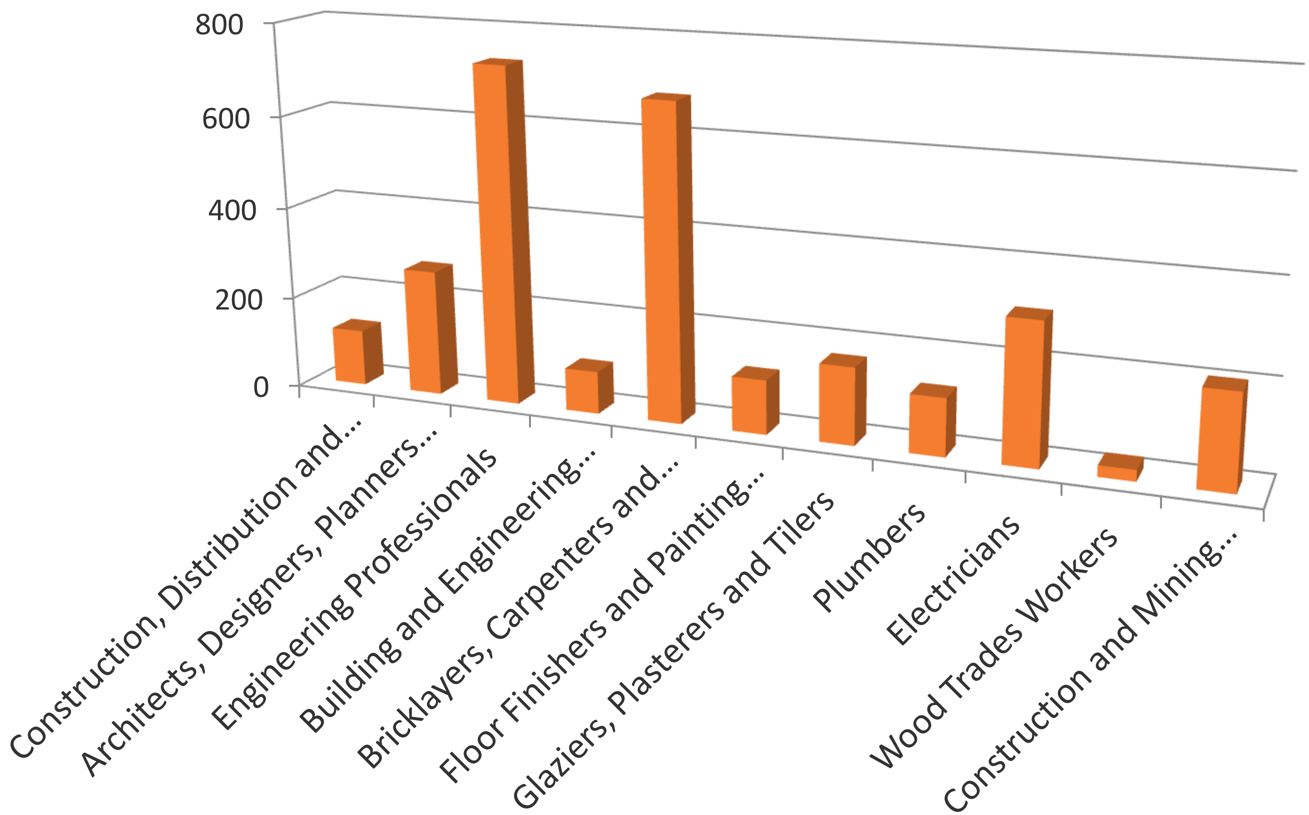

Net outflows to Australia - March 2012 year

Ian Page, **BRANZ**

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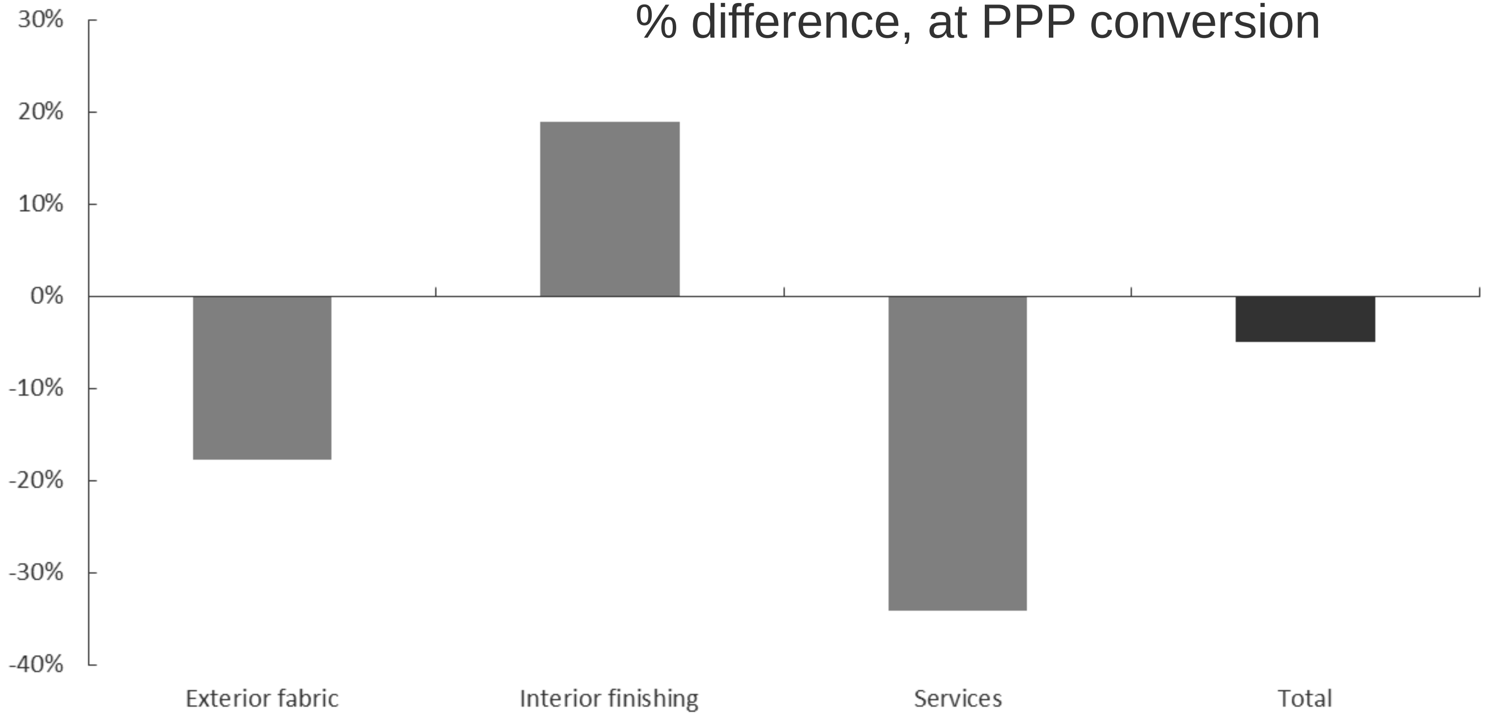
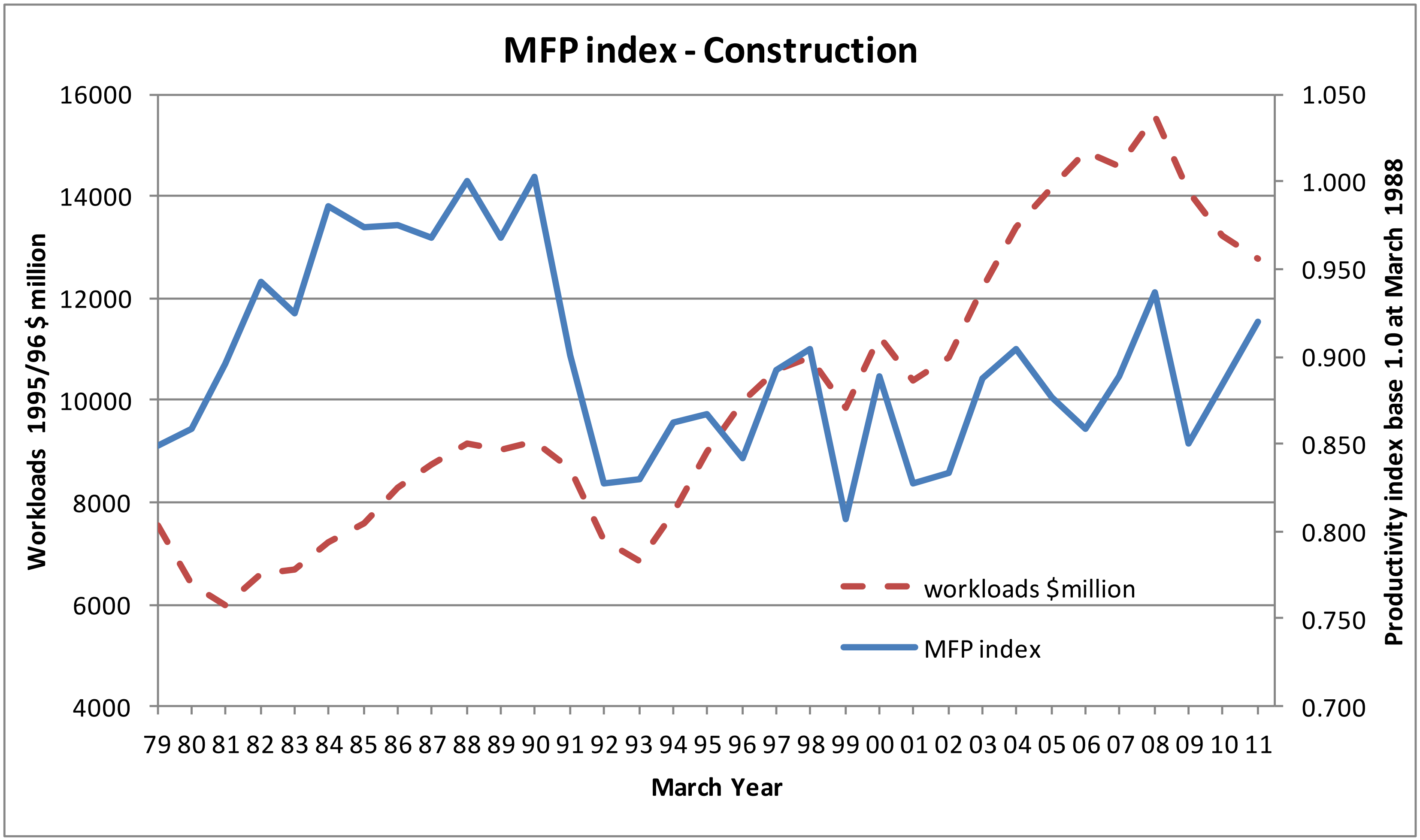
but it is slightly cheaper to build in NZ than Australia

Difference in house build cost: NZ vs OZ
% difference, at PPP conversion



NZIER (2013), Data: Rawlinson’s, NZIER

Workload and productivity – the link



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The sector is complicated

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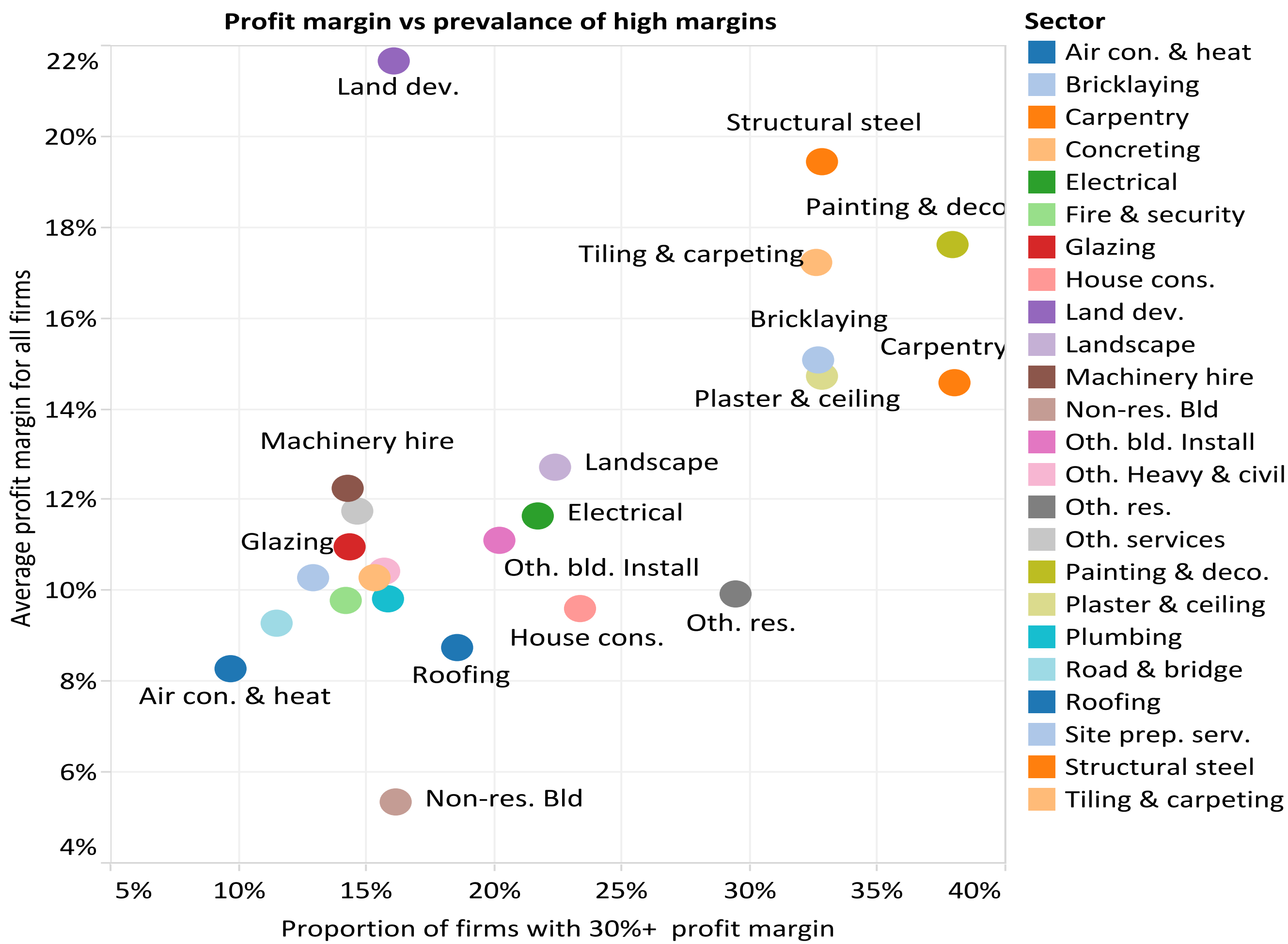
Industries with a high profit margins (2011)



Source: NZIER (2013) Data: Statistics New Zealand, NZIER

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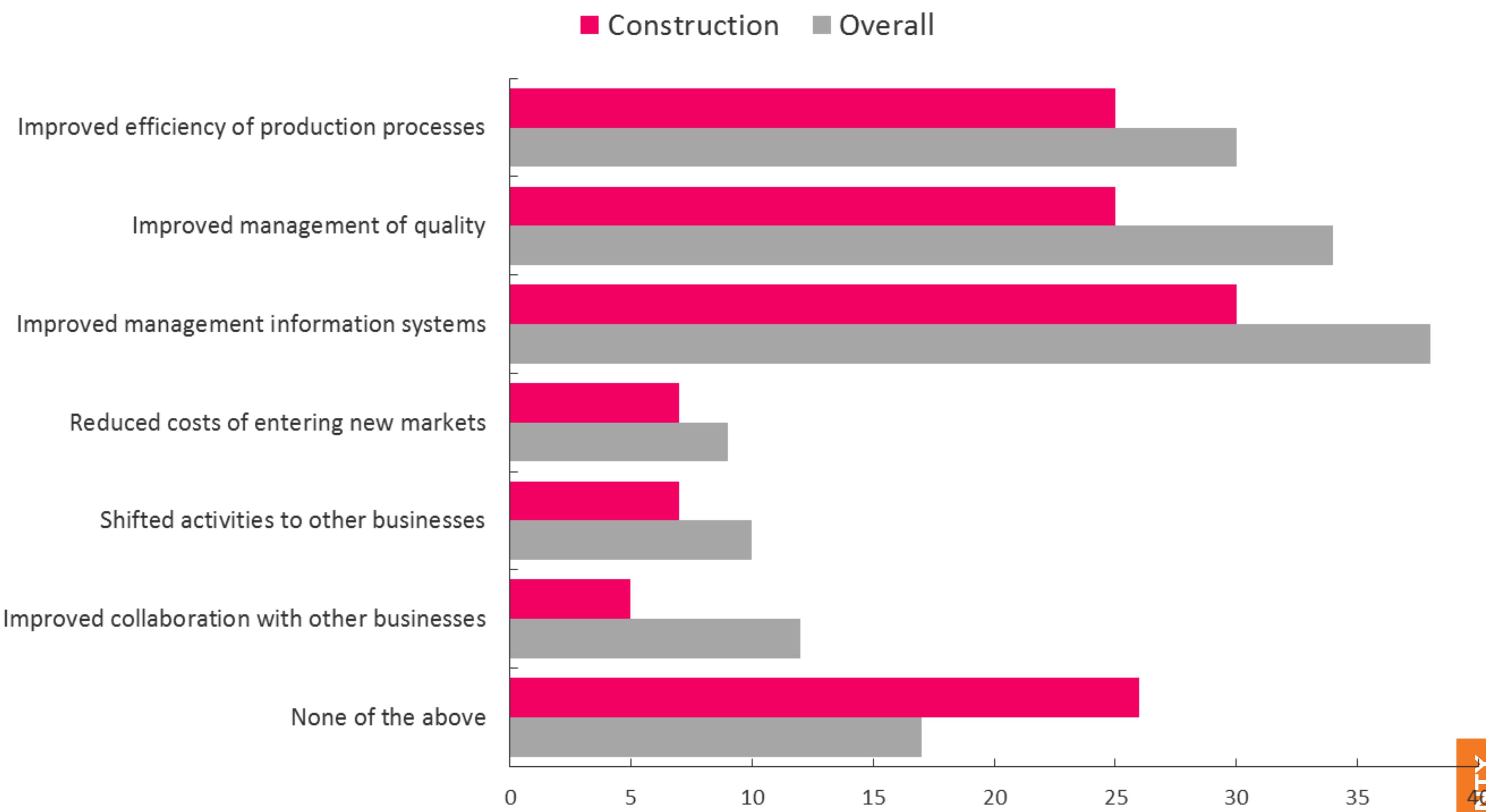
Nearly 30% of the total value of construction is in the residential: new houses (low rise) and A&A:

Construction work 2011 Value of work placed			Value added investigation
	Segment	$million	Chose ?
	New house /low-rise units - small builders	2701	Yes
	Dwelling alterations/ additions	1309	Yes
	Central Govt roads	1185	
	Priv sect mining/gas/oil	954	
	New house/low-rise units - group builders	900	
	Industrial buildings	876	Yes
	Education buildings	867	Yes
	Rail	741	
	Local Govt roads	741	
	Retail buildings	738	Yes
	Central Govt power gen & transmission	716	
	Local Govt water/waste	716	
	Priv Sect power gen & distribution	716	
	Central Govt mines	636	
	Office buildings	593	Yes
	Health	460	
	Housing (mid,hi-rise)	406	
	Recreation/ civic bldgs	370	
	Forestry/farm roads/bridges	289	
	Local Govt power gen &distribution	239	
	Farm bldgs	231	
	Ports infrastructure	148	
	Air transport infrastructure	148	
	Hotel/motels	144	
	Corrections	104	
	Transport bldgs (road/air/rail/ sea)	78	
	Courts	30	
	Central Govt housing	25	
	Local Govt housing	25	
	Housing trusts	25	
	Religious bldgs	16	
	Sports clubs	16	
	Cultural bldgs	16	
Totals	$ million	17160	7084

29%

41%

Technology uptake is slow



Source: NZIER (2013), Data: Statistics BOS

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