



RISK DOLLARISATION®

REDUCED DAMAGE COSTS =

INCREASED PROFITS

JL HAMILTON

Risk Dollarisation@: REDUCED DAMAGE COSTS = INCREASED PROFITS © JL Hamilton (2018) www.managedamage.com

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Disclaimer

All the information, techniques, skills and concepts contained within this publication are of the nature of general comment only, and are not in any way recommended as individual advice.

The intent is to offer a variety of information to provide a wider range of choices now and in the future, recognising that we all have widely diverse circumstances and viewpoints.

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It is recommended that the reader obtain their own independent advice.

CHAPTER 1

MONEY TALKS

“Money speaks sense in a language all nations understand”

APHRA BEHN

Herbert W Heinrich	Frank E. Bird Jr	Karl' Weick	Thomas Krause	Dupont STOP	James Reason	Patrick Hudson	Dianne Vaughan	Scott Geller	Myers	Andrew Hopkins	Sidney Dekker	Robert Long	Jillian Hamilton
1931	1970	1979-2011	1979 - 1990	1987	1990	1994-2000	1996	2001	2003	2008	2010	2012	2017
Data	Mathematics	Psychology	Psychology	Psychology	Ergonomics	Psychology	Sociology	Psychology	Psychology	Sociology	Safety/Arts/Science	Sociology	Safety/Economics
Insurance Data & Statistical Analysis	Insurance Data & Mathematic Ratio Predictions	Organisational Theorist High Reliability Organisations HROs	The Working Interface Measuring Performance Behaviour Based Safety Culture	Safety Training Observation Plan Behaviour Based Safety Culture	Design Human Error ICAM Swiss Cheese	Behaviour Based Safety Culture	Deviance in organisations Social Normalisation of deviance	Selling Idea of Safety Total Safety Culture Behaviour Based Safety Culture	Accidents triggered by unsafe behaviours Behaviour Based Safety Culture	Process Safety Training Safety Differently Safety Anarchy Empowered People	Human Factors Safety Differently Safety Anarchy Empowered People	Social Psychology of risk	Risk Dollarisation® Financial Approach to Non-Financial Risk Insurance Data & Damage Costs Statistical Analysis

Manage Damage have found that this approach does not appeal to all people at a business in particular the leaders and managers who are focused on financial outcomes, related threats and opportunities.

We have found a middle ground, a place where we can improve your businesses profits and also improve Workplace Health and Safety. This is a win-win situation and I believe the very essence of Corporate Social Responsibility and the future of business.

Society knows the costs of the damage and the impact of lost lives and livelihoods of such incidents. Businesses need to adjust to reflect this knowledge.



Year	Damage Event	Country	Event	People Fatalities
14 June 2017	Grenfell	United Kingdom	Building Fire	72
\$ Impact (US\$) <ul style="list-style-type: none"> • Council Rehousing Cost US\$311.3M • UK Gov't – Replace Cladding – \$77.5M • 14 June 2017 - 15 February 2018, RBKC spent £20.9m on rooms at 53 hotels for former residents of Grenfell Tower and evacuees from the Lancaster West estate. 				
2017	Dreamworld Theme Park	Australia	Ride Mechanical Failure	4
\$ Impact (US\$) <ul style="list-style-type: none"> • Company Valuation of Loss ↓43% US\$691M Ardent Leisure • Share price from 2.67 – 1.52 				
2013	Rana Plaza	Bangladesh	Factory Fire & Collapse	1135 fatalities
\$ Impact (US\$) <ul style="list-style-type: none"> • A further 3600 suffered or were injured • Primark Bonmarché, El Corte Inglés, Inditex, Mango, Mascot, Premier Clothing and Loblaw Clothing Manufacturer • US\$40M to be gathered by ILO where workers are paid US\$68/month 				
2010	Deep Water Horizon	United States	Explosion & Spill	11
\$ Impact (US\$) <ul style="list-style-type: none"> • Company Total Cost \$61.6B (pre-tax) 				

CHAPTER 2

PROFIT PIPELINE

“A penny saved is a penny earned.”

BENJAMIN FRANKLIN

Effects of 90% on Your Business Workers Compensation Premiums 2017FY
 Queensland Actual Opportunity - How other States Could Benefit



2016-17	NSW	VIC	QLD	WA	SA	TAS	NT	ACT
Average Premium rate (% of payroll)	1.397	1.272	1.2	1.525	1.8	2	2.33	2.58
10% (% of payroll)	0.140	0.127	0.120	0.153	0.180	0.200	0.233	0.258
50 Staff 100%	55,880	50,880	48,000	61,000	72,000	80,000	93,200	103,200
50 Staff 10%	5,588	5,088	4,800	6,100	7,200	8,000	9,320	10,320
100 Staff 100%	111,760	101,760	96,000	122,000	144,000	160,000	186,400	206,400
100 Staff 10%	11,176	10,176	9,600	12,200	14,400	16,000	18,640	20,640
300 Staff 100%	335,280	305,280	288,000	366,000	432,000	480,000	559,200	619,200
300 Staff 10%	33,528	30,528	28,800	36,600	43,200	48,000	55,920	61,920
500 Staff 100%	558,800	508,800	480,000	610,000	720,000	800,000	932,000	1,032,000
500 Staff 10%	55,880	50,880	48,000	61,000	72,000	80,000	93,200	103,200
1000 Staff 100%	1,117,600	1,017,600	960,000	1,220,000	1,440,000	1,600,000	1,864,000	2,064,000
1000 Staff 10%	111,760	101,760	96,000	122,000	144,000	160,000	186,400	206,400
5000 Staff 100%	5,588,000	5,088,000	4,800,000	6,100,000	7,200,000	8,000,000	9,320,000	10,320,000
5000 Staff 10%	558,800	508,800	480,000	610,000	720,000	800,000	932,000	1,032,000

CHAPTER 3

THE NUMBERS DONT LIE

“The numbers don’t lie and they spell disaster for you.”

SCOTT STEINER

Scorecard A for Area A – Pre Damage Costs Reporting	
Time	Better Than Projected
Cost	Below Budget
Quality	Excellent
Safety	Zero LTIFRs

Scorecard A for Area A – Post Damage Costs Reporting	
Time	Better Than Projected
Cost	Above Budget
Quality	Excellent
Safety	Damage Cost Ratio High

Business Systems Hide This Cost

Damage Costs often get lost in business systems.

We find that the larger and more complex a business structure is, the more difficult the Damage Costs are to identify, simply due to the traditional cost allocation methods.

In particular, some costs that are Damage Costs related are even more difficult to assign, as the “confidentiality” of some costs tend to lead to extensive disclosure issues, even internally.

CHAPTER 4

ROI ON PREVENTION

“Expenditure on Work Reintegration is now 3.7 to 1.”

INTERNATIONAL SOCIAL SECURITY ASSOCIATION

CHAPTER 5

THE COST OF DAMAGE

“He who fails to economize will agonize.”

CONFUCIUS



SOME IMPORTANT NUMBERS	
Suitable Duties	Medical
Counsellors	Investigators
Public Liability	Legal
Physiotherapy	External providers
Doctors	Surveillance
Common Law or Legal Claims	Insurance

This is the starting point for how you can understand your Damage Costs and how you can improve you whole system, reduce error rates and increase your profit.

The margin your business can save/gain instantly compared to your competitors, as discussed before, can be vast.

Let's show you three real scenarios for the same kinds of business, with three very different financial outcomes. In all scenarios, the baseline is the same for performance of a collective group of risk to an insurer.

Wages: Average \$60,000 per worker per annum
Workers: 500 people
Total Wages: 30 million
Average Insurance Rate: 2%



Insurance Scenario	Average Industry Rate Performer	Optimal Performer 90% Discount	Worst Performer (capped 2 x)
Premium Amount	\$600k	\$60k	\$1.2M

I am yet to meet a business owner who would prefer to pay \$1.2M for a service that could cost as little as \$60k. In this example, the worst performer is paying 1900% more than the best performer!

If your business is paying \$1.2M for a workers compensation premium bill and your competitors are paying \$60k or \$600k, even if we work from the actual industry rate, your business is paying \$600k more to operate than one of your direct competitors.

Starting with an overhead that is \$600k greater than your competitors is far from optimal.

If you make 10% margins for sale, you are going to have to make \$6M in sales to catch your competitor's position.

Below is the position of each business if you and your competitor make \$100M in sales each, with a 10% sales margin.




Insurance Scenario	Average Industry Rate Performer	Optimal Performer 90% Discount	Worst Performer (capped 2 x)
Premium Amount	\$600	\$60k	\$1.2M
Sales/Revenue	\$10M	\$10M	\$10M
Margin (10%)	\$1M	\$1M	\$1M
Revenue minus Premium	\$400k	\$940K	\$(200K)

Your business can either have a \$940k profit or a \$200k loss with all of the same variables except your workers compensation premium.

Here is another example of three variable outcomes for Aged Care Health in Queensland:

Wages: Average \$80,000 per worker per annum
Workers: 200 people
Total Wages: 16 million
Average Insurance Rate: 2.557%



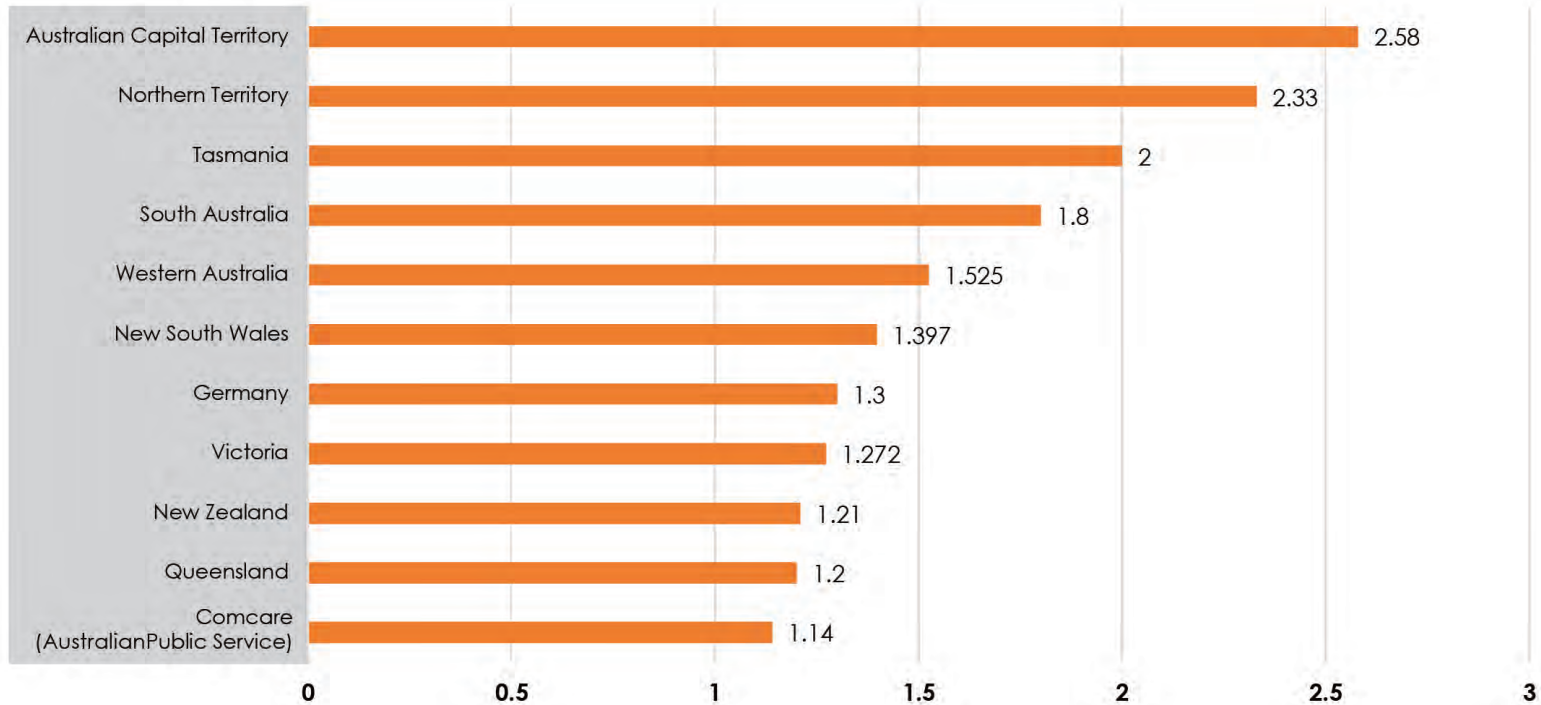
Insurance Scenario	Average Industry Rate Performer	Optimal Performer	Worst Performer (capped 2 x)
Premium Amount	\$409,120	\$40,912	\$818,240
Sales/Revenue	\$10M	\$10M	\$10M
Margin (10%)	\$1M	\$1M	\$1M
Revenue minus Premium	\$590.9k	\$959K	\$181.8K

Your business can either have a \$959k or a \$181.8k profit with all of the same variables except your workers compensation premium.

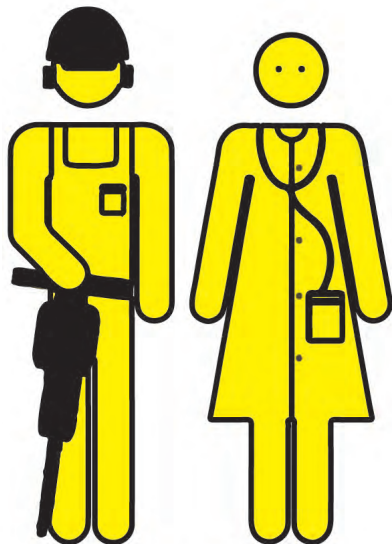
Your Current Business Costs of Injury and Incidents are Available

It should now be clear that, as a business leader, you should seek out and review your workers compensation premiums.

Average Scheme Costs to Insure 2017/18FY



State/Territory/Definition	Regime
New South Wales	State Based Regulated Insurance
Queensland	State Based Regulated Insurance
Victoria	State Based Regulated Insurance
South Australia	State Based Regulated Insurance
Tasmania	Risk State Insurance
Northern Territory	Risk State Insurance
Western Australia	Risk State Insurance
Australian Capital Territory	Risk State Insurance
Commonwealth Employees	Comcare includes: <ul style="list-style-type: none"> ▪ Commonwealth Government agencies and statutory authorities (excluding serving members of the Australian Defence Force with injuries sustained after 1 July 2004) ▪ ACT Government ▪ Corporations or authorities who have been granted a license to self-insure, called 'licensees'.
Companies Self Insure	Self Insurers
Individuals Workers/Directors	Individual Insurance Brokers, Queensland State Based Regulated Insurance Option
Seafarers	SeaCare



28 APRIL

**ILO - WORLD DAY
FOR SAFETY AND
HEALTH AT WORK**

Source of Data: Information sourced from International Labour Organisation July 2018

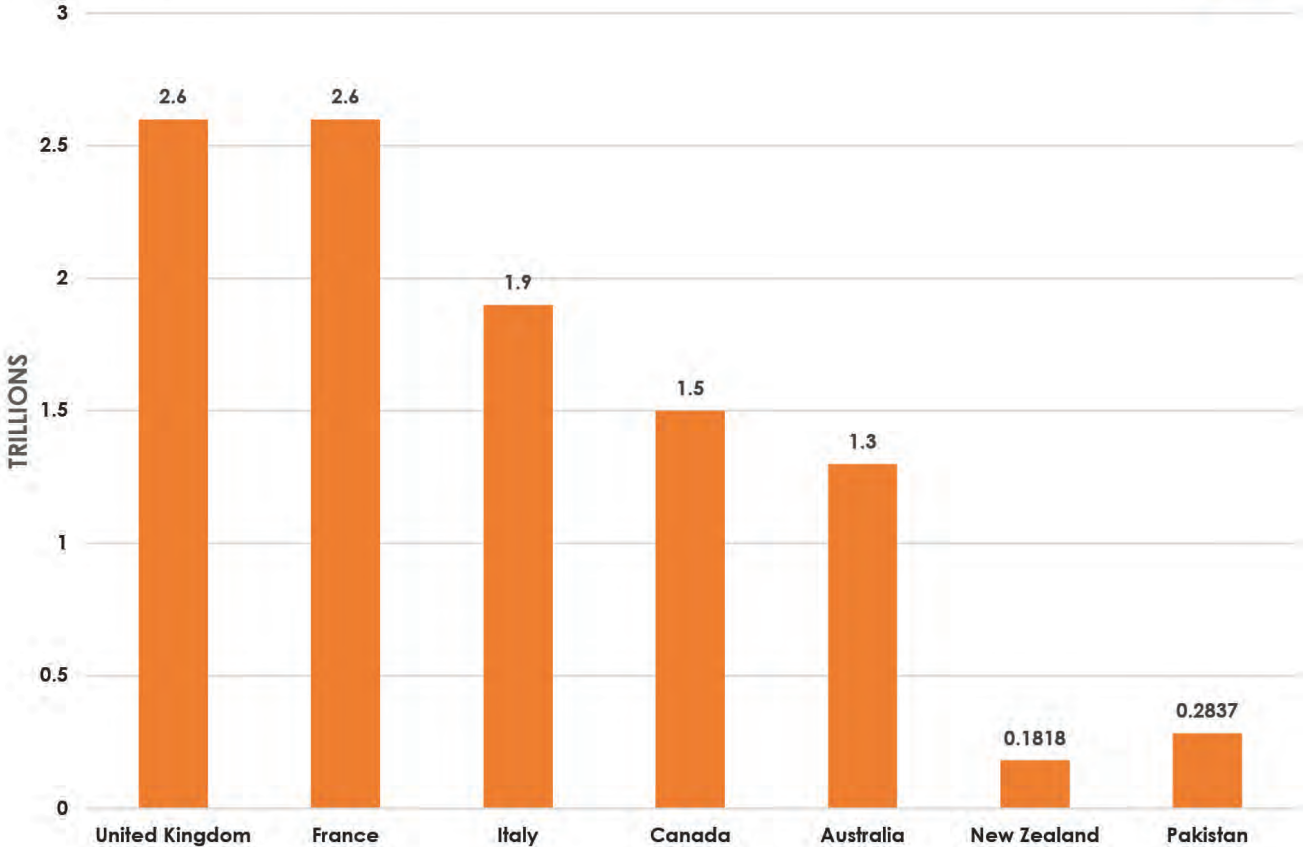
2.8 MILLION
PER YEAR DIE AT WORK

374 MILLION
WORKPLACE INJURIES

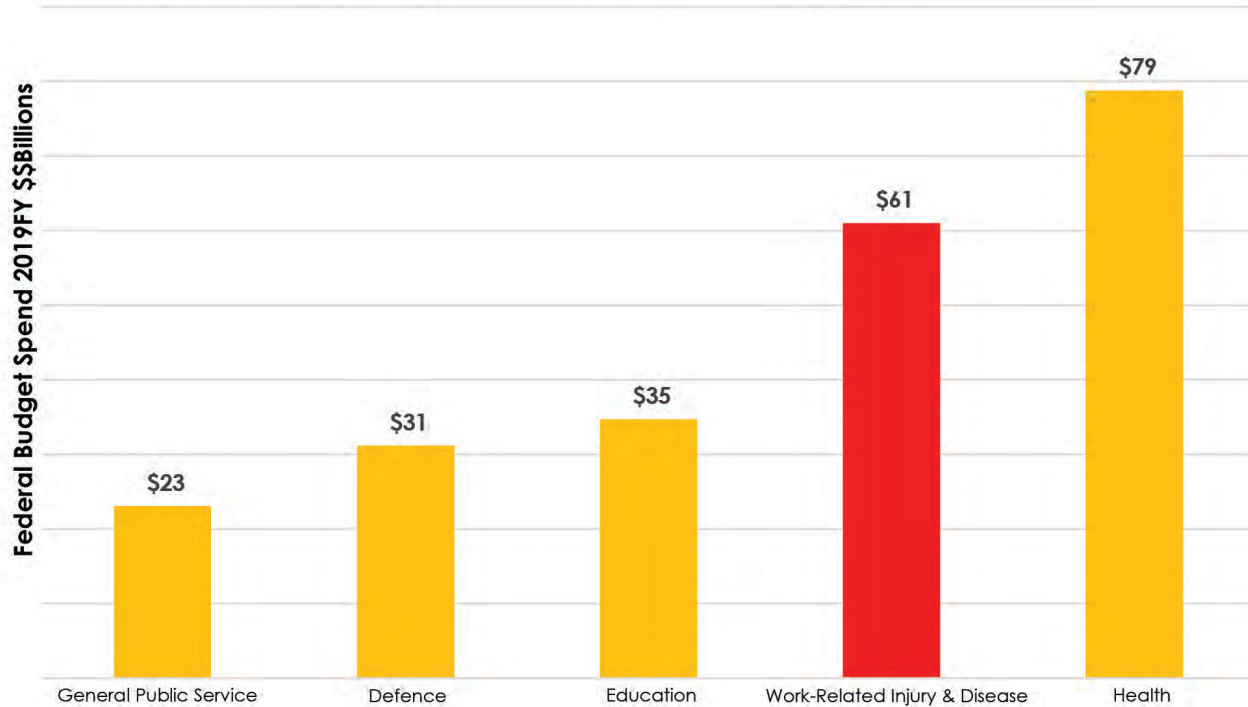
\$3.45 TRILLION
COST OF WORKPLACE
INJURY/ILLNESS WORLDWIDE

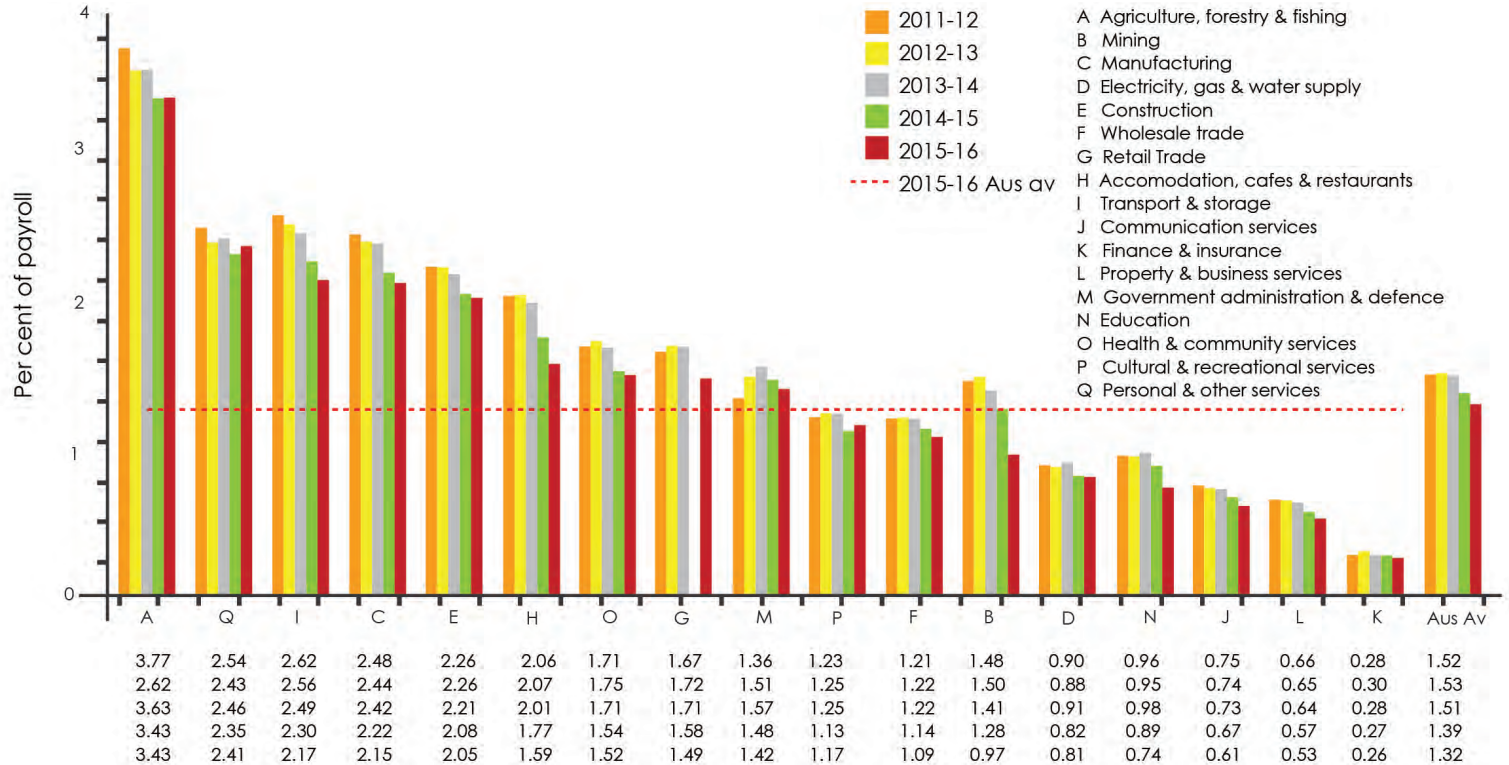
3.94%
GLOBAL GROSS DOMESTIC
PRODUCT EACH YEAR

Nominal GDP \$USA Trillion - 2016



Cost of Work Related Injury & Disease in Australia Compared with the 2019 Federal Budget Expenditure (\$Billions)





Reference: Safe Work Australia May 2018 Comparative Performance Monitoring Report 19th Edition Part 3 – Premium, entitlements and scheme performance.
 (this report) contains information on premium rates, entitlements and scheme performance of all jurisdictions during a five year period between 2011–12 and 2015–16.

You can further understand this in regards to your specific classification. Beef Farmers, for example, are paying one of the highest premiums in Australia. This cost is also relatively very expensive when compared to the Average Premium Rate per state.

The information displayed in the table explains that Beef Industry Farmers in Australia pay on average 392% higher workers compensation premiums than the average of all of Australia's workers compensation premiums.



Jurisdiction	Average Premium Rate (15/16)	Premium Rate Beef Farming (17/18)
NSW	1.34	7.3
VIC	1.31	4.6
QLD	1.19	6.6
WA	1.16	8.4
SA	1.89	5.1
TAS	1.55	6.1
NT	1.62	5.0
ACT	1.74	9.0
Australia	1.32	6.5
\$500k Wages	\$6,600	\$32,500

CHAPTER 6

LOSING CONTROL OF YOUR BUDGET

“A budget is telling your money where to go instead of wondering where it went.”

DAVE RAMSEY

These costs are then reviewed as the year plays out, measuring their performance against the budget. However, usually the Damage Costs are not reviewed.

Premium Increases can be Financially Debilitating

In some cases, premium increases can lead to reduced margins, to no margin or to negative results.

An example of premium increases occurring on a very simplistic scale is shown below:

Wages: Average \$60,000 per worker per annum
Workers: 500 people
Total Wages: 30 million
Average Insurance Rate: 2%



Insurance Scenario	Average Industry Rate Performer	Optimal Performer 90% Discount	Worst Performer (capped 2 x)
Premium Amount	\$600k	\$60k	\$1.2M
Sales/Revenue	\$10M	\$10M	\$10M
Margin (10%)	\$1M	\$1M	\$1M
Revenue minus Premium	\$400k	\$940K	\$(200K)

Costs Of Damage Are Unsustainable

We know that Damage Costs in a business are unsustainable.

A business cannot sustain increases in Damage Costs that are greater than its revenue and profits.

In the example below, the business that is the worst performing is hurting so many people that the insurer has increased their premium to the highest amount. This has created a businesses cost so great that they can no longer operate in their current form.



Insurance Scenario	Average Industry Rate Performer	Optimal Performer 90% Discount	Worst Performer (capped 2 x)
Premium Amount	\$600	\$60k	\$1.2M
Sales/Revenue	\$10M	\$10M	\$10M
Margin (10%)	\$1M	\$1M	\$1M
Revenue minus Premium	\$400k	\$940K	\$(200K)



YOUNG WORKERS - CASE STUDY



MANAGE DAMAGE APPROACH



OBJECTIVE

Manage Damage identified opportunities:

- Savings to the business' bottom line.
- Locating the root cause of the increasing insurance premium.
- Reduction of costs for management of damage risk.
- Enhancing business sustainability for future years' premiums.

APPROACH

Manage Damage views all businesses on a holistic approach. This is a due diligence review that drive insurance premium and damage cost relief.

RESULTS

- Identified opportunities to improve business' bottom line.
- Optimised damage risk insurance pricing and structure.
- Reduced costs to business in relation to current and future damage risk exposure.

KEY ACTIONS SPECIFIC TO CLIENT



- The Client was recommended to undertake a **Damage Costs Sanity Check** by a Trusted Business Advisor - the initial check of their damage risk portfolio and insurance was as a low risk opportunity, to receive expert guidance and identify the potential opportunity for savings.
- Facilitated the successful **recoveries of Workers Compensation insurance premiums.**
- **Adjusted the WorkCover Insurance Classifications (WIC)** for whole of business.
- Provided advisory assistance in relation to new legislation regulation obligations, merger and acquisition activities and **interpreting the legislative insurance premium guidance.**
- Supported and facilitated the business to challenge the Workers Compensation law in relation the retrospective assessment of premiums, specifically challenging a 5 year return instead of a 3 year return.

JOURNEY TO FURTHER IMPROVEMENT



The Client will be implementing the **MetricDriver Program** post current Merger and Acquisition activities which ensure they move to a sustainability model for managing their damage risk portfolio.

KEY LEARNINGS FOR CLIENT

Understanding that the Workers Compensation insurance premium is a cost the business can reduce by improving their performance and their understanding of the legislative insurance premium requirements.

Ensuring the Return to Work processes provide direction that supports the effective management of workers and Workers Compensation claims will provide sustained savings for the business.



YOUNG WORKERS - CASE STUDY



BUSINESS SUCCESSES



Increased Revenue

- \$48K immediate saving for Financial Year
- \$910K recovery received for over payment of Workers Compensation insurance premiums (returned cash).

Reduced Business Costs

- Reduced Worker Compensation premium insurance costs
- Reduce Return to Work costs.

Reduced Damage Risk Exposure

- Installation of new System and Process Improvements from Review.

Sustainable Knowledge

- Improved navigation of insurance premiums.

Total Savings 2017-22 (est.)

A\$244K ongoing benefit = \$48K/year

A\$1.54M total recovery benefit.

CLIENT BUSINESS PROFILE



Business Activity

- Australia's largest commercial employer of apprentices and trainees
- Provides workforce management support.

Business Size

- Wages \$40M / Annually
- Australian – across Queensland – Regional, remote and city based
- Majority of Workers are considered vulnerable (young workers) working in high risk environments
- Over 20,000 workers employed in career enhanced roles.
- Managed workers in over 8000 Queensland businesses.

Industry Sector

- Workers across all industry sectors.

BUSINESS CHALLENGES



- Significant Increases in Worker Compensation Insurance Premiums
- This Premium was 250% greater than the gazetted industry
- Majority of business portfolio with Low Experience Young Workers in High Risk Industries
- Construction and Manufacturing
- Limited understanding of the complex and opaque Worker Compensation insurance process
- Navigating the insurance regulatory requirements (specifically WorkCover Insurance Classifications (WIC) Codes Management)
- Less than effective return



MANUFACTURING/LOGISTICS - CASE STUDY



MANAGE DAMAGE APPROACH



OBJECTIVE

Manage Damage identified opportunities:

- Savings to the business' bottom line.
- Locating the root cause of the increasing insurance premium.
- Reduction of costs for management of damage risk.
- Enhancing business sustainability for future years' premiums.

APPROACH

Manage Damage views all businesses on a holistic approach. This is a due diligence review that drive insurance premium and damage cost relief.

RESULTS

- Identified opportunities to improve business' bottom line.
- Optimised damage risk insurance pricing and structure.
- Reduced costs to business in relation to current and future damage risk exposure.

KEY ACTIONS SPECIFIC TO CLIENT



- The Client approached Manage Damage to undertake a Damage Costs Sanity Check - the initial free check of their damage risk portfolio & insurance was as a low risk opportunity, to receive expert guidance & identify the potential opportunity for savings.
- Most experienced agent was assigned due to urgent time constraints for requesting Insurer assess premiums.
- Reviewed current insurance structure, broker & insurer relationships in the Business Group and Damage Risk Portfolio (worked with business's CFO and CEO, as well as managers with in the Group Corporation)
- Installed a temporary Return to Work Agent into the business to help manage the cases, as the associated costs were very high and open worker compensation claims large.

JOURNEY TO FURTHER IMPROVEMENT



The Client commenced the MetricDriver Program immediately to ensure they move to a sustainability model for managing their damage risk portfolio.

KEY LEARNINGS FOR CLIENT

Learning that the true value of an effective Return to Work and Safety/Prevention Team in the business, as there is a direct impact on revenue.

Understanding the best way to manage Worker Compensation insurance costs means a small investment by the Insured Employer instead of incurring all costs by Insurer - this resulted in a significant premium cost increase.

Understanding that the Workers Compensation insurance premium is a cost the business can reduce by improving their performance & their understanding of the legislative insurance premium requirements.



MANUFACTURING/LOGISTICS - CASE STUDY



BUSINESS SUCCESSES



Reduced Damage Risk Exposure

- Installation of new System and Process Improvements from Review Findings specifically around RTW Management

Financial Systems Improvement

- Improved navigation of insurance premiums, systems & opportunities

Increased Service by Insurers

- The process saw improved Insurer response & RTW Management

Reduced Workers Comp. Costs

- Reduced Worker Compensation premium insurance costs
- Reduce Return to Work cost

Senior Leader Engagement

- Enhanced Commitment & Involvement
- New Focus of SLT on Safety

Workforce Engagement

- Elevation and Importance of Safety/RTW
- Improved Skill/Performance Existing Staff

Sustainable Knowledge

- Improved navigation of insurance premiums, systems & opportunities

CLIENT BUSINESS PROFILE



Business Activity

- Workforce Management & Recruitment support

Business Size

- Wages \$190M / Annually
- Australian – across all States – Regional, remote and city based
- New Zealand – Regional, remote and city based
- High Legal Risk Exposure = 10,000 pay summaries issued per year on average

Global perspective

- Part of an international listed Group with a M&A growth strategy
- Revenue A\$1.563B
- Business Group more than 84,000 workers
- Work across Africa, Asia & Australia

Industry Sector

- Workers across all industry sectors

Major Focus

- Heavy Food Manufacturing
- Agribusiness
- Wholesaling
- Transport & Logistics

BUSINESS CHALLENGES



- Significant Increases in Worker Compensation Insurance Premiums
 - One State Premium was as high as 116% greater than last financial year
- Majority of business portfolio with Low Experience /International Workers in High Risk Industries
 - Heavy Food Manufacturing | Agribusiness | Wholesaling, Transport & Logistics
- Increased costs of damage risk were reducing margins and revenue
- Difficulty navigating Workers Compensation Insurance premiums and processes
- Insurance regulator had formally requested they improve risk management strategies
- Had not clearly identified the problem or causes of problem
- Less than effective Return to Work processes



INFO TECH | ENGINEERING | FINANCE- CASE STUDY



MANAGE DAMAGE APPROACH



OBJECTIVE

Manage Damage identified opportunities:

- Savings to the business' bottom line.
- Locating the root cause of the increasing insurance premium.
- Reduction of costs for management of damage risk.
- Enhancing business sustainability for future years' premiums.

APPROACH

Manage Damage views all businesses on a holistic approach. This is a due diligence review that drive insurance premium and damage cost relief.

RESULTS

- Identified opportunities to improve business' bottom line.
- Optimised damage risk insurance pricing and structure.
- Reduced costs to business in relation to current and future damage risk exposure.

KEY ACTIONS SPECIFIC TO CLIENT



- Business acknowledgement that the Worker Compensation insurance is a scalable variable cost
- Audit & adjust the financial structure so it will support the accrual model for payment of insurance premiums
- Apply immediate changes to Return to Work and employment processes to improve the management of injured/ill workers and reduce the Worker Compensation claims.
- Elevate the focus on Return to Work and Safety risk management across the business

JOURNEY TO FURTHER IMPROVEMENT



Implement recommended strategy for:

- short-term cost savings, which will support the implementation of the strategy activities
- an immediate reduction in risk exposure of the damage risk portfolio
- a pathway to a sustainability model for managing their damage risk portfolio

KEY LEARNINGS FOR CLIENT

Audit & adjust the financial structure so it will support the accrual model for payment of insurance premiums

Learning that the true value of an effective Return to Work and Safety/Prevention Team in the business, as there is a direct impact on revenue.

Understanding the best way to manage Worker Compensation insurance costs means a small investment by the Insured Employer instead of incurring all costs by Insurer - this resulted in a significant premium cost increase.



INFO TECH | ENGINEERING | FINANCE- CASE STUDY



BUSINESS SUCCESSSES



Financial Systems Improvement

- Improved navigation of insurance premiums, systems & opportunities

Financial Accrual Improvement

- Ensuring the accrual model for insurance premium payment functions as needed by complex business
- Improved navigation of insurance premiums, systems & opportunities

Increased Service by Insurers

- The process saw improved Insurer response and RTW Management

Reduced Workers Comp. Costs

- Reduced Worker Compensation premium insurance costs
- Reduce Return to Work cost

Senior Leader Engagement

- Enhanced Commitment & Involvement
- New Focus of SLT on Safety

Reduced Damage Risk Exposure

- Installation of new System and Process Improvements from Review Findings specifically around RTW Management

CLIENT BUSINESS PROFILE



Business Activity

- Information Technology, Engineering & Finance

Business Size

- Wages \$844.4M / Annually (Aust & NZ)
- Australian & NZ – across All States – Regional, remote & city based
- Around 50% Workers of are white collar & 50% Warehousing/Logistics
- High Legal Risk Exposure = 18,000 Pay Summaries Annually

Global perspective

- Part of an international listed Group with a M&A growth strategy
- Revenue USA\$19,654M
- Business Group more than 600,000 workers worldwide

Business Activity

- Workers across all industry sectors

Major Focus

- Information Technology
- Engineering
- Finance
- Transport & Logistics

BUSINESS CHALLENGES



- Significant Increases in Worker Compensation Insurance Premiums
 - One State Premium was as high as 206% more than last FY
- Increased costs of damage risk were reducing margins and revenue
- Difficulty navigating Workers Compensation Insurance processes
- Insurance company audit requested
- Had not clearly identified the problem or causes of problem
- Ran an accrual model for insurance payment of premiums, however the accrual balance was reducing so there was insufficient funds to pay premium
- High workers' compensation claims, costs (which were eroding margins)
- Insufficient Workers Compensation skill available internally (restructured)
- Lost focus on Return to Work and Safety risk management, due to business restructure
- Did not treat the damage risk costs as a true cost to business
- Took for granted that the insurance premium price would not change



CONSTRUCTION - CASE STUDY



MANAGE DAMAGE APPROACH



OBJECTIVE

Manage Damage identified opportunities:

- Savings to the business' bottom line.
- Locating the root cause of the increasing insurance premium.
- Reduction of costs for management of damage risk.
- Enhancing business sustainability for future years' premiums.

APPROACH

Manage Damage views all businesses on a holistic approach. This is a due diligence review that drive insurance premium and damage cost relief.

RESULTS

- Identified opportunities to improve business' bottom line.
- Optimised damage risk insurance pricing and structure.
- Reduced costs to business in relation to current and future damage risk exposure.

KEY ACTIONS SPECIFIC TO CLIENT



- Apply immediate changes to Return to Work & employment processes to improve the management of injured/ill workers & reduce the Worker Compensation claims.
- Business acknowledgement that the Worker Compensation insurance is a scalable variable cost
- Audit & adjust the financial structure so it will support the payment of insurance premiums & forecasting for financial expenditures
- Cost analysis provided new insights into true bottomline in business divisions.

JOURNEY TO FURTHER IMPROVEMENT



The Client completed a successful business sale - the Damage Risk Profile was a key point of difference.

KEY LEARNINGS FOR CLIENT

Learning that the true value of an effective Return to Work & Safety/Prevention Team in the business, as there is a direct impact on revenue.

Understanding the best way to manage Worker Compensation insurance costs means a small investment by the Insured Employer instead of incurring all costs by Insurer - this resulted in a significant premium cost increase.

Understanding the true return on investment (ROI) on Effective Prevention & RTW Programmes

Cultural Improvements from Top Down & Bottom Up for Commitment to Safety.

Financial Incentives for great performance are real & measurable.



CONSTRUCTION - CASE STUDY



BUSINESS SUCCESSES



Improved Business Revenue

- Business rewarded with \$16.8M saving (more savings than profit bottomline \$11.5M)
- Reducing Workers Compensation claim numbers
- Reducing Workers Compensation insurance premium costs

Financial Systems Improvement

- Improved navigation of insurance premiums, systems & opportunities

Increased Service by Insurers

- The process saw improved Insurer response & RTW Management

Reduced Workers Comp. Costs

- Reduced Worker Compensation premium insurance costs in long term
- Reduce Return to Work cost short term

Senior Leader Engagement

- Enhanced Commitment & Involvement
- New Focus of SLT on Safety

CLIENT BUSINESS PROFILE



Business Activity

- Australian Construction Company

Business Size

- Wages \$300.4M / Annually (Aust & NZ)
- Australian – across all States – Regional, remote and city based
- New Zealand – Regional, remote and city based
- High Legal Risk Exposure = many third party engagements

Industry Sector

- Workers in Construction – Residential, Non-Residential & Commercial

BUSINESS CHALLENGES



- Significant Increases in Worker Compensation Insurance Premiums
 - More than two State Premiums were 200% greater than last financial year & well above industry rates
- Significant exposure from active Third-Party claiming on Public Liability Policy
- Increased costs of damage risk were reducing margins & revenue
- Difficulty navigating Workers Compensation Insurance premiums & processes
- Insufficient Workers Compensation skill available internally, due to business restructure
- Lost focus on Return to Work & Safety risk management, due to business restructure
- Did not treat the damage risk costs as a true cost to business
- Took for granted that the insurance premium price would not change

CHAPTER 7

MERGING YOUR BUDGETS

“Remind people that profit is the difference between Revenue and Expense. This makes you look smart.”

SCOTT ADAMS (Cartoonist)

LEFT BRAIN	RIGHT BRAIN
Logical	Emotional
Focused on Facts	Focused on Art and Creativity
Realism Predominates	Dreams & Imagination Predominate
Planned and Orderly	Occasional Absentminded
Math and Science Minded	Prefers Fiction
Prefers Non-Fiction	Enjoys creative storytelling

Source: slant.avenue-razorfish.com

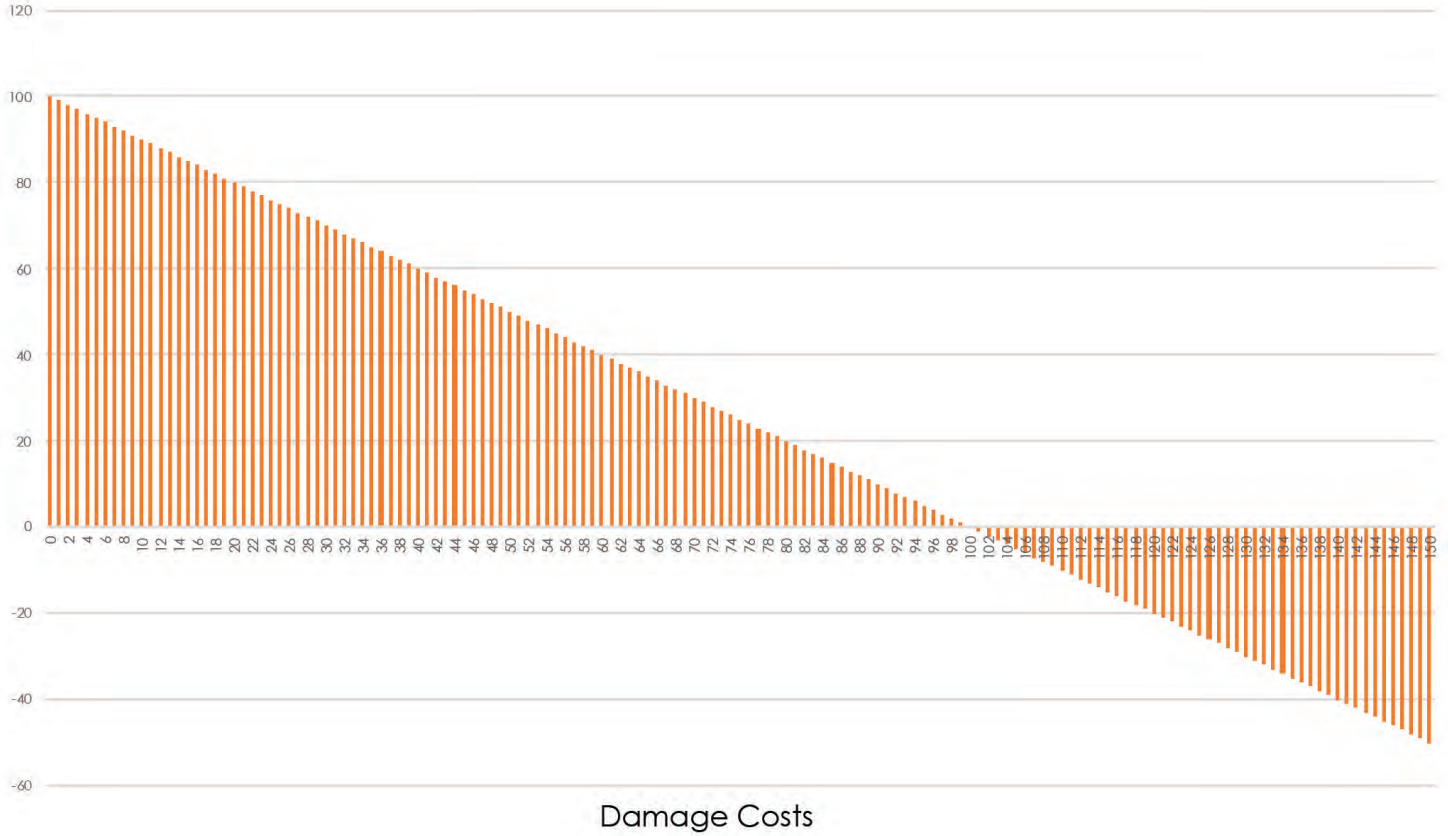
You can see the approaches and languages of the two “brains” are polar opposites; hence the opposing views.

Like a kairotic moment, these two “brains” converge when Damage Cost and Risk Dollarisation® is used.

We place safety and finance/operations/business leaders in the same building, room, book, page and line. Neither party wants high Damage Costs. This can be explained via the Happiness Scale for Safety and Operations vs. Damage Costs.

The lower the Damage Costs, the happier the safety and operational people are, as there is less cost due to less harm. Inversely, the higher the Damage Costs, the less satisfaction there is for both parties.

Happiness for Safety & Operations



CHAPTER 8

VALUE PERCEPTIONS

“There is no truth. There is only perception.”

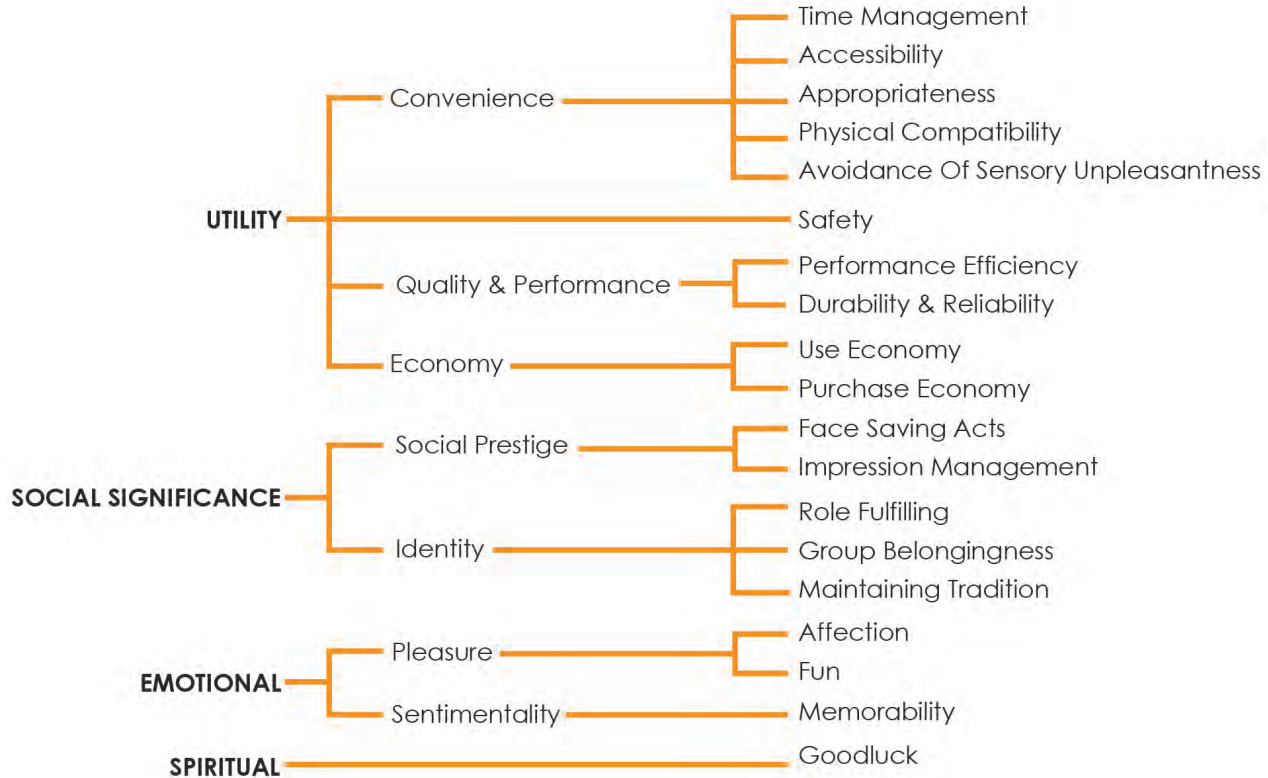
GUSTAVE FLAUBERT

LEFT BRAIN	RIGHT BRAIN
<p>Practical Standpoint</p>	<p>Story Telling Approach</p>
<p>Description of what you get, why you need it and why no other way is quite the same</p>	<p>A short story, mini plot, climax and resolution.</p>
<p>Focus on solution</p>	<p>Focus on outrageous comedy and element of surprise to make the share memorable</p>
<p>Needs testimonials of previous success with same process</p>	<p>Creates a fold out advertisement spread focused on breathtaking imagery and vivid language to captivate the readers' attention</p>
<p>How much they will save on the product if you buy now</p>	<p>Goal is to romanticize the reader into ignoring the competing content of the publication instead of the practicality of the product</p>
<p>What is the Return on Investment?</p>	<p>Sparkling Digital Billboard accentuating luxury or pleasure from the sale</p>

Source: slant.loveira-razorfish.com

Risk Dollarisation® allows non-financial parts of the business to share their great ideas, work and dreams in cold hard factual numbers that are heard and valued by business decision makers.

Types of User Value (Adaped from Holbrook (1999))



CHAPTER 9

RISK DOLLARISATION

“Companies that start by redesigning the economics of an industry often finish by redesigning the whole industry-and owning it.”

TIM FERRISS



RISK DOLLARISATION® APPROACH	OTHER NON-FINANCIAL APPROACHES
Quantitative	Qualitative
Hard Science	Soft Science
Objective	Subjective
Basis of Knowing – Cause & Effect	Basis of Knowing – Meaning, Context
Single Reality	Multiple Realities - Continually changing with Individual Interpretation.
Dollars	Counts
Budgets & Business Cases	Paragraphs & convincing statements/requests

The New Way to Approach Risk/Damage Costs

The new way to approach risk and Damage Costs tests the current theories and concepts of safety.

This approach allows the leaders of business who think in dollar terms and financials terms every day to know and understand the true cost of Damage Costs.

This approach challenges the concept of assigning costs, people and damage in one conversation.

CHAPTER 10

SAFETY FINANCIAL REPORTING

“What gets measured gets managed.”

PETER DRUCKER

CHAPTER 11

CREATE ACTION

**If you always do what you always did, you will always get
what you always got.”**

ALBERT EINSTEIN

Want to Engage? #RiskDollarisation

**“MONEY SPEAKS SENSE IN A LANGUAGE ALL
NATIONS UNDERSTAND.”**

The New Way to Approach Safety (Non-Financial Risk)

www.managedamage.com

Accountability

The most powerful way of gathering attention on any matter within a business system is to create an accountability element.

The new lines of accountability are clear. They are Damage Costs, but instead of just saying, “You have to improve your safety”, the business leader is saying, “You are responsible for reducing your Damage Costs; it is in your budget”.

CHAPTER 12

FUTURIST THINKING

“Intelligence is the ability to adapt to change.”

STEPHEN HAWKING

EFFECTS OF GIG ECONOMY ON YOUR BUSINESS WORKERS COMPENSATION PREMIUMS

2016-2017	NSW	VIC	QLD	WA	SA	TAS	NT	ACT
Average Premium rate (% of payroll)	1.397	1.272	1.2	1.525	1.8	2	2.33	2.58
Average Premium rate (% of payroll) w Gig Economy	1.956	1.781	1.680	2.135	2.520	2.800	3.262	3.612
10 Staff Pre Gig	11,176	10,176	9,600	12,200	14,400	16,000	18,640	20,640
10 Staff Post Gig	15,646	14,246	13,440	17,080	20,160	22,400	26,096	28,896
50 Staff Pre Gig	55,880	50,880	48,000	61,000	72,000	80,000	93,200	103,200
50 Staff Post Gig	78,232	71,232	67,200	85,400	100,800	112,000	130,480	144,480
100 Staff Pre Gig	111,760	101,760	96,000	122,000	144,000	160,000	186,400	206,400
100 Staff Post Gig	156,464	142,464	134,400	170,800	201,600	224,000	260,960	288,960
500 Staff Pre Gig	558,800	508,800	480,000	610,000	720,000	800,000	932,000	1,032,000
500 Staff Post Gig	782,320	712,320	672,000	854,000	1,008,000	1,120,000	1,304,800	1,444,800
1,000 Staff Pre Gig	1,117,600	1,017,600	960,000	1,220,000	1,440,000	1,600,000	1,864,000	2,064,000
1,000 Staff Post Gig	1,564,640	1,424,640	1,344,000	1,708,000	2,016,000	2,240,000	2,609,600	2,889,600
5,000 Staff Pre Gig	5,588,000	5,088,000	4,800,000	6,100,000	7,200,000	8,000,000	9,320,000	10,320,000
5,000 Staff Post Gig	7,823,200	7,123,200	6,720,000	8,540,000	10,080,000	11,200,000	13,048,000	14,448,000
10,000 Staff Pre Gig	11,176,000	10,176,000	9,600,000	12,200,000	14,400,000	16,000,000	18,640,000	20,640,000
10,000 Staff Post Gig	15,646,400	14,246,400	13,440,000	17,080,000	20,160,000	22,400,000	26,096,000	28,896,000

POTENTIAL EFFECTS OF GIG ECONOMY ON YOUR BUSINESS WORKERS COMPENSATION PREMIUMS (HIGHEST PREMIUM RATES)

2017-2018	NSW	VIC	QLD	WA	SA	TAS	NT	ACT
Highest Premium Rate (% of payroll)	10.42	8.007	8.393	8.35	7.555	10	15	14.18
Highest Premium Rate (% of payroll) w Gig Eco	14.588	11.210	11.750	11.690	10.577	14.000	21	19.852
10 Staff Pre Gig	83,360	64,056	67,144	66,800	60,440	80,000	120,000	113,440
10 Staff Post Gig	116,704	89,678	94,002	93,520	84,616	112,000	168,000	158,816
50 Staff Pre Gig	416,800	320,280	335,720	334,000	302,200	400,000	600,000	567,200
50 Staff Post Gig	583,520	448,392	470,008	467,600	423,080	560,000	840,000	794,080
100 Staff Pre Gig	833,600	640,560	671,440	668,000	604,400	800,000	1,200,000	1,134,400
100 Staff Post Gig	1,167,040	896,784	940,016	935,200	846,160	1,120,000	1,680,000	1,588,160
500 Staff Pre Gig	4,168,000	3,202,800	3,357,200	3,340,000	3,022,000	4,000,000	6,000,000	5,672,000
500 Staff Post Gig	5,835,200	4,483,920	4,700,080	4,676,000	4,230,800	5,600,000	8,400,000	7,940,800
1,000 Staff Pre Gig	8,336,000	6,405,600	6,714,400	6,680,000	6,044,000	8,000,000	12,000,000	11,344,000
1,000 Staff Post Gig	11,670,400	8,967,840	9,400,160	9,352,000	8,461,600	11,200,000	16,800,000	15,881,600
5,000 Staff Pre Gig	41,680,000	32,028,000	33,572,000	33,400,000	30,220,000	40,000,000	60,000,000	56,720,000
5,000 Staff Post Gig	58,352,000	44,839,200	47,000,800	46,760,000	42,308,000	56,000,000	84,000,000	79,408,000
10,000 Staff Pre Gig	83,360,000	64,056,000	67,144,000	66,800,000	60,440,000	80,000,000	120,000,000	113,440,000
10,000 Staff Post Gig	116,704,000	89,678,400	94,001,600	93,520,000	84,616,000	112,000,000	168,000,000	158,816,000

State	Coverage of independent contractors	Is your Gig Person a "Worker"?
New South Wales	Not unless contractor is a deemed worker pursuant to schedule 1, Workplace Injury Management and Workers Compensation Act 1998.	<p>In Gig Definition = YES a Worker</p> <p>There is a Worker or Contractor Tool http://workerstatus.workcover.nsw.gov.au</p> <p>The tool is designed to help you determine whether a person is a worker, a deemed worker or contractor for workers compensation insurance purposes.</p> <p>Worker: section 4 (1) of the Workplace Injury Management and Workers Compensation Act 1998 (1998 Act).</p> <p>Deemed Worker: https://www.legislation.nsw.gov.au/#/view/act/1998/86/sch1</p> <p>Under NSW workers compensation legislation, many people working as contractors are deemed workers for workers compensation purposes. In these cases, the employer is treated as a 'principal' and is responsible for declaring remuneration for the purpose of workers compensation.</p> <p>Note: a person's status for tax purposes may not be the same as their status as a worker for workers compensation insurance purposes. For example, a person may be a contractor for tax purposes, but still be a worker for the purposes of workers compensation.</p> <p>You can also apply for a private ruling if you are not sure: http://www.sira.nsw.gov.au/forms/s175c-private-ruling-form</p>
Victoria	Not unless the contractor is a deemed worker pursuant to clause 9 of schedule 1.	<p>In Gig Definition = YES a Worker – unless you have a very firm, detailed contract</p> <p>Who is a Worker Tool https://www.worksafe.vic.gov.au/insurance/types-of-workers</p> <p>Tool https://www.worksafe.vic.gov.au/pages/insurance-and-premiums/-contractors-and-workers/worker-and-contractor-assessment-tool</p>
Queensland	No, unless determined an employee using the ATO Decision Tool.	<p>In Gig Definition = YES a Worker</p> <p>https://www.ato.gov.au/calculators-and-tools/employee-or-contractor/</p>
Western Australia	No, unless employed under contract for service and remunerated in substance for personal manual labour or service.	<p>In Gig Definition = YES a Worker</p> <p>https://www.workcover.wa.gov.au/employers/understanding-your-rights-obligations/covering-your-workers/</p>

Definition of a worker

The definition of a 'worker' covers:

- full-time workers on a wage or salary
- part-time, casual and seasonal workers
- workers on commission
- piece workers
- working directors (optional)
- contractors and sub-contractors (in some circumstances)

This definition is broad and can be broken up into two parts: primary and extended.

Primary definition of a 'worker'

This covers any person who works under a contract of service or apprenticeship with you. The contract may be expressed or implied, oral or written. A large part of the workforce is covered under this part of the 'worker' definition, including:

- full-time and part-time workers
- casual workers
- seasonal and piece workers
- workers on salary or wages
- workers supervised and controlled by an employer
- workers who may be fired by an employer
- workers who work for only one employer
- workers with set hours of work.

Extended definition of a 'worker'

This covers any person who works under a contract for service. Many people who work as contractors or sub-contractors may be covered under this part of the definition, and it may cover workers who:

- are paid on piece rates, hourly rates or per job
- work for the employer on a 'one-off' or per job basis
- do not have set hours of work
- work for more than one employer
- work unsupervised
- pay 20 per cent prescribed payments (sub-contractor's tax)
- are covered by an industrial award or agreement.

<p>South Australia</p>	<p>Yes, if covered by definitions in s4:</p> <ul style="list-style-type: none"> ▪ 'worker' which includes a person by whom work is one under a contract of service (whether or not as an employee). ▪ 'contract of service' which includes if person undertakes prescribed work or work of a prescribed class. <p>See also Regulation 5 and s4(7)</p>	<p>In Gig Definition = YES a Worker</p> <p>A worker (for workers compensation purposes) is a person who is engaged to perform work under a contract of service (as defined by the Return to Work Act 2014 (the Act)). Contract of service represents a relationship formed between an employer and employee but in the context of the Act, the definition of "contract of service" has a much broader application. Self-employed contractors and other persons that meet particular criteria are also 'deemed' workers for the purpose of the Act, including people that work in the following classes of work:</p> <ul style="list-style-type: none"> ▪ building work ▪ cleaning work ▪ driving a taxi-cab or similar motor vehicle ▪ driving or riding a vehicle (other than a commercial motor vehicle) for fee or reward ▪ performing as an entertainer ▪ performing work as an outworker where that work is governed by an award or industrial agreement that applies to 'outworkers' ▪ work of a minister, priest or other member of a religious order except a minister, priest, pastor, ordained minister, deaconess or lay priest of prescribed religious orders ▪ thoroughbred riding work performed by a licensed jockey.
<p>Tasmania</p>	<p>Persons engaged under a contract for services are not covered unless the contract is for work exceeding \$100 that is not incidental to a trade or business regularly carried out by the contractor. A contractor is not covered during any period for which they have personal accident insurance - s4B.</p>	<p>In Gig Definition = YES a Worker</p> <p>If the worker doesn't take out Insurance you need to inform the company who has made the temporary engagement and technically then they would be held accountable. Outworkers are specifically named as excluded</p>
<p>Northern Territory</p>	<p>No, unless determined an employee using the ATO Decision Tool.</p>	<p>In Gig Definition = YES a Worker</p> <p>https://www.ato.gov.au/calculators-and-tools/employee-or-contractor/</p>
<p>Australian Capital Territory</p>	<p>No, if employed under contract for services. However, there are provisions for the coverage of regular contractors.</p>	<p>In Gig Definition = YES a Worker</p> <p>"The simple answer is that they could be a worker, an employer or even both"</p> <p>https://www.accesscanberra.act.gov.au/app/answers/detail/a_id/2989/~/-workers-compensation#t:abs-5</p>

C'wealth Comcare	No, compensation only through employment of employees.	Yet to be tested
C'wealth Seacare	No, compensation only through employment of employees.	In Gig Definition = YES a Worker A Seafarer who is employed in any capacity
C'wealth DVA	Only if a 'declared member' — s8.	Not very likely
New Zealand	Yes	Yes



- Hirer (Buyer Beware)
- Unlikely Due to Hiring Process
- Not Yet Tested

Hirer



Seacare

 **MANAGE
DAMAGE**

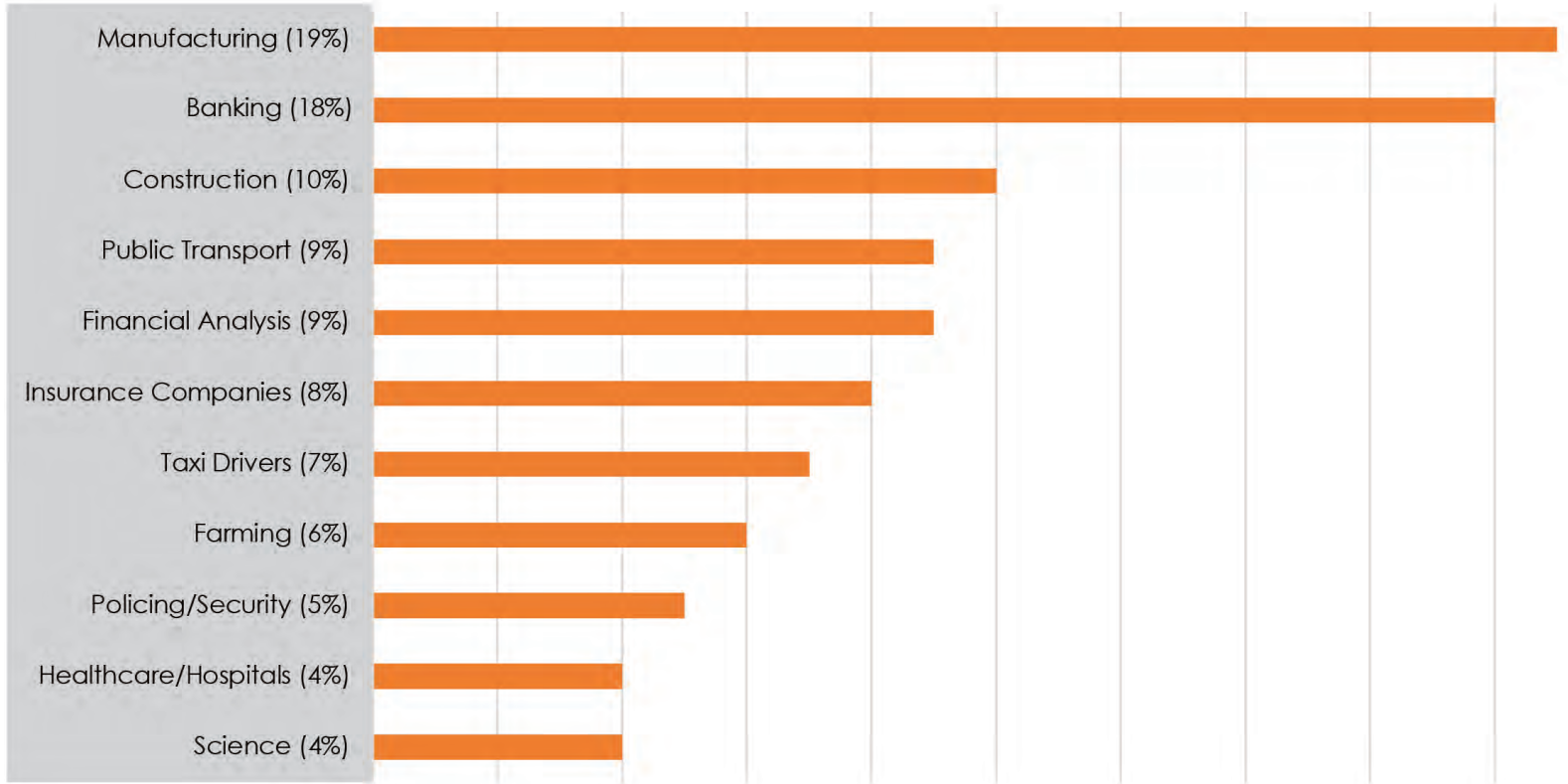


C'th DVA
Unlikely



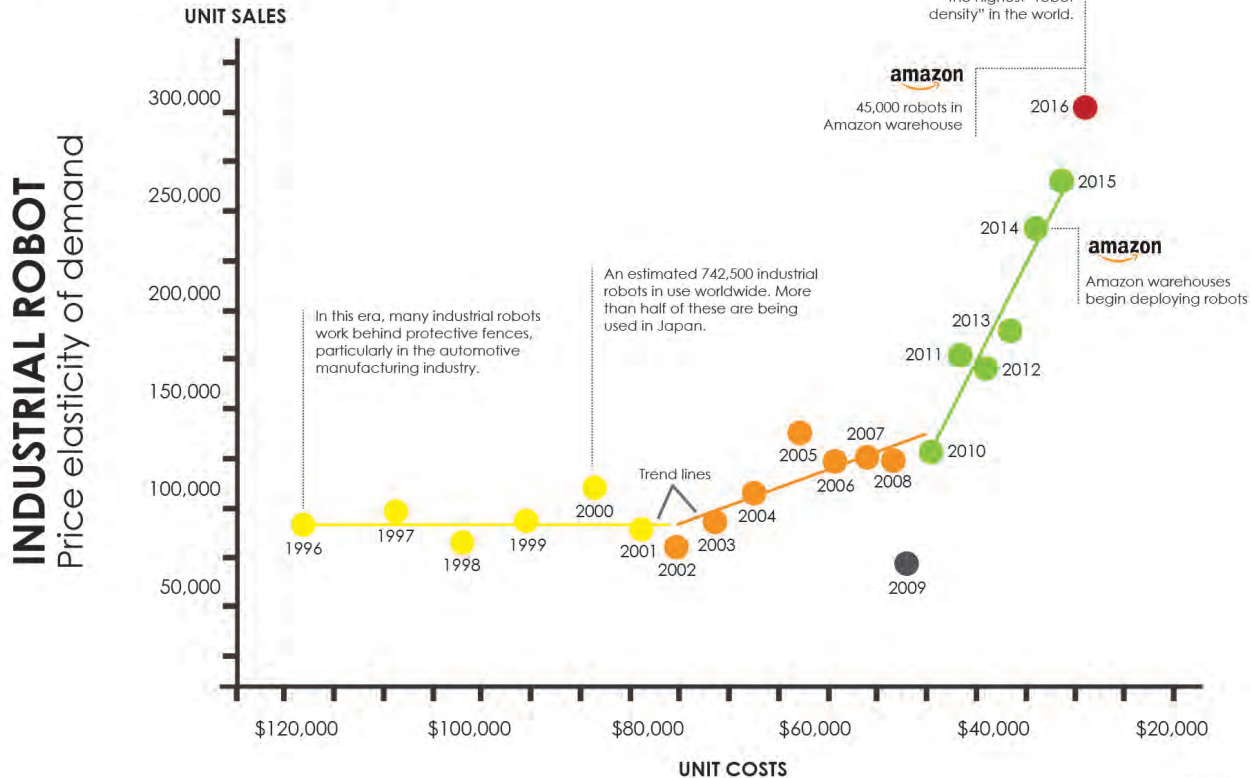
Australian Government
Comcare
Untested

Australian Employment in High Risk of AI/Robotic Replacement



THE NEAR FUTURE IS AUTOMATED

Production is increasing dramatically as robots become cheaper to produce



ARTIFICIAL INTELLIGENCE (AI)

TYPE 1

APPLIED AI – Systems that can perform specific tasks



WHAT IS AI?

Applied AIs use machine learning to learn and adapt without needing to be programmed. On the net, these AIs watch your activity and use it to make new suggestions.

Applied AIs can also be combined with sensors to create machines that can learn from the environment.

TYPE 2

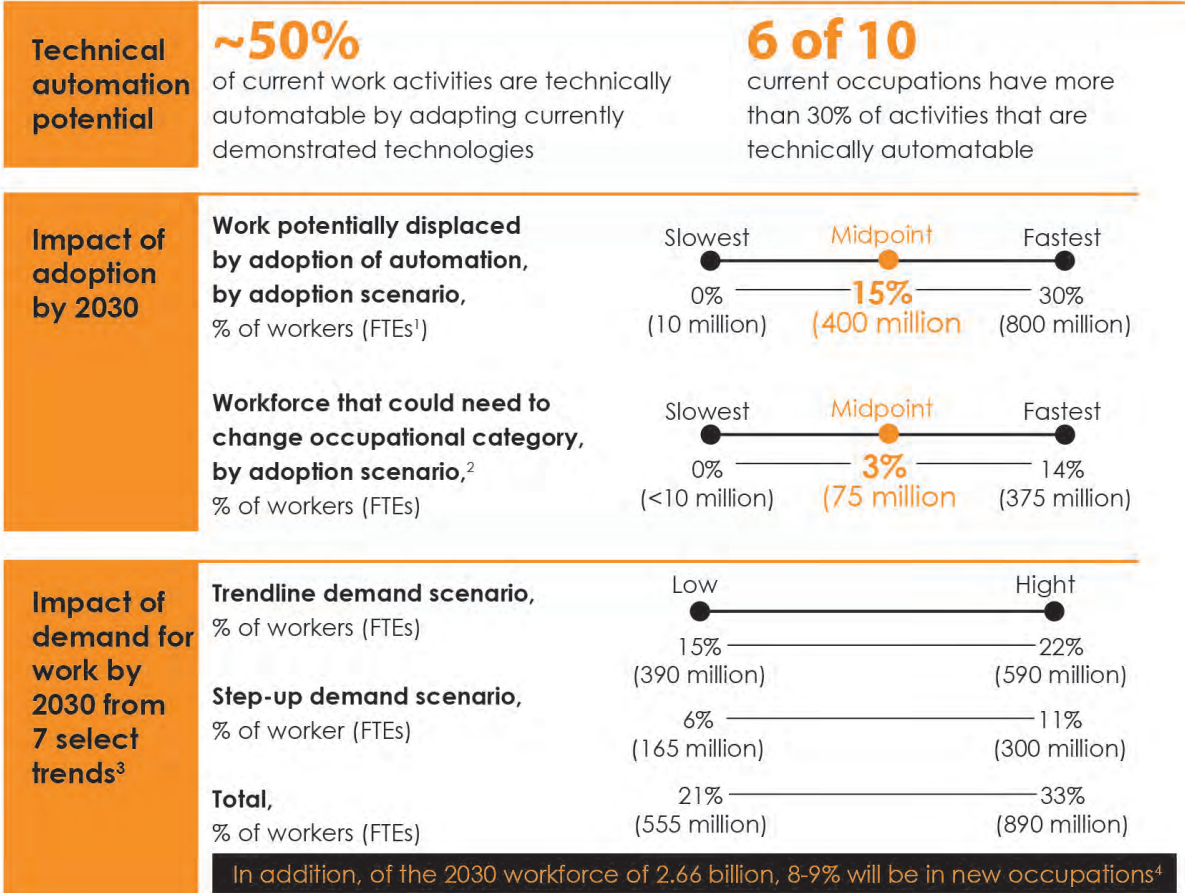
GENERALIZED AI – systems that can learn any task



Generalized AIs are AIs with human or above intelligence that can perform any task. They do not currently exist, but leading experts believe it may be on the horizon.

Artificial Intelligence is not just a technology of the future - it is here now & is everywhere around us

Automation will have a far-reaching impact on the global workforce.



In addition, of the 2030 workforce of 2.66 billion, 8-9% will be in new occupations⁴

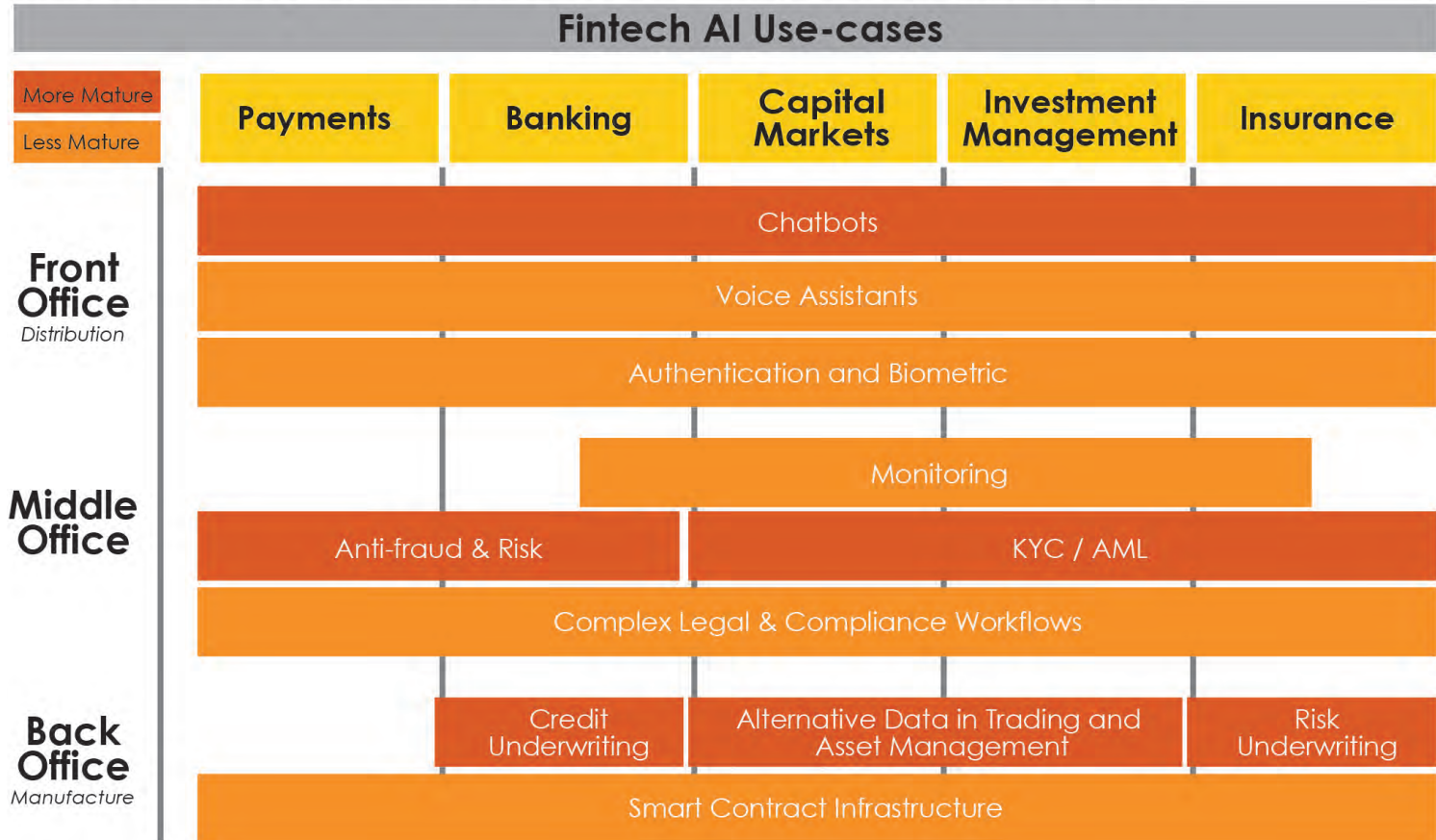
¹ Full-time equivalents.

² In trendline labor-demand scenario.

³ Rising incomes; healthcare from aging; investment in technology, infrastructure, and buildings; energy transitions; and marketization of unpaid work. Not exhaustive.

⁴ See Jeffrey Lin, "Technological adaptation, cities, and new work," Review of Economics and Statistics, Volume 93, Number 2, May 2011.

Artificial Intelligence is being applied across Financial Services



Source: Autonomous NEXT

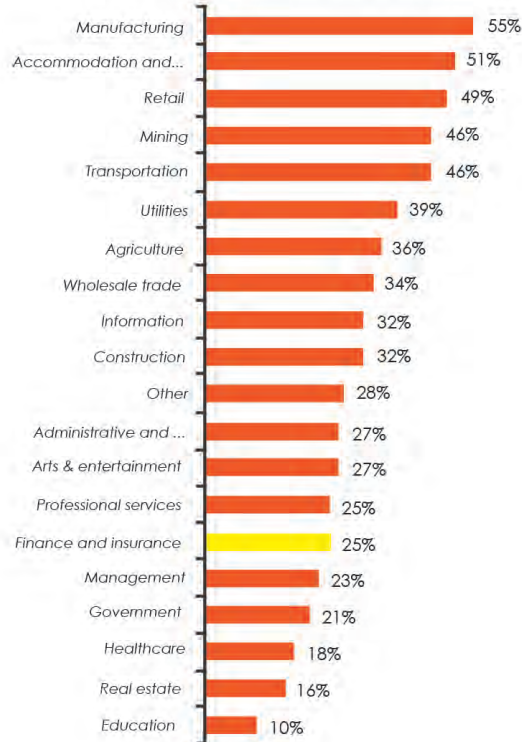
Scale

Our bottoms up analysis is consistent with other studies about the expected size of the impact from Artificial Intelligence on financial services

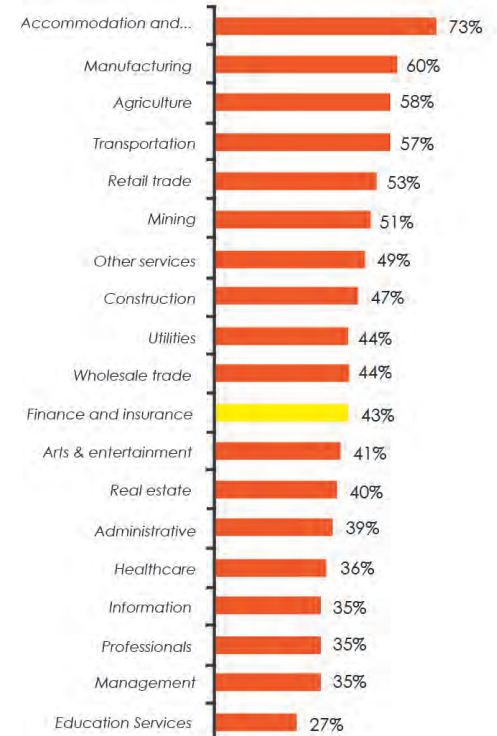
Brain sees a potential \$5.4 trillion shortfall in GDP by 2030, which would translate to \$1.1 trillion of associated GDP in the financial sector

Accenture sees AI adding \$1.2 trillion in financial services value by 2035

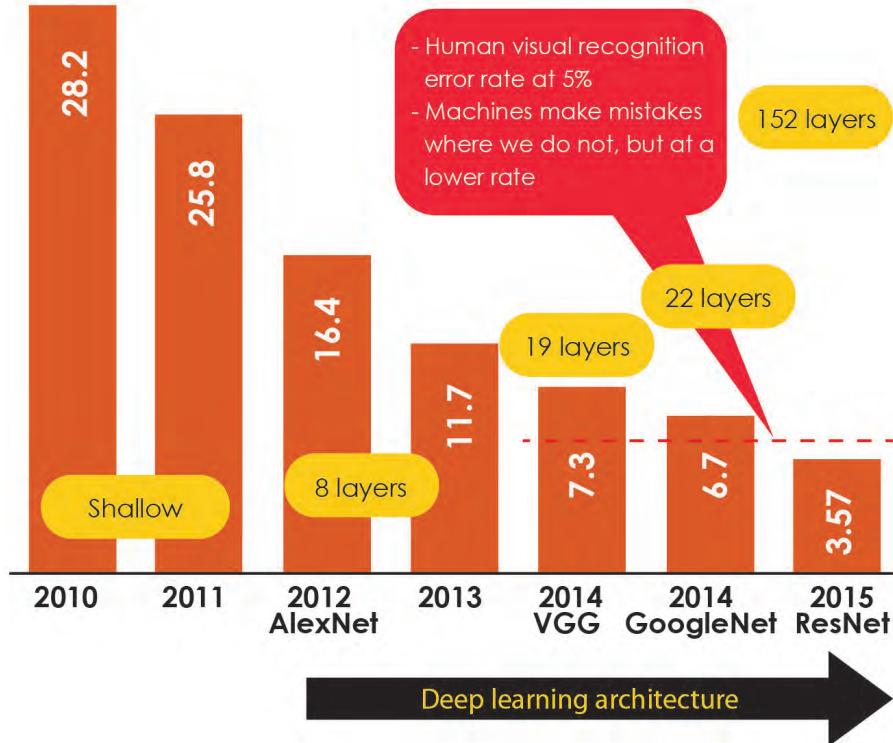
Productivity Gains from Automation (Bain 2018)



Automation Potential of Industry (McKinsey 2017)



Error Rate in Image Recognition in the ImageNet Competition (%)



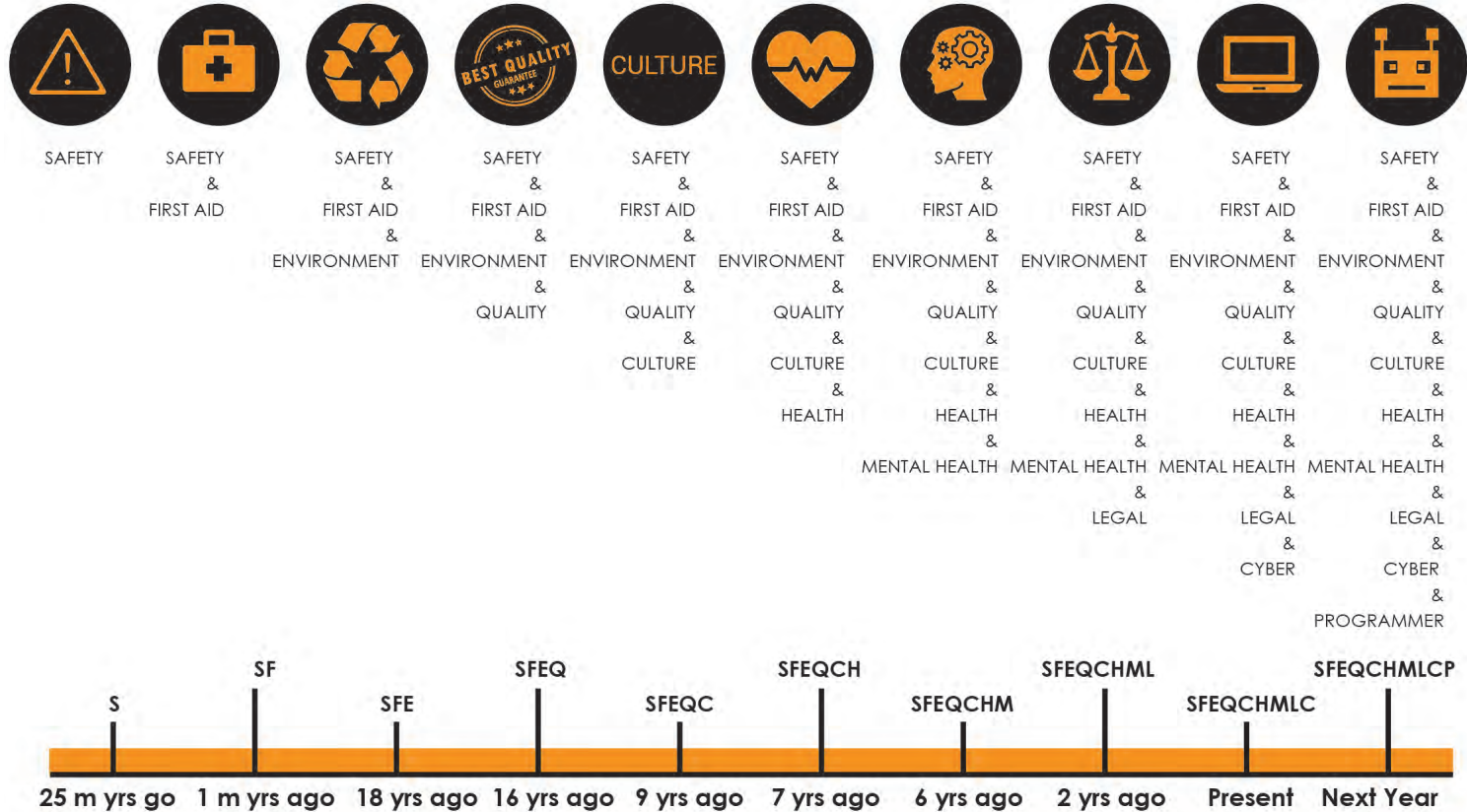
ImageNet is a project focused on powering visual object recognition software

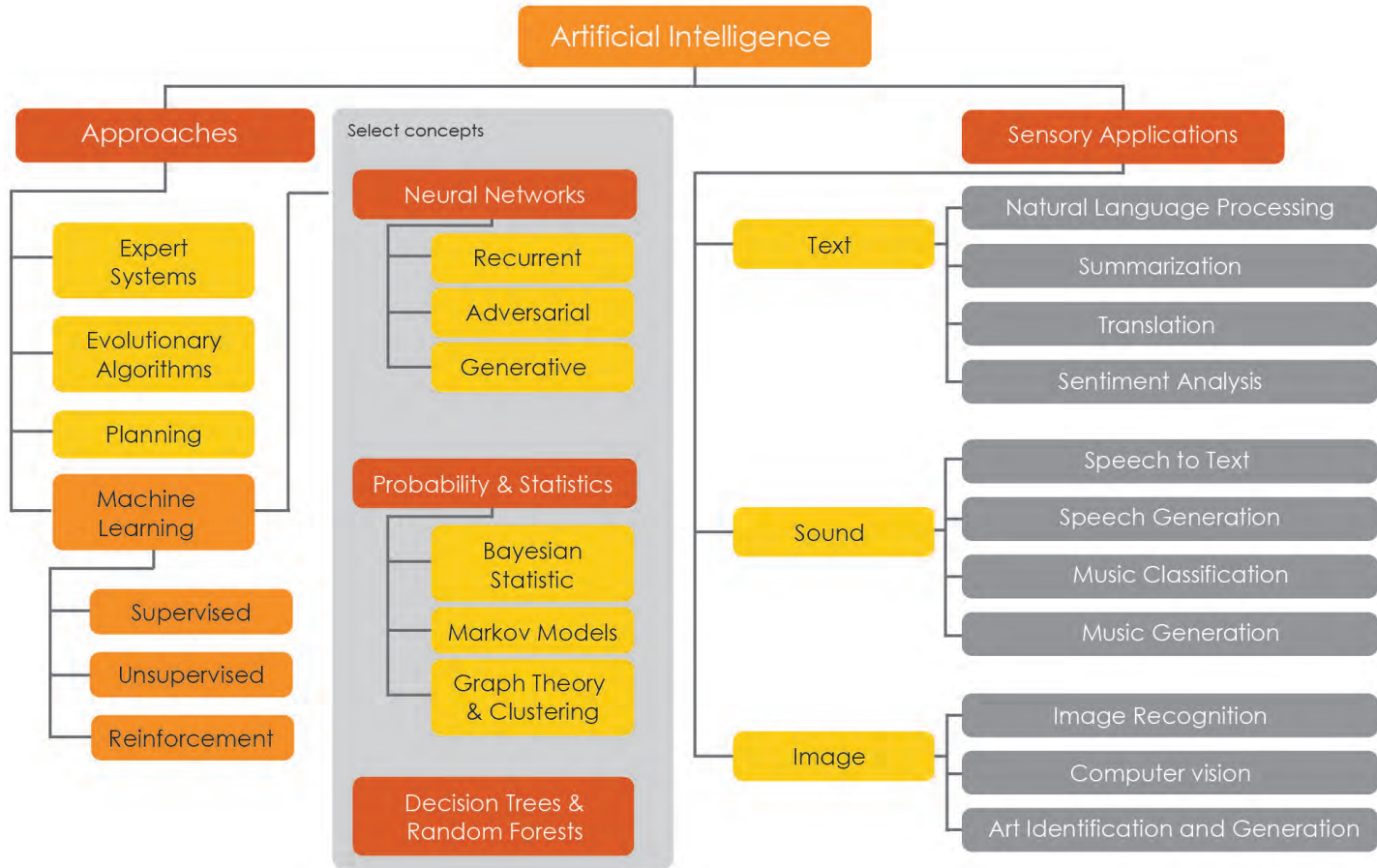
The ImageNet Challenge has been run since 2010, where teams of data scientists and developers compete to achieve high accuracy on machine vision tasks

A breakthrough in 2012, using neural networks on modern hardware, paved the way for machine vision that is more accurate than human vision on this particular data set

Source: Image Net, Paddle Paddle
(http://paddlepaddle.org/docs/develop/book/03.image_classification/index/.html); <https://www.dsiac.org/resources/journals/dsiac/winter-2017-volume-4-number-1/real-time-situ-intelligent-video-analytics>

EVOLUTION SAFETY-HUMAN

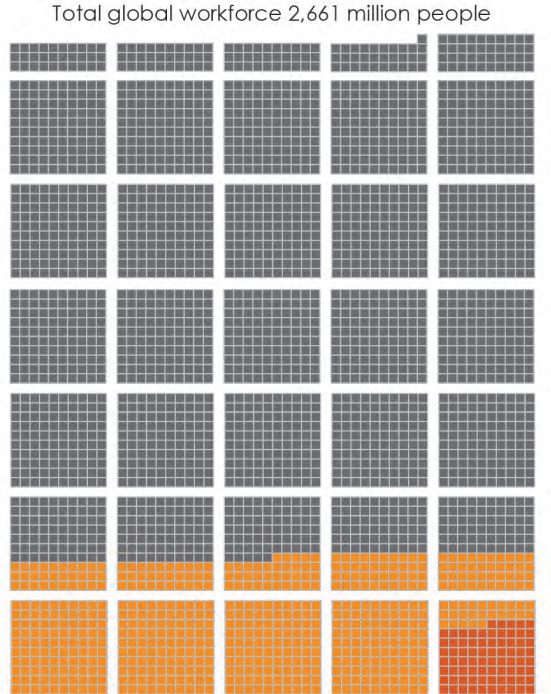
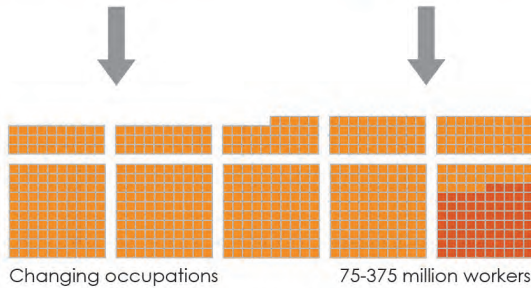
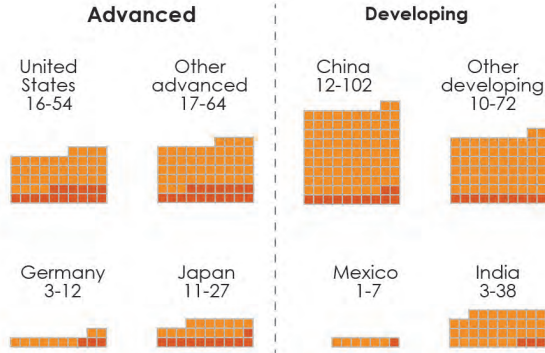




Globally, up to 375 million workers may need to switch occupational categories.

Number of workers needing to move out of current occupational category to go find work, 2016-30 (trendline scenario)¹

■ Midpoint automation ■ Additional from rapid automation adoption (each block = 1 million workers)



Up to 375 million workers or 14% of all workers affected by 2030

¹ some occupational data projected into 2016 baseline from latest available 2014 data
 McKinsey&Company | Source: US Bureau of Labor Statistic; McKinsey Global Institute analysis

APPENDIX

INTERVIEW

Interview with Jillian L Hamilton on Robotics & AI

LIAM KELLY

APPENDIX

LEGISLATIVE REVIEW

**Shortfalls of Legislation Regarding Artificial Intelligence &
Humanoid Robotics**

L KELLY & J L HAMILTON

The table below explains the major Artificial Intelligence Categories, their uses, their risks, controls and the protections available. Manage Damage Team Member Liam Kelly produced this.

ARTIFICIAL INTELLIGENCE RISK IDENTIFICATION AND POSSIBLE CONTROLS & PROTECTIONS

AI Technology	Description / Possible uses	Risks of use	Potential Controls	Protections available
1. Mobile Phones / Smart Devices	Storage of personal information and contacts, as well as internet search history and social media activity	Hackers could obtain personal information or tap into device systems such as cameras or microphones	Review any security permissions granted to third party apps prior to installation	Keep devices updated for security purposes Use password protection for accessing device
2. Social Media	Social media services use AI to selectively filter news and advertisements to the user	Overexposure to information that has been specifically selected to tailor to individual biases Privacy concerns regarding notificatio pop-up Risk of hacking or phishing schemes	Consider alternate sources for information rather than just a social media news feed Use different passwords for services. Never share account information	Review security settings to avoid potential privacy concerns Seek out social media alternatives that place greater emphasis on privacy and personal security
3. GPS	GPS systems utilise AI that factor in traffic data to determine ideal routes	GPS history can be reviewed to determine previous destinations Certain systems may be susceptible to hacking	Review GPS history and delete entries	Use trusted GPS applications on secure device
4. Spam filtering	Google's spam filtering employs AI to review content of emails so they can be categorised	Privacy concerns regarding Google analysing and storing the content of every email received	If concerned, consider alternate email services that place greater emphasis on privacy	Google will permanently delete stored emails after deletion of the account

5. Search engines	Search engines use AI to filter and select most relevant results	<p>Priority of results can be manipulated through search engine optimisation</p> <p>Certain search engines may censor or hide relevant links</p> <p>Search engine history can easily be reviewed by anyone using the same device</p>	<p>Review search engine history and delete entries</p> <p>Passively observe driver-less cars activities and intervene if it is about to perform an unsafe action</p>	Consider alternate sources of information or alternate search engines if you suspect manipulation of results
6. Driver-less cars	Driver-less cars use AI and sensory technologies to drive without a user	Collision due to systems error or mismatched priorities (i.e., car may veer off-road to avoid a collision but inadvertently cause more damage)	Perform risk assessment on automated technology to determine potential risks to worker safety	Do not use current driverless technologies until they have been determined to be reliable. Emergency stop systems
7. Automated machines	Automated machines use AI and sensory technologies to perform work without the need for a user	Damage or injury due to malfunction or corrupted priorities	Perform risk assessment on robots to determine risks to safety	Only utilise automated machinery that has been certified for safe use
8. Robots	Robots are a form of mobile automated machine that uses AI and sensory technology	Damage or injury due to malfunction or corrupted priorities	Perform continuous assessments over course of lifetime	<p>Emergency stop systems</p> <p>Use robots certified for safe use</p> <p>Discuss safety concerns with designer/ manufacturer</p>

LEGISLATION REVIEW: WORK HEALTH AND SAFETY ACT 2011 (QLD)

Liam Kelly of Manage Damage created the following table, which highlights the current shortfalls of today's legislation structures. To acknowledge Artificial Intelligence and Humanoid Robotics in the workplace, the Queensland Work Health and Safety Act has been developed by the Model Act for Occupational Health and Safety for Australia, and thus has a number of similarities to other Australian State legislation.

SECTION	DESCRIPTION	SHORTFALL FOR AI	ISSUES	RECOMMENDATIONS AND SOLUTIONS
S7 - Meaning of worker	Outlines the current definition of workers	No mention of AI or electronic workers	Electronic personhood will likely need to be considered for certain work tasks	Addition of: (a) the type of worker (human or electronic)
S8 - Meaning of workplace	Outlines the current definition of workplace	Does not mention workplace AI	Large AI systems could be considered workplaces. (e.g., vehicles can be considered workplaces; do driverless vehicle workplaces then count as an AI workplace?)	Additional requirements regarding the operation and management within AI workplaces
S10 - Act binds all persons	Specifies that the Act applies to all persons (inc. businesses, State, & the Commonwealth)	Need to apply Act to AI / robotic systems to enable workplace use	If AI is not bound by the Act then there are difficulties in determining liability	Specify that the Act binds all persons including AI / robotic systems
S17 - Management of risks	Outlines the requirements for the management of workplace risks	Does not consider AI technologies to aid in management of risk	Als will likely be able to identify risks that are undetectable to normal persons	Addition of a requirement to use risk-identifying Als in high-risk workplace environments Addition of requirements to address identified risks from specialised Als

S19 - Primary Duty of Care	Outlines the PCBUs duties to ensure that risk to workers is minimised	No mention of duties of AI / robotics if they are in a supervisory role (officer)	Officer AIs would be required to uphold the duties outlined in this section	Specify that the Primary Duty of Care applies to AI / Robots. Expand section relating to the safe use, handling, and storage of plant to include AI / robots.
S20 - Duty of persons conducting businesses or undertakings involving management or control of workplaces	Outlines the duties of the person with management control at a workplace	No mention of duties of AI / robotics if they are in a supervisory role (officer)	Officer AIs would be required to uphold the duties outlined in this section	Specify that the duties outlined in this section apply to officer AI / Robots.
S21 - Duty of persons conducting businesses or undertakings involving management or control of fixtures, fittings or plant at workplaces	Outlines the duties regarding management of control of fixtures, fittings or plant	Does not include workplace management of AI or robots No mention of duties of officer AI / Robots	AI / Robotics will have unique management requirements from plant and will need to be addressed separately	Additional specifications regarding the management of AI systems and robots
S22 - Duties of persons conducting businesses or undertakings that design plant, substances or structures	Outlines the duties regarding the design of plant, substances or structures	Does not include the duties regarding the design of AI or robots	AI / Robotics will have unique design requirements compared to plant	Additional specifications regarding the design of AI systems and robots
S23 - Duties of persons conducting businesses or undertakings that manufacture plant, substances or structures	Outlines the duties regarding manufacture of control of fixtures, fittings or plant	Does not include the duties regarding the manufacture of AI or robots	AI / Robotics will have unique manufacturing requirements compared to plant	Additional specifications regarding the manufacture of AI systems and robots
S24 - Duties of persons conducting businesses or undertakings that import plant, substances or structure	Outlines the duties regarding the importing of control of fixtures, fittings or plant	Does not include the duties regarding the importing of AI or robots	AI / Robotics will have unique importing requirements compared to plant	Additional specifications regarding the importing of AI systems and robots

S25 - Duties of persons conducting businesses or undertakings that supply plant, substances or structures	Outlines the duties regarding the supply of control of fixtures, fittings or plant	Does not include the duties regarding the supply of AI or robots	AI / Robotics will have unique supply requirements compared to plant	Additional specifications regarding the supply of AI systems and robots
S26 - Duty of persons conducting businesses or undertakings that install, construct or commission plant or structures	Outlines the duties regarding the installation of control of fixtures, fittings or plant	Does not include the duties regarding the installation of AI or robots	AI / Robotics will have unique installation requirements compared to plant	Additional specifications regarding the installation of AI systems and robots.
S27 - Duties of officers	Specifies the duties of officers and requirement to exercise due diligence in carrying out duties	Does not include duties for electronic officers	AI / Robotic can exercise due diligence in carrying out duties listed in this section	Include "electronic officers" to have the same duties as listed in this section
S28 - Duties of workers	Specifies the duties of workers to take reasonable care for their own safety and others	No mention of duties of AI/robotics as workers	These duties will apply if AIs are considered electronic persons	Wording in this section does not need to be changed so long as workers include electronic persons
Division 5 - Offences and Penalties (incl. S30-34)	Expands on the penalties applied upon failure to uphold duties	Does not consider penalties for non-human persons	There is a need to consider penalties for damages caused by AI / Robots as well as circumstances of dual liability between duty holders	Introduction of a new class of penalties that considers input from the designer, manufacturer, imparter, or supplier (or other persons) to determine liability

S42 – Requirements for authorisation of plant or substance	Outlines the requirements regarding permitted use of plant	No mention regarding the use of unauthorised / regulated AI or robot systems	There will likely be certain classes of AI / Robotic systems that are regulated or require authorisation for use	An additional section or addendum to the current requirement to specify the requirements for authorisation of AI / Robots New guides will have to be written that cover the ethics and safety in design for robots and AI systems
S46 – Duty to consult with other duty holders	Outlines the requirement for consultation, coordination and cooperation between persons with the same duties	Does not specify requirements for duty holders to consult with regards to AI / Robotics.	The requirements for manufacturers, designers, importers, and suppliers will extend to AI / Robotics	Wording in this section may not need to be altered, but the specific duties of described parties will need to be well-understood by those who wish to use AI / Robotics. Consider duty to consult to workers on the installation of robotics
S50 – Request for election of health and safety representative	Specifies that workers may elect one or more health and safety representatives	Does not consider health and safety representative as electronic persons	AI / Robotics could fulfil the role of health & safety representative in workplace. Workers may request advice or assistance from AI representatives	Specify that AIs / Robotics can fulfil the requirements of Health & Safety Representatives and may be required to fulfil this role in high-risk workplaces.
S51 – Determination of work groups	Outlines the requirement for PCBUs to establish work groups upon request	No consideration regarding the creation of AI work groups	AI / Robotics work groups may be established within the workplace (and may be required for sufficiently hazardous activities)	Addition of a specification that AI / Robots can be ordered into work groups

<p>Division 4 Health and Safety committees (inc. S60-67)</p>	<p>Outlines the requirement for the PCBU to establish a health and safety committee</p>	<p>No consideration regarding role of AI in health and safety committees</p>	<p>High-risk industries may require AI / Robotic workers to provide input in Health and Safety committees</p>	<p>Inclusion of a potential requirement for a specialized AI / Robot to be included in Health and Safety Committees</p> <p>Otherwise language can stay the same but consideration must be made for increased role of AI in Health & Safety representation</p>
<p>Division 5 Issue Resolution (inc. S80-82)</p>	<p>Outlines the requirements with regards to issue resolution (i.e., resolving disputes relating to workplace health & safety)</p>	<p>No consideration for role of AI workers and potential disputes between electronic and human personnel</p>	<p>Considerations will have to be made regarding how AI / Robotics will factor into issue resolution</p>	<p>Disputes will likely need to be mediated by a human representative on behalf of the AI / Robotic system</p> <p>Legal precedence may need to be set before it is clear how these issues will normally be resolved</p>
<p>Division 6 Right to cease or direct cessation of unsafe work (inc. S83-89)</p>	<p>Outlines the situations in which workers can refuse to perform work that may pose a risk to their health & safety</p>	<p>Does not consider the role of AI risk identifiers and what conclusions they may come to regarding working operations</p>	<p>As stated, AI / Robotics may be better equipped to determine whether work being carried out is unsafe</p>	<p>An additional specification that specialised AI / Robots may be able to direct cessation of unsafe work if it is determined</p>

LEGISLATION REVIEW: WORK HEALTH AND SAFETY REGULATION 2011 (QLD)

Liam Kelly of Manage Damage created the following table, which highlights the current shortfalls of today's legislation structures. To acknowledge Artificial Intelligence and Humanoid Robotics in the Workplace, the Queensland Work Health and Safety Regulation has been developed by the Model Regulation for Occupational Health and Safety for Australia, and thus has a number of similarities to other Australian State legislation.

SECTION	DESCRIPTION	SHORTFALL FOR AI	ISSUES	RECOMMENDATIONS AND SOLUTIONS
S8 - Meaning of Supply	Defines supply as not including persons who do not control the supply or have authority over the supply	There are duties for supply of plant that would be expected to extend to supply of AI	Must consider specific duties that apply to the suppliers of AI / Robots	Potential specifications of unique requirements regarding supply of AI / Robots. Otherwise language in this section can remain the same
S17 - Matters to be taken into account in negotiations [with regards to work groups]	Outlines the requirements involved in specifying and determining work groups	No mention of AI / Robotic work groups	AI / Robotic work groups will likely be required for high-risk workplaces	It is expected that determination of work groups would require specifying whether the worker is electronic, ie: <ul style="list-style-type: none"> • (a) the type of worker (human or electronic)
S23 - Default Procedure [with regards to Issue Resolution]	Outlines the procedures required in issue resolution	No mention of role of AI / Robots in issue resolution	Unique procedures for disputes between electronic and human workers will need to be determined	Additional specifications regarding procedures to be carried out between human and electronic workers AIs will likely need to be represented by a human for these matters
S35 - Management of risk	Outlines the requirements for PCBUs to manage risk as far as is reasonably practicable	No mention of the role of AI / Robots in risk identification	Specialised AI / Robotic systems may be able to identify and manage risk that are undetectable by regular human workers	The language in this section can remain the same, but consideration should be made regarding risks identified by AI / robot workers and the requirements for PCBUs to adhere to their recommendations

S36 - Hierarchy of Control Measures	Provides an overview of the accepted hierarchy of control measures for managing risk (Elimination, substitution, isolation, engineering controls, administrative controls, PPE)	No mention of AI / Robot systems as a potential engineering control	Specialised AI / Robotic systems may be able to make determinations regarding the best application of the hierarchy of control measures	Use of AI in risk management may be considered an engineering control, but also may fall under its own category as it may become indispensable in certain high-risk industries
S37 - Maintenance of control measures	Outlines the requirements for the maintenance of control measures used to minimise risk	No mention of requirement to maintain AI if it is used as a control measure to minimise risk	Als / Robots being used as an engineering control will likely require maintenance to ensure they are operational	Additional specification to ensure that AI controls are being maintained so as to ensure their correct operation
S38 - Review of control measures	States the requirements for a PCBU to review and update control measures if required	Does not consider the role of AI in review of control measures	Specialised AI / Robots will likely be able to review control measures more efficiently than human workers	Additional specification for PCBUs to employ Als in review of control measures for high-risk workplaces
S39 - Information, training and instruction	Outlines requirements to ensure that workers adequate training regarding the nature of their work	Does not specify training requirements for electronic persons	AI / Robotic workers will likely need to be trained in specific tasks, but the method of teaching them may differ	Potential introduction of "training data" that can be uploaded into AI systems to qualify them for an area of work. Additional specifications regarding unique requirements for electronic workers may need to be outlined under this section
S42 - Duty to provide first aid	Outlines the requirements for PCBUs to ensure that workers can receive first aid in the event of an incident	Does not consider the role of AI in applying or receiving first aid	Specialised AI/Robots may be able to perform first aid procedures on site.	Electronic workers who have been damaged may have their own "first aid" requirements, though this may just be considered maintenance/ repairs

			Damage AI/Robots may have unique requirements for "first aid" or repair	For high-risk industries, it may be necessary to include a requirement for first aid robots to be available in the event of an incident
S43 – Duty to prepare, maintain and implement emergency plan	States the requirements for a PCBU to implement an emergency plan for the workplace	Does not consider the role of AI /robotic systems in the development of emergency plans Does not consider the role of AI / Robotic systems in carrying out emergency plans	AI / Robotic systems may be able to analyse and determine best course of action with regards to development of emergency plans Certain classes of AI / Robot may be able to mount rescues in the event of an emergency	An additional stated requirement for emergency AI / Robotic systems for high-risk workplaces
S44 – Provision to workers and use of personal protective equipment	States the requirements of the PCBU to ensure that PPE is provided to workers	Does not consider PPE requirements for robotic systems.	Certain robotics / AI systems may be exempt from PPE requirements, or they may have their own unique PPE requirements (e.g., water protection)	Expansion of this section to include consideration for AI / Robotic personnel and their PPE requirements or lack thereof
S48 – Remote or isolated work	Outlines requirements for remote or isolated work (inc. specification to be able to communicate with worker in isolation)	Does not consider role of AI / Robotics in remote or isolated work	Robots / AI will likely have different requirements with regards to isolated work. Psychosocial stressors are not expected to apply to AI / Robots	A potential requirement for work that requires extreme isolation to be carried out by an electronic worker rather than a human.
S49 – Ensuring Exposure standards for substances etc. not exceeded	Outlines the requirements to ensure exposure standards to a hazardous substance is not exceeded	Does not consider role of AI / Robotics in workplace monitoring and	Robots / AI can use sensors that will allow them to continuously monitor the workplace	A potential requirement for workplaces that utilise hazardous materials to employ AI / Robots who are able to perform workplace monitoring and direct

<p>S50 - Monitoring airborne contami- nant levels</p>		<p>determin- ing exposure levels</p>	<p>Robots / AI may be exempt from requirements if they are unharmed by airborne contaminants</p>	<p>direct cessation of work if conditions become unsafe</p> <p>A specification for electronic workers to be exempt from safety requirements if it is determined they would not be harmed by airborne contaminants</p>
<p>S51 - Managing risks to health and safety [with regards to hazardous atmos- pheres]</p>	<p>Outlines the requirements to determine if an atmosphere is hazardous and manage it accordingly</p>	<p>Does not consider role of AI / Robotics in determin- ing safe atmospheric levels</p>	<p>Robots / AIs can use sensors that can determine oxygen levels as well as concen- tration of potential poisons / contaminants in the atmos- phere</p>	<p>A potential require- ment to use specialised monitor- ing AIs in workplaces where the atmos- phere may become hazardous</p> <p>An exemption for electronic workers who would not be harmed by hazard- ous atmospheres</p>
<p>S54 - Manage- ment of risk of falling objects</p>	<p>Outlines the requirements of PCBUs to manage the risk of falling objects in the workplace</p>	<p>Does not consider role of AI / Robots in identifying risks</p> <p>Does not consider role of AI / Robots in posing a risk as a falling object</p>	<p>Robotic systems could pose a risk to workers if they topple and injure human personnel</p> <p>Robotic systems could also identify and manage potential falling hazards</p>	<p>Language in this section can likely remain the same; however PCBUs must consider the risk of AI / Robotic workers based on their size and the jobs they are performing (e.g., whether they are working at height)</p>
<p>S57 - Manag- ing risk of hearing loss from noise</p>	<p>Outlines the requirements for PCBUs to manage the risk of hearing loss to workers</p>	<p>Does not consider role of AI in monitoring sound level</p>	<p>AIs with sensors can determine overall sound exposure.</p> <p>AIs / Robotics will likely have different requirements with regards to acceptable levels of sound exposure</p>	<p>Consider a require- ment for noise-sens- ing AIs to monitor workplace noise and direct cessation of work if unsafe</p> <p>This section may also need to specify an exemption from the requirement to manage noise exposure to AIs if it is</p>

				deemed they will be unharmed from the exposure
S60 – Managing risks to health and safety [from hazardous manual tasks]	Outlines the requirements for PCBUs to manage risk of musculoskeletal disorders emerging from hazardous manual tasks	Does not consider the unique role of AI / Robots in performing hazardous manual tasks	Certain AI/Robots will be able to perform hazardous manual tasks with significantly reduced risk of damage compared to humans	Consider a requirement for robots to perform hazardous manual tasks that have been associated with the development of a musculoskeletal disorder.
S61 – Duties of designers, manufacturers, importers and suppliers of plant or structures	Outlines the duties that apply to designers, manufacturers, importers and suppliers of plant	Does not mention duties relating to AI / Robotics	The requirements of the listed duty holders can be expected to extend to AI systems	Additional specifications are required in this section that specify the duties of designers, manufacturers, importers, and suppliers of AI / robotic systems
Part 4.3 – Confined Space	This part defines “confined space” and outlines the various responsibilities PCBUs have to ensure worker safety in these conditions	Does not consider role of AI / Robotics in confined spaces. No mention of electronic persons	AI / Robotics can be expected to perform work in confined space without serious risk to themselves	Work in confined spaces may need to be restricted to AI / Robotic systems in sufficiently hazardous situations.
Part 4.5 – High risk work	This part defines “high risk work” and outlines the various responsibilities PCBUs have to ensure worker safety in these conditions	Does not consider role of AI / Robotics in performing high risk work. No mention of electronic persons	AI / Robotic work groups may be required to undertake high-risk work instead of human personnel due to their ability to withstand certain conditions	It may be necessary to specify that only electronic personnel can perform high-risk work in situations where it has been determined that they are not at significant risk of being damaged
S167 – Diving Work	Outlines the requirements for persons performing diving work	Does not consider role of electronic workers who can withstand diving conditions	Specialised diving robots may be employed to perform high-risk work due to their unique requirements	An exemption for the requirements for AI / Robotics under this section and an outline of new requirements (i.e., the robot must be designed specifically for designing and must be able to be trained)

S168 - Person conducting business or undertaking must ensure fitness of workers [with regards to diving]	Outlines specific fitness requirements for persons performing diving work	Does not consider role of electronic workers who can withstand diving conditions	Specialised robots will not need to demonstrate human fitness to perform diving work	An exemption for the requirements for AI / Robotics under this section and an outline of new requirements (i.e., the robot must be designed specifically for designing and must be able to be trained)
Part 5.1 - General duties for plant and structures	This part outlines the general requirements with regards to plant and structures	No mention of AI / Robots	The duties of plant under this should also apply to AI / Robotics	Introduction of a new part of an addendum to this section that covers the General duties for AI and Robots
S187 - Provision of information to manufacturer	Specifies the requirements of the plant designer to consult with the plant manufacturer regarding associated risks	No mention of AI / Robots	The duties of plant under this should also apply to AI / Robotics	Requirements for the provision of information between designer and manufacturer will need to be established for AI / Robots (Likely based on an extension of the plant requirements listed in this section)
S188 - Hazard identified in design during manufacture	Specifies the requirements for manufacturers to communicate with designers in the event of identified hazards during manufacture	No mention of AI / Robots	The duties of plant under this should also apply to AI / Robotics	Requirements for the provision of information between designer and manufacturer will need to be established for AI / Robots
S193 - Control of risks [regarding undertakings that manufacture plant]	Specifies the duties to control risk that apply to manufacturers of plant	No mention of AI / Robots	The duties of plant under this should also apply to AI / Robotics	Requirements under this section are expected to extend to AI / Robotics and should have their own sections or addendums to address this

S196 – Information to be obtained and provided by importer	Specifies the information that importers must take reasonable steps to obtain	No mention of AI / Robots	The duties of plant under this should also apply to AI / Robotics	Requirements under this section are expected to extend to AI / Robotics and should be addressed in their own section.
S197 – Control of risk [regarding importing of plant]	Specifies the duties to control risk that apply to importers of plant	No mention of AI / Robots	The duties of plant under this should also apply to AI / Robotics	Requirements under this section are expected to extend to AI / Robotics and should be addressed in their own section
S198 - Information to be obtained and provided by supplier	Specifies the information that suppliers must take reasonable steps to obtain	No mention of AI / Robots	The duties of plant under this should also apply to AI / Robotics	Requirements under this section are expected to extend to AI / Robotics and should be addressed in their own section
S199 - Supply of second-hand plant - duties of supplier	Outlines the requirements for suppliers of second-hand plant to take reasonable steps to identify faults and provide written notice of the condition of the plant	No mention of AI / Robots	The duties of plant under this should also apply to AI / Robotics	Requirements under this section are expected to extend to AI / Robotics and should be addressed in their own section
S200 - Second-hand plant to be used for scrap or spare parts	Outlines the requirements to specify that second-hand plant must be used for scrap before supply	No mention of AI / Robots	The duties of plant under this should also apply to AI / Robotics Potential ethical considerations may eventually be necessary when considering disposal of AI / robots	Requirements under this section are expected to extend to AI / Robotics and should be addressed in their own section Sufficiently intelligent robots / AIs may have their unique requirements regarding decommission / dismantling due to ethical concerns

S201 – Duties of persons conducting businesses or undertakings that install, construct or commission plant	Outlines the requirements for installation of commission of plant to be in accordance with information provided by the manufacturer, supplier, designer, or importer of the plant	No mention of AI / Robots	The duties of plant under this should also apply to AI / Robotics	Requirements under this section are expected to extend to AI / Robotics and should be addressed in their own section
S204 – Control of risks arising from installation or commissioning	Specifies the duties to control risk that apply to installers or commissioners of plant	No mention of AI / Robots	The duties of plant under this should also apply to AI / Robotics	Requirements under this section are expected to extend to AI / Robotics and should be addressed in their own section
S205 - Preventing unauthorised alterations to or interference with plant	Outlines the requirement for the person with management or control of plant at a workplace to prevent unauthorised alterations to plant	No mention of AI / Robots	The duties of plant under this should also apply to AI / Robotics, though it may be difficult to determine what counts as plant alteration with machine-learning AIs, who are consistently learning from the environment to inform their behaviour	Requirements under this section are expected to extend to AI / Robotics and should be addressed in their own section. Consideration should be made for what exactly constitutes an unauthorised alteration to an AI or robotic system.
S206 - Proper use of plant and controls	Outlines the requirement for the person with management or control of plant to ensure that plant is being used correctly by persons	No mention of AI / Robots	AI / Robotics may not be “used” by workers as plant is. In this case the requirements listed in this section could apply to AI / Robots that appear to be acting beyond their usual parameters	A requirement to ensure that AI / Robotic systems are working according to specifications and are demonstrating no unusual outward behaviour

S211 - Emergency stops	Outlines the requirements for the person with management or control of plant to ensure the correct form of emergency stop are installed if necessary	No mention of AI / Robots	AI / Robotics will likely need an emergency stop function (potentially remote activated) if its actions are posing a risk to human workers, or if it is malfunctioning in any way that could cause harm	Requirement for the implementation of emergency stop systems for AI / Robots that could potentially cause harm to human workers
S212 - Warning devices	Outlines the requirements for the positioning of warning devices in a workplace if they are being used	No mention of AI / Robots	AI / Robots may be fitted with warning devices if it detects dangerous activities or is malfunctioning	Requirement for certain AI / Robotic systems to have in-built warning devices to alert workers
S213 - Maintenance and inspection of plant	Outlines the requirements for the person with management or control of plant to ensure that required maintenance and inspection is performed	No mention of AI / Robots	The duties of plant should also apply to AI / Robotics, though they will likely have unique requirements that distinguishes them from plant	Requirements under this section are expected to extend to AI / Robotics and should be addressed in their own section with additional considerations made regarding the persons required to perform maintenance and inspections
S214 - Powered mobile plant - general control of risk	Outlines the responsibility to determine that plant will not overturn, collide, or experience mechanical failure, as well as responsibility to determine that operators of plant are not at risk	No mention of AI / Robots	The duties of plant under this section should also apply to AI / Robotics, though it is unlikely that AI systems will often require human operators	Requirements under this section are expected to extend to AI / Robotics and should be addressed in their own section with potential alterations made regarding the control of risk for operators

S215 - Powered mobile plant - specific control measures	Outlines the specific actions to take to avoid potential risks outlined above	No mention of AI / Robots	The duties of plant under this should also apply to AI / Robotics, though it is unlikely that AI systems will often require human operators	Requirements under this section are expected to extend to AI / Robotics and should be addressed in their own section with potential alterations made regarding the control of risk for operators
S219 - Plant that lifts or suspends loads	Outlines the requirements for the person with management or control of plant to manage risks associated with plant that lifts or suspends loads	No mention of AI / Robots	The duties of plant under this section should also apply to AI / Robotics (i.e., the robot must be designed to be able to lift or suspend loads)	Requirements under this section are expected to extend to AI / Robotics and should be addressed in their own section
S220 - Exception - Plant not specifically designed to lift or suspend a person	Outlines the requirements for lifting personnel if the plant was not originally designed for that purpose	No mention of AI / Robots	Large AI systems will likely follow the same requirements for plant under this section	Requirements under this section are expected to extend to AI / Robotics and should be addressed in their own section
S222 - Industrial Robots	Outlines the requirements for management or control of an industrial robot	No mention of AI / Robots	The role of robots in industry is expected to greatly expand and include additional risks to plant	Additional risks to consider include privacy concerns from AI monitoring, lack of maintenance resulting in malfunctions, environmental factors
S226 Plant with presence-sensing safeguarding system -records	Outlines the requirements for presence-sensing safeguards to be recorded, monitored, and maintained	No mention of AI / Robots	Robotic systems that contain moving parts that could be damaging to humans will likely utilise presence-sensing systems	The specifications outlined in this section of the regulations would also apply to Robotic presence-sensing systems

Part 5.2 – Additional duties relating to registered plant and plant designs	This part outlines the requirements for certain plant to be registered	No mention of AI / Robots	Certain AI / Robotic systems will likely require registration	Additional specification under this part concerning registration of AI / Robots
S228 – Records and information [with regards to Duty of person conducting a business or undertaking who designs plant to record plant design]	Outlines the requirements to take records on plant that requires registration inc. risk controls, and the requirement to provide this information to the manufacturer	No mention of AI / Robots	Registered AI / Robots will require similar records and specifications of controls used to minimise risk	The specifications for plant outlined in this section should be separately applied to AI / Robots
S237 – Records of plant	Outlines additional requirements to record tests, inspections, maintenance, de/commission, dismantling, and alterations of registered plant	No mention of AI / Robots	Registered AI / Robot systems will require records to be taken for all actions listed under this section	The specifications for plant outlined in this section should be separately applied to AI / Robots
S238 – Operation of amusement devices	Outlines the requirements for amusement devices to be tested without participants under the supervision of a competent person in a manner that does not pose a risk to health and safety	No mention of AI / Robots	If is conceivable that AI / Robotic systems could be used as entertainment/ amusement devices. The relevant risks to persons interacting with these AIs must be controlled	Depending on the nature of the device (i.e., robot dancers) it is likely that the list of risks will need to include other considerations such as risk of "amusement AI" malfunction, ethical concerns, and potential psychosocial effects

S243 - Plant design to be registered	Schedule 5 lists the elements of plant design to be registered in accordance with this section of the Regulations	No mention of AI / Robots	Certain intelligent AI / Robotic systems will undoubtedly require registration under new criteria than is currently available under Schedule 5	The list under Schedule 5 should be expanded to include a number of potential AI / Robotic systems inc. monitoring AIs, AIs that perform hazardous manual tasks, and AIs that may have authority over the workplace (officer AIs)
S244 - Altered plant designs to be registered	Outlines the specifications for alterations to plant to be registered under Schedule 5	No mention of AI / Robots	Alterations to AI systems / robotics will also be registered	A determination of what alterations it is acceptable to make to certain classes of AI systems should be made to prevent possibility of malfunction
S251 - Design verification statement	Outlines the qualifications required for the person who signs the design verification statement	Currently no listed requirement for AI systems to receive a design verification statement	Safe AI systems will require verification similar to registered plant	Language in this section can remain the same
S252 - Who can be the design verifier	Outlines the qualifications required for the person who can verify plant designs	Currently no listed requirement for AI systems to be verified	AI / Robotic systems will need to have their designed verified by a competent person before they can be used in the workplace	Language in this section can remain the same
S267 - When is a person competent to inspect plant	Outlines the qualifications required for the person who can inspect plant	Currently no listed requirement for AI systems to be inspected	AI / Robotic systems will need to be routinely inspected to ensure it is operating correctly	Language in this section can remain the same

<p>S300 – Compliance with safe work method statement [For high-risk construction]</p>	<p>Outlines the requirement for the PCBU to carry out high-risk construction work in accordance with the safe work method statement</p>	<p>Currently no requirement to include AI systems into safe work method statement</p>	<p>AI / Robots (particularly those engaged in high-risk construction work) will need to be included in Safe Work Method Statements</p>	<p>Safe Work Method Statements should include sections for managing the risk of AI / Robots The language in this section can remain the same</p>
<p>S315 - Further health and safety duties -specific risks</p>	<p>Outlines specific health & safety duties with regards to disposal of substances or plant, as well as storage</p>	<p>There are no specifications regarding the storage of robots / AI system when not in use</p>	<p>When not in use or operational, it is expected that robots will need to be stored</p>	<p>This section should be expanded to include the storage of AI systems / robots</p>
<p>S316 - Duty to provide general construction induction training</p>	<p>Outlines the PCBU's duty to provide training and induction to workers expected to carry out general construction tasks</p>	<p>Does not consider AI / Robot trainers Does not consider methods to train AI/robots in general construction</p>	<p>Robots / AIs may be able to have essential training data uploaded into them, qualifying them for the task</p>	<p>Consideration should be made for the role of workplace training AIs as well as the ability to program AIs with new training behaviours. It is possible that this may count as a change in design.</p>
<p>S317 - Duty to ensure worker has been trained</p>	<p>Outlines the PCBU's duty to ensure workers have received adequate training and holds a training card</p>	<p>Does not consider AI / Robot trainers Does not consider methods to train AI / robots</p>	<p>Electronic workers may be more easily trained in hazardous tasks compared to human personnel</p>	<p>It may be necessary to consider certain tasks that are considerably high-risk to only be performed by trained AI / robot work groups</p>
<p>S326 - Duties of workers</p>	<p>Outlines the requirements for workers to have a general construction training card and a training certificate</p>	<p>Does not consider AI/Robots</p>	<p>Electronic persons would be expected to hold the same duties under this section, though they may not be required to carry physical cards</p>	<p>The language in this section can remain unchanged</p>

S359 - Fire protection and firefighting equipment	Outlines the requirement of the PCBU to have fire protection that is appropriate for the workplace	Does not consider role of AI / Robots in fire protection	Specialised AI / Robotic systems can be used to combat fire hazards	Requirement for "fire-fighting" robots / AIs in workplaces that are at a high risk of the occurrence of a fire
S420 - Exposure to airborne asbestos at workplace	Outlines the requirement to limit exposure of asbestos to workers as far as is reasonably practicable	Does not consider the role of AI / Robots in asbestos removal	Robots can be expected to be unharmed by asbestos – may be utilised for all asbestos removal tasks in the future due to minimal risk	Requirement for specialised robots to perform asbestos removal tasks to ensure that human workers are not unnecessarily exposed
S703 – Primary duty of care [to general public]	Outlines the requirement for the PCBU to ensure the health and safety of any persons who may be affected by the actions of the PCBU	Does not consider the risk of AI / Robots to the general public	Workplace AIs / Robots could potentially interact with members of the general public.	All AI / Robotic systems that may come into contact with the general public must be determined to be safe before it can be allowed to operate in proximity to the general public
S705 – Duties of other persons at relevant premises	Outlines the requirements for other persons to take care for their health and safety	Does not consider the risk of AI / Robots to the general public	Other persons may wish to interact with robots despite not being safe	Any AI / Robotic system that could cause harm to other persons should have necessary safeguards

GUIDANCE ON THE PRINCIPLES OF SAFE DESIGN FOR WORK MAY 2006
SAFework AUSTRALIA

Liam Kelly of Manage Damage created this table, which highlights the current shortfalls of today's guides and Codes of Practice to acknowledge Artificial Intelligence and Humanoid Robotics in the Workplace. The Guidance on the Principles of Safe Design for work has been developed by the Safe Work Australia and is a guide for all Australian Designers.

SECTION	DESCRIPTION	SHORTFALL FOR AI	ISSUES	RECOMMENDATIONS AND SOLUTIONS
1.1 What is Safe Design?	Describes "safe design" as "the integration of hazard identification and risk assessment methods early in the design process to eliminate or minimise the risks of injury throughout the life of the product being designed. It encompasses all design including facilities, hardware, systems, equipment, products, tooling, materials, energy controls, layout, and configuration"	Does not address safety in AI / Robotics design	The area of AI / Robotics will pose its own set of unique risks that must be controlled. Currently there is little guidance on the management and control of risks associated with AI	<p>Include specification for software i.e.: "It encompasses all design including facilities, hardware, software, systems, equipment,"</p> <p>Include any other unique specifications to AI / Robotics including parameters regarding initial programming / design safety</p>
1.5 Legal Obligations	Specifies that there are specific duties that apply to: <ul style="list-style-type: none"> • designers of plant, buildings and structures • building owners and persons with control of workplaces • manufacturers, importers and suppliers of plant and substances, and • persons who install, erect or modify plant. 	Does not address specific legal obligations pertaining to AI / Robotics; currently only addresses plant	The legal requirements specified for plant are expected to be similar to AI requirements with additional specifications regarding the safe design of intelligent computer systems	<ul style="list-style-type: none"> • "designers of plant, AI systems, robots, building and structures" • building owners and persons with control of workplaces • manufacturers, importers and suppliers of plant and substances, and • manufacturers, importers and suppliers of AI systems and robots • persons who install, erect or modify plant. • persons who install or modify AI systems or robots

2.1 Persons with Control	Outlines the responsibilities of the persons with control, particularly in making design decisions throughout the product's lifetime and alterations in design	Does not consider what constitutes an alteration in the design of an AI / Robot	Machine learning AI systems that learn from the environment may count as constant alterations to design – some of which could negatively affect it	A requirement (as stated in the Regulations) to register any alterations to the design of AI / robotic systems – possibly through constant monitoring of AI / Robot behaviour
2.2 Product Lifecycle	Outlines the expected lifecycle of a product as including: <ul style="list-style-type: none"> • constructed or manufactured • imported, supplied or installed • commissioned, used or operated • maintained, repaired, cleaned, and/or • modified • de-commissioned, demolished and/or • dismantled, and • disposed of or recycled. 	Does not consider how this product lifecycle may apply to AI / Robotic systems	<p>Must consider whether there are any ethical implications in the decommission/dis-mantling of sufficiently intelligent AI systems and whether PCBUs are obligated to treat "injuries" to AI / Robotic systems as they would be for a worker</p> <p>Must also consider retrieval of sensitive information from dismantled robots / AI</p>	Potentially unique requirements regarding the lifecycle of AI systems should be examined with consideration to privacy and ethical concerns
2.2.2 Design	Includes consideration towards a number of aspects in design including: <ul style="list-style-type: none"> • Design for safe erection and installation • Design to facilitate safe use • Physical characteristics of users • Consider intended use and reasonably foreseeable misuse • Design so the plant "fails to safety" 	Does not include design consideration specifically for AI / Robots	<p>The considerations that must be made under this section largely apply to AI / Robotic systems as well.</p> <p>In particular, methods to ensure the "safe" failure of an AI / Robot system could prevent potential incidents</p>	Plant design considerations for this section should be adapted and applied to AI / Robotics

2.2.3 Construction and Manufacturing	Includes requirements for constructors and manufacturers to follow design plans as well as to include plans and schedules which ensure safe construction and manufacturing constructor's risk assessments and OHS management systems	Does not specify requirements for safe construction / manufacture of AI / Robotic systems	Currently unclear what the necessary relationship will be between hardware and software for AI & Robotics – designers and manufacturers may operate in completely different areas compared to plant development	Construction and manufacturing considerations for this section should be adapted and applied to AI / Robotics
2.2.4 Supply and Installation	"Suppliers should also conduct risk assessments for the safe receipt, storage and handling of products. Risk assessments should be based on information provided by designers and manufacturers on the residual risk and risk control measures, whether the products come from within Australia or from overseas."	Does not include supply and installation specifications for AI /Robots	Suppliers of AI/Robotic systems will be expected to have an understanding of the risks involved in their storage and handling.	Ways to effectively perform risk assessments on AI/Robotic units will need to be explored to allow for suppliers to be informed regarding the state of AI / Robots being supplied
2.2.5- Commission and Usage	States that "person with control of the workplace needs to assess and control the risks that may arise during the operation and use of products"	Does not include specifications for the commission and usage of AI / Robots	Person with control of the workplace needs to be aware of the relevant risks of their AI or robotics systems	Needs to incorporate AI safety into Safe Work Method Statements, Management Systems, and Risk Assessments
2.3.1 Risk Management Process	<ul style="list-style-type: none"> • identify design-related hazards associated with the range of intended uses, including any foreseeable misuse of the product • assess the risks 	Does not specify actions to take regarding the risk management of	One of the reasons that AI systems / Robots may be more likely to be classified as "workers" is because the spectrum of risk that they represent will	The language in this section may stay the same for the most part – however, the process of risk management for sufficiently advanced AI

	<p>arising from design-related hazards</p> <ul style="list-style-type: none"> • eliminate hazards and control risks • monitor and review the risk control measures • maintain records of risk assessments • consult with individuals or groups involved in the lifecycle of the product, and • provide information on the intended use of products for the benefit of users throughout the product lifecycle " 	AI / Robots	become much more like a human i.e., somewhat unpredictable in nature.	units would be expected to be very difficult as these systems may have very diverse functions that could represent risks in many areas to the point that it would almost be impossible to effectively recognize and manage them all without assistance.
2.3.1.1 Identify Hazards	<p>Relevant sections include:</p> <ul style="list-style-type: none"> • Hazards relating to the products themselves. • Hazards relating to how the products will be used and the environment where they will be used 	Does not specify methods to identify hazards that relate to AI / Robots	Certain Robots / AIs could be influenced by the environment and this could have negative consequences unless new technologies are invented that can accurately monitor and diagnose potential defects in AI systems before they manifest behaviourally.	Development of methods to monitor AI behaviour and diagnose any potential issues.
2.3.2.7 Communicate and Document	<p>Outlines the requirements for duty holders to communicate and document relative actions during each design phase and following any alterations</p>	Does not specify requirements to communicate and document information that is specific to AI / Robots	Machine-learning AIs can be unpredictable and difficult to monitor (with current technologies). To counteract potential for risk it is important any relevant information regarding AI / Robots be stored and made available to other duty holders	The guidelines should be updated to include potent ways to ensure that AIs are operating correctly AI/Robotics will need to be closely monitored and any aberrant or unusual behaviour must be effectively documented and assessed for potential risk

<p>2.5.1 - Consultation</p>	<p>Outlines the requirement for duty holders to consult regarding design decisions concerning plant, workplace layout, work systems, etc..</p>	<p>Does not specify requirements to consult with regards to design phases of AI systems /alterations to design</p>	<p>Considering the potential wide variety of risks associated with certain AI/Robotic systems, new specialized areas of "AI consultation" will likely arise, where qualified people can diagnose and manage potential issues with AI systems.</p>	<p>esigners and manufacturers of AI systems & robots will need to be available for continuous consultation at any stage of the lifecycle of the AI system or robot, and should be able to recognize the hallmarks of risk during any of the development stages.</p>
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ACKNOWLEDGMENTS

YOU KNOW WHO YOU ARE

Remain #EPIC I am externally grateful

The Husband - The Accountant - The Farmer

The Wonder Woman - The Elon - The SuzeZ - The Ginger

APPENDIX
ABOUT THE AUTHOR

Biography

J L HAMILTON



Jillian Hamilton is the Managing Director of Manage Damage, an Australian risk management advisory firm. As a well-known speaker and mentor, Jillian's great ability to form positive relationships has made her known throughout the entrepreneurial world for being a strong and insightful business leader.

Following her extensive career across many industries, Jillian saw the need to approach safety and risk in a different way. Her vast knowledge on health and safety has seen many businesses save millions of dollars in Damage Costs. Currently studying a Bachelor of Laws, Jillian's impressive academic background consists of a Post Graduate Diploma in Occupational Health, Safety and the Environment and a Bachelor in Natural Resource Economics. Jillian has studied the complete set of key skill sets for risk, ranging from ergonomics, to economics to econometrics, to environmental law and politics.

As a result of Jillian's hard-working ethos, Manage Damage has been successful with both public and private sectors. The business works from a holistic perspective by understanding clients' needs and providing value with every offering. This was demonstrated when Manage Damage was awarded the Risk Management

Advisory Firm of the Year in 2017, Most Outstanding Risk Management Advisory Firm of the Year 2018, 2018 Gold Stevie Award for Product Innovation for HR and 2018 Gold Stevie Award for Product Innovation for a Business to Business Service.

When asked what Jillian's philosophy for life is, she remarked, "We get one shot at life and living and I want to say that if I died tomorrow I had no regrets, I tried everything and didn't leave any stones unturned. There are so many amazing places and people in this world – I look forward to seeing as many people and places as I can." This is shown by the list of places she has visited, career highlights and achievements, and has contributed to Jillian appearing on radio, winning awards and speaking at many events.

As a well-connected inspirational game changer, whose mission is to raise the profile on risk and safety within the workplace, Jillian's one goal is to make customers self-sustainable so that they can stand on their own as soon as possible. Her strong leadership skills and innovative ideas have led to her to quickly become a valued thought leader within the industry.

APPENDIX

APPEARANCES

Speaking Appearances & Articles with JL Hamilton



APPENDIX AWARDS

Manage Damage® Business Awards

Risk Dollarisation®



APPENDIX

TRADEMARKING & PATENTS

Information on Manage Damage®

Trademarking & Licensing

At least some of the systems and methodologies discussed in this book are the subject of intellectual property rights including patents, trademarks and copyright.

APPENDIX

ADDITIONAL PRODUCTS

**Safety Financial Reporting - Damage Cost Reviews - Global
Supply Chain Management - Safety in Design - M&A - Other
Services**



Safety Financial Reporting

MetricDriver® - Non-Financial Risk in a Financial Report

Damage Cost Reviews

Uncover where your business is losing money & how to improve workforce and fiscal health





Global Supply Chain Management

Risk Reviews, Mapping & Advice

Let us help you navigate the global supply uncharted



Merger & Acquisition Reviews

We assess Damage & Insurance Costs for your impending sale, purchase or merge - implications can be very financial.



Other Services

Safety In Design - AI, Robotics and Other Plant
Legal Compliance Reviews & Due Diligence Reviews

Risk Management Strategic Advice

Futurist Advice

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Manage Damage works with Boards, CEOs, CFOs and other senior leaders to drive efficiency, productivity and profitability by dollarising a business's risk portfolio.

Manage Damage is able to create an environment where non-financial risk is converted into dollar terms to enable management to more easily address the complex interplay of these factors within a business and reduce associated costs.

"Our method provides senior management with risk information in language they understand – we convert non-financial data into a financial context to enable businesses to see where issues lie and where true associated costs are located."

By assessing a company's risk portfolio via the cost of damage they are able to better manage and reduce, the costs associated with risk. We provide complete visibility of true damage costs and highlight the opportunities to manage the damage. Our unique approach to 'dollarising' risk reduces the cost of damage and the negative impact on the bottom-line.

To provide ongoing visibility, accountability and measurement to this area of risk across the entire business we developed MetricDriver™, a powerful process that uses the philosophy of Risk Dollarisation™.

We provide positive impacts and results for Companies - Business Units – Countries - Employer Self Insurers - Employer Funded Insurance – States.

We welcome the opportunity to have a confidential conversation about your risk needs.

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