Skills gaps assessment for ITS in 2035

NZTA RR 639 *Technology related transport skill requirements and availability*

Transport Knowledge Hub 30th May 2018, Wellington

Dr. Julian Williams, Senior Economist, Business and Economic Research Limited

Dr. Douglas Wilson, Associate Professor, The University of Auckland

M4KING SEN5E OF
7HE NUMBERS

berl

A note to the audience

This presentation is based on research report RR 639 – *Technology related transport skill requirements and availability*.

While the NZ Transport Agency provided investment, the research was undertaken independently, and the resulting findings should not be regarded as being the opinion, responsibility or policy of the Transport Agency or indeed of any NZ Government agency.

The Transport Agency is established under the Land Transport Management Act 2003. The objective of the Transport Agency is to undertake its functions in a way that contributes to an efficient, effective and safe land transport system in the public interest. The Transport Agency funds innovative and relevant research that contributes to this objective.

People using this research should apply and rely on their own skill and judgement and, if necessary, they should seek appropriate legal or other expertise regarding its use.

NZ TRANSPORT AGENCY
WAKA KOTAHI

Research team

BERL

- Julian Williams; Fiona Stokes; Hugh Dixon

Beca

- Stephen Hewett

University of Auckland

- Douglas Wilson; Prakash Ranjitkar; Sujith Padiyara; Bevan Clement; Puti Wilson

Research topic

In an ITS environment in NZ by 2035 environment, what are likely gaps between demand and supply of:

- Occupations – a basket of skills
- Skills – a basket of qualifications and learning by doing
- Qualifications – a basket of training
- Training – a basket of learning experiences: codified and tacit, formal and on-site

of ITS workers:

- Professionals – engineers, ICT, planning, policy
- Technicians – engineers, ICT, automotive technicians, etc
- Others – drivers

This presentation focuses on skills gaps expressed as occupations gaps

Beca berl THE UNIVERSITY OF AUCKLAND Te Whare Wānanga o Tāmaki Makaurau NEW ZEALAND

Research framework

Conceptual framework:

- Technological change creates a change in demand for occupations
  - which creates a change in the demand for skills
    - which induces a change in qualifications sought
      - which leads to a change in demand for training

Evidence base (from research project):

- ITS studies – global (eg TSC) and local (eg ATAP)
- experts and stakeholders - individuals, survey and workshops (Auck & Wgtn)
- labour market statistics (official counts – Census 2013)
- macroeconomic modelled projections (BERL model) of future economy

Beca

berl

THE UNIVERSITY OF AUCKLAND
Te Whare Wānanga o Tāmaki Makaurau
NEW ZEALAND

Method – skills gaps

Assess technological change

- create scenarios of ITS uptake in terms of: technologies; transport users; public policy
- assess order of magnitude (%) of ITS change by 2035 – reports/experts

Assess skills change

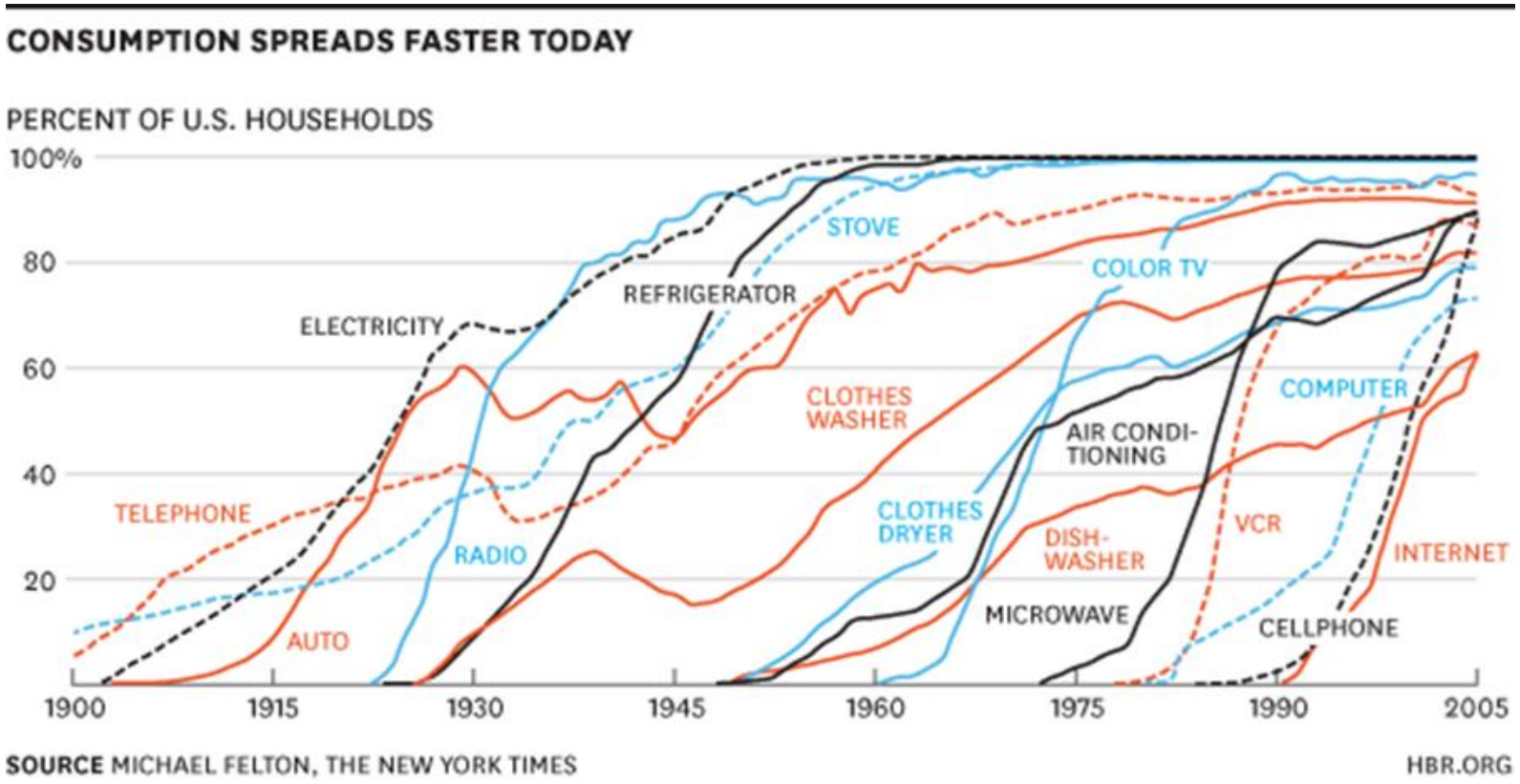
- qualitatively assess types of skills that will change
- assign order of magnitude change from a baseline

Assess skills gaps

- project 55 occupations in demand in 2035 as a baseline (assume no-ITS)
- adjust each baseline projection with an order of magnitude change due to ITS
- conclude gaps in occupations in demand in 2035 for ITS scenarios from baseline

Beca berl THE UNIVERSITY OF AUCKLAND Te Whare Wānanga o Tāmaki Makaurau NEW ZEALAND

Assess technological change 1 – S curves

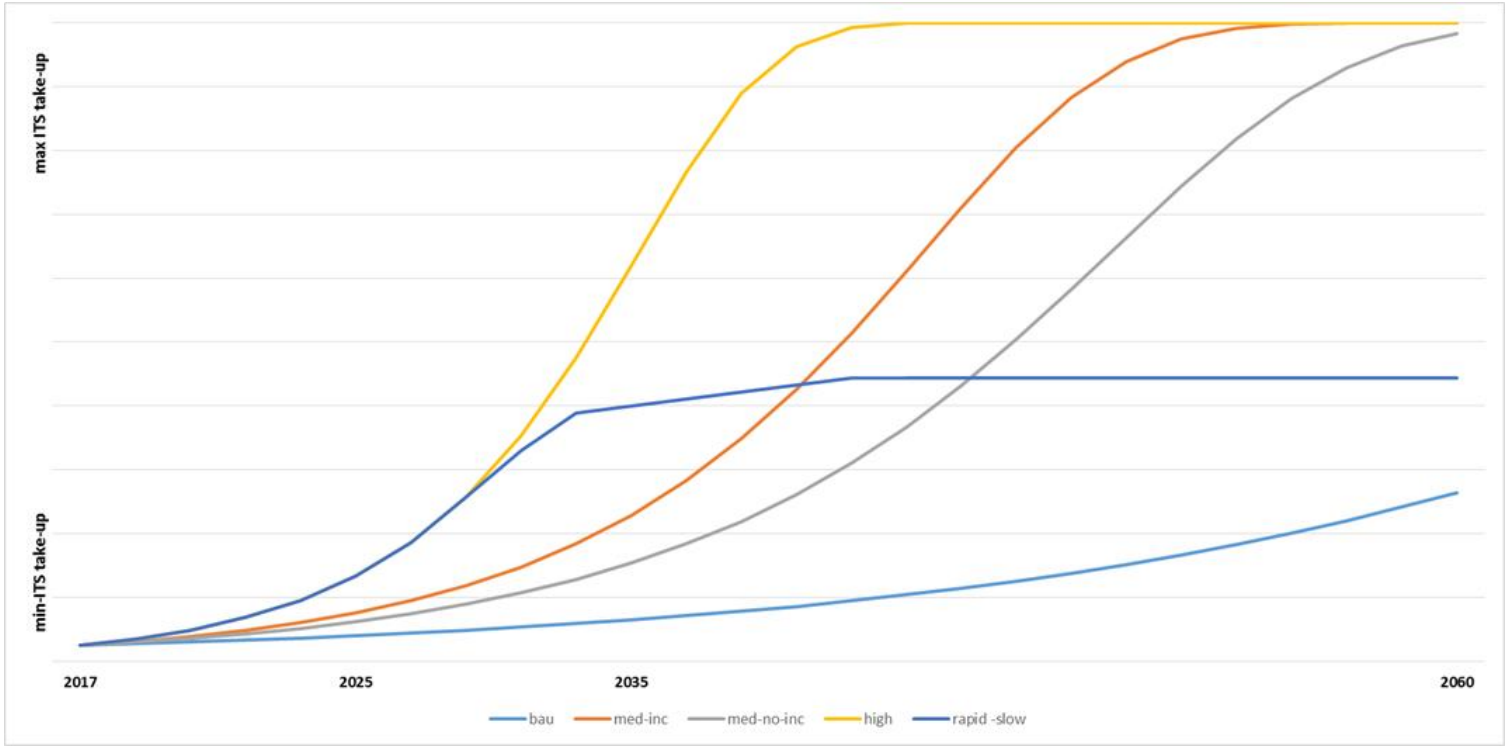


Beca

berl

THE UNIVERSITY OF AUCKLAND
Te Whare Wānanga o Tāmaki Makaurau
NEW ZEALAND

Assess technological change 2 - ITS uptake pathways (stylized) to the very long-term



Assess technological change 3 – technologies and participants - link to relevant skills

Progress path scenario in the very long-term	Technologies				Transport Users		Public Policy	Connected mobility outcome in the very long-term
	Vehicles	Data Analytics	Infrastructure National	Infrastructure Local	Business	Households		
1. Slow	L	M	L	L	L	L	L	Business as usual
2. Medium with no incentives	M	M	L	L	M	L	L	Agencies reluctant to invest/subsidise, businesses see benefits
3. Medium with incentives	M	M	M	M	M	M	M	Agencies willing to support/invest and businesses and households cautiously support
4. Rapid	H	H	M	M	M	M	M	Rapid growth in technology and cautious development of confidence.
5. Mixed rapid/slow	H	H	L	L	M	L	L - M	Initial novelty/enthusiasm takeup, long term households more reluctant to change, barriers exist due to user convenience and cost.

Beca

berl

THE UNIVERSITY OF AUCKLAND
Te Whare Wānanga o Tāmaki Makaurau
NEW ZEALAND

Assess technological change 4 – quantify change from baseline by 2035

Use autonomous vehicle take-up as metric of change - global reports (incl TSC, ATAP - below):

ATAP	2026	2036	2046
Level 0 – No Automation	59 – 79%	15 – 38%	5 – 15%
Level 1 – Driver Assistance	15 – 30%	33 – 40%	5 – 25%
Level 2/3 – Partial/Conditional Automation	5 – 8%	10 – 20%	10 – 35%
Level 4 – High Automation	1 – 2%	7 – 17%	N/A
Level 5 – Full Automation	<1 – 1 %	5 – 15%	25 – 80%
Cooperative Adaptive Cruise Control	6 – 11%	22 – 52%	60 – 90%

Beca berl THE UNIVERSITY OF AUCKLAND Te Whare Wānanga o Tāmaki Makaurau NEW ZEALAND

Assess type of skills change 1- drivers and auto technicians to 2035

Commercial drivers:

- slow - same
- rapid - less – eg due to platooning in dedicated lanes

Automotive technicians:

- slow - more – high tech diagnostic
- rapid – more – higher codified skills – brand specific

Assess type of skills change 2 - engineers and ICT to 2035

Engineers – professional & technical:

- slow – more – policy & planning – outcomes focused
- fast – more – multidisciplinary – human centric - collaborative

ICT – professional & technical:

- slow – more – data analytics
- fast – more – collaborative
  - information solutions
  - software solutions - eg for infotainment in car

Beca berl THE UNIVERSITY OF AUCKLAND Te Whare Wānanga o Tāmaki Makaurau NEW ZEALAND

Occupation projections with no ITS technology change – BERL model

Occupation	1991	2015	2035	1991–2015 %pa	2015–2035 %pa
Engineer occupation group total	20,223	27,880	39,685	1.3%	1.8%
ICT occupation group total	20,244	52,025	72,405	4.0%	1.7%
Driver occupation group total	30,528	47,295	68,105	1.8%	1.8%
Repair and maintenance occupation group total	18,441	22,785	32,420	0.9%	1.8%
Logistics occupation group total	5,634	6,615	8,360	0.7%	1.2%
Salesperson occupation group total	2,493	3,455	4,465	1.4%	1.3%
Total 55 key occupations	**95,070**	**160,055**	**225,440**	**2.1%**	**1.7%**

Beca

berl

THE UNIVERSITY OF AUCKLAND
Te Whare Wānanga o Tāmaki Makaurau
NEW ZEALAND

Occupation projections – with ITS technology change – type and order of magnitude

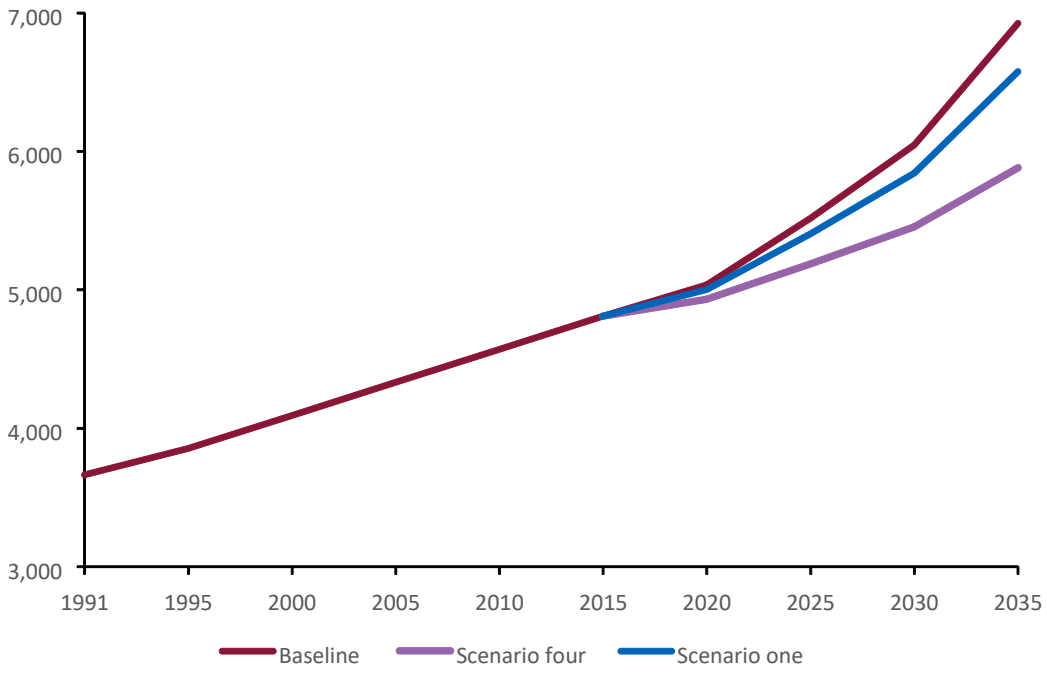
Occupation	Total employment counts 2035			Difference between scenario and base line			
	Base line	Scenario one	Scenario four	Scenario one	Percentage change	Scenario four	Percentage change
Engineer occupation group total	39,685	41,640	45,615	1,955	4.9%	5,930	14.9%
ICT occupation group total	72,405	75,965	83,215	3,560	4.9%	10,810	14.9%
Driver occupation group total	68,105	64,670	57,875	-3,435	-5.0%	-10,230	-15.0%
Repair and maintenance occupation group total	32,420	32,175	31,700	-245	-0.8%	-720	-2.2%
Logistics occupation group total	8,360	8,765	9,605	405	4.8%	1,245	14.9%
Salesperson occupation group total	4,465	4,465	4,465	0	0.0%	0	0.0%
Total 55 key occupations	**225,440**	**227,680**	**232,475**	**2,240**	**1.0%**	**7,035**	**3.1%**

Beca

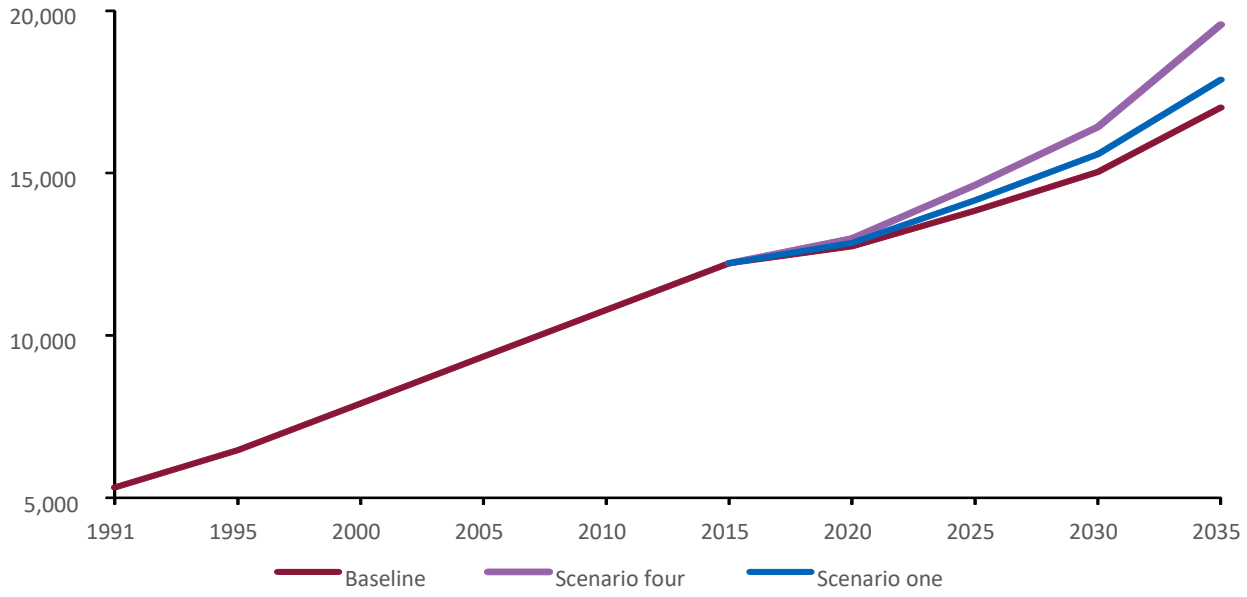
berl

THE UNIVERSITY OF AUCKLAND
Te Whare Wānanga o Tāmaki Makaurau
NEW ZEALAND

Projections – taxi drivers



Projections – IT systems analysts



Beca

berl

THE UNIVERSITY OF AUCKLAND
Te Whare Wānanga o Tāmaki Makaurau
NEW ZEALAND

Possible next steps for this research

Update technology change assumptions:

- rate of change
- type for impact on particular occupations
- order of magnitude for particular occupations

Update baseline projections:

- Census 2018 counts for occupations
- Macroeconomic model assumptions

Beca

berl

THE UNIVERSITY OF AUCKLAND
Te Whare Wānanga o Tāmaki Makaurau
NEW ZEALAND

Skills gaps assessment for ITS in 2035

NZTA RR 639 *Technology related transport skill requirements and availability*

Transport Knowledge Hub 30th May 2018, Wellington

Dr. Julian Williams, Senior Economist, Business and Economic Research Limited

Dr. Douglas Wilson, Associate Professor, The University of Auckland

M4KING SEN5E OF
7HE NUMBERS

berl