

RESEARCH PAPER

Australian attitudes towards innovation, work and technology: Towards a cultural explanation

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ABSTRACT

Australia, despite its G20 status, has not been performing as well in innovation in high-technology sectors as its educational levels and sustained growth would suggest. Australia has found it difficult to emerge from an economy based on resources and agriculture to a services economy based on knowledge and the application of technology. Several reasons have been put forward over the years. This study considers one reason that has not been considered in any detail – culture and national identity. In this paper, we look closely at a number of artefacts of popular culture from the late 1800s to the present day (such as art, poetry, song and film). These continue to underpin Australia's national identity, despite the multicultural and multiethnic nature of modern Australia. This study argues that the current Australian attitude to work, technology and innovation is strongly rooted in the egalitarian and anti-authoritarian ethos associated with what has been termed the 'Australian legend' or the 'pioneer legend'. A national discourse with emphasis on hyper-masculine hard work as opposed to education and innovation has favoured policies to assist the resource and agricultural sectors of the economy, rather than sectors capable of creating greater value.

Introduction

Australia is a technologically advanced nation with sophisticated infrastructure, access to world-class healthcare and education systems, and a relatively stable political environment that fares well on world corruption scales. However, based on a narrative of innovation developed in a post-war context in highly industrialized economies rather different from that of Australia, data suggest that Australia's innovative activity is still focused on the resource sectors that built the country rather than on the service sectors that other similarly advanced countries have targeted of late. Despite the rhetoric of Australian policy makers about Australia's bright future as an innovation nation, Australia has not yet made the switch to a knowledge economy.

When Australian prime minister Malcolm Turnbull launched his Innovation Nation policy in 2015, he named six sectors as target areas for innovation and growth: cyber security; food and agribusiness; modern technologies and pharmaceuticals; oil, gas and energy resources; mining equipment and technology; and services (Borrello and Keany, 2015). By September 2017, however, the Coalition government had conceded that the innovation agenda was a political failure: 'Throw

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as much AI and robotics at an iron ore mine as you like, it doesn't change the fact that mines are and always will be wasting assets, their output a commodity for which we are a price taker – once their finite resource is gone, their robots will be dormant' (Bailey, 2017).

The Australian economy maintains a strong reliance on resource exploitation and agriculture, economic activities closely rooted in the nation's post-colonial past. This is despite the ongoing narrative about the nation's need to shift to a high value-added economy based on science, technology, innovation, entrepreneurship and competition (Australian Department of Industry, Innovation, Energy and Resources, 2015). The notion is hardly new. Donald Horne (1964, p.22) famously pointed out the problems inherent in relying on a resource-based economy some 50 years ago in *The Lucky Country* when he observed that 'cleverness can be considered un-Australian'. Every few years since, there is spike in political interest in the nation evolving to become a more knowledge-based economy, often in response to a period of globally depressed prices for natural resources or agricultural products. In effect, this has become a narrative in itself, with few commentators daring to question the appropriateness of such a transition, even though the nation continues to prosper from natural resources and agricultural products to the extent of experiencing almost 30 years of uninterrupted growth.

Efforts to raise Australia to a position of international prominence as either a producer of technology or a service provider in high-technology industries have not been particularly fruitful. There are various explanations: its underdeveloped venture capital market (Proimos and Wright, 2005); the vested interests of those already involved in resource extraction and agriculture (which arguably manifests itself as crony capitalism) (Garnaut, 2016), together with the easy rents associated with these sectors that attract investment capital that might otherwise flow elsewhere; the SME sector's relative lack of involvement in a national innovation system (Dodgson *et al.*, 2011); and the lack of the high-level leadership required to drive home a policy that would fundamentally change the national economy (Tiffen, 2017). But possibly the most overarching of all the factors impacting on Australia's approach to innovation is culture. The Australian government itself acknowledged this problem in the 2017 national science statement: 'there are cultural barriers to engaged participation in all aspects of science, from education through to innovation' (Australian Department of Industry, Science, Energy and Resources, 2017).

We propose looking at Australia's attitudes towards knowledge generation and innovation from one perspective in particular, that of the constructed sense of Anglo-Celtic national identity that manifested itself in the decades leading up to Australian Federation on 1 January 1901 (Curthoys, 1997, p.32). This national identity – strongly rooted in supposedly quintessential Australian values of hard work, self-deprecation, egalitarianism and mateship (that peculiarly Australian take on friendship and camaraderie), together with its lukewarm attitudes towards other forms of endeavour – continues to influence Australia's focus on mining and agribusiness at the expense of innovation in other areas. In effect, the innovation agenda represents a largely imported narrative thrown, like a Golden Apple of Discord, into a socio-political landscape that has come to dominate other economic goals. This narrative remains closely connected to cultural stereotypes that are nevertheless still highly privileged within popular discourse about work and innovation. It warrants unpacking. Indeed, without understanding the depth of this narrative, and how it manifests and permeates itself in popular and political discourse, attempts to embrace a different strategy may falter. Alternatively, unpacking this national narrative might cause Australians to ask whether the competing narrative of knowledge generation and innovation, being largely imported, even works for them, or whether it should also embrace a more local flavour that resonates more closely with the prevailing cultural ethos. This could be particularly apposite given that Australians have adapted largely imported technology to provide highly innovative bespoke solutions in agriculture, mining and construction (Morris, 1983; Menghetti, 2005; Pickard, 2010). Such innovation, crafted for specific contexts, might have limited applicability in global markets.

In this study, we look at how Australian national identity has been manifested over the years in what might be broadly described as popular culture. Popular culture not only drives popular and political views, but also reflects and reifies popular attitudes. As Forbes (2017, p.6) points out,

'If popular culture reflects values we already hold, that reflection also serves to reinforce our values and deepen our commitment to them'. While the role of culture and values has been noted in the literature (for example, Shane, 1993), it has received scant attention in the context of science, technology and innovation policy. First, though, we consider the duality of Australia's approach to technology and innovation, and then turn to explaining Australian national identity. From there, we reflect on the ability of artefacts to add to our understanding of popular and political narratives. We then examine how art, literature, music and film have influenced Australia's national discourse on work and innovation. Before offering some concluding remarks, we look at how the narrative embedded in these artefacts continues to influence contemporary discourse on our theme.

Setting the scene: Australia's innovation problem

Australia's innovation activities are a tale of two economies. Australia has all the hallmarks of an advanced, sophisticated economy, with high rates of early adoption of new technologies, a well-educated population and lots of knowledge workers. And yet Australia does not, for the most part, produce ground-breaking technologies that are adopted around the world.

This duality in the Australian economy can be seen in Figure 1, the global innovation index (GII) for 2019 (Cornell University, 2019), which details the innovation performance of 128 countries. Here, Australia's performance on five measures in the global innovation index is compared with that of nine other countries. (The numbers shown are rankings, so the lower the number, the better the ranking.) The rationale for choosing these countries is that Australia, Canada and New Zealand have similar legislative frameworks; all have relatively sophisticated education systems and relatively low levels of corruption. The other comparator countries are all innovation leaders with which Australia might be expected to be competitive in the innovation race. Almost all these countries have a high percentage of the population with tertiary qualifications.

Australia ranks close to Canada on the global innovation index (22 versus 17 for Canada), and has high levels of human capital and research (R&D capability), including very high levels of tertiary enrolment. Australia also ranks very well on market sophistication, including access to credit and venture capital. On business sophistication, a component of market sophistication, Australia, at 26, is close to Canada at 22. On the face of it, a highly qualified population and

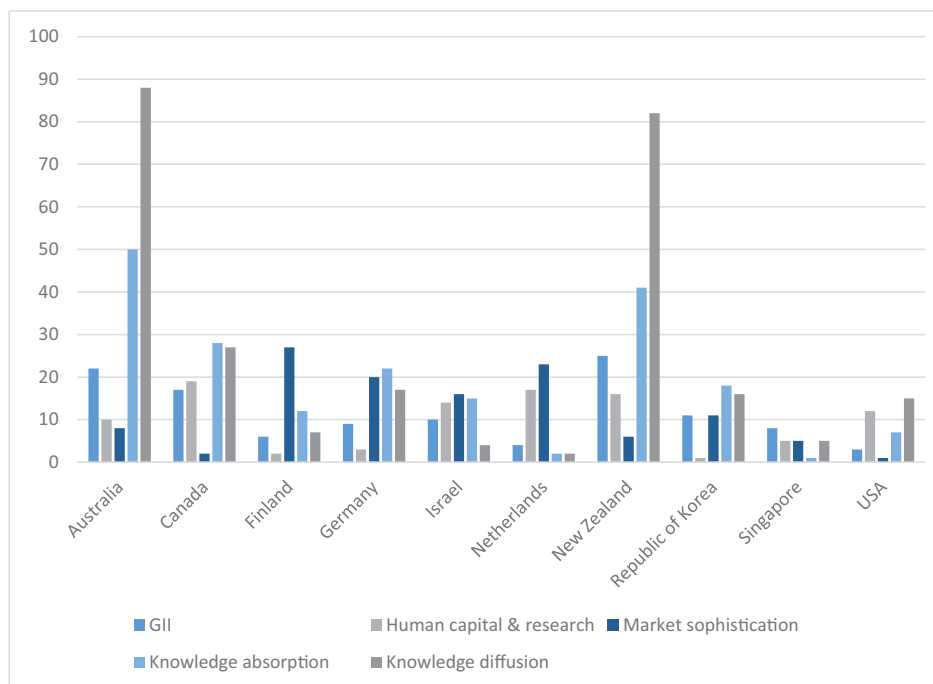


Figure 1. Global innovation index

relative sophistication of markets should correlate with greater R&D intensity. It does in South Korea, but not in Australia.

On knowledge absorption, an enabler of innovative activity through the application of knowledge created overseas in a domestic context, Australia at number 50 ranks well below other countries that have high levels of value-adding innovative activity. Australia at 88 ranks even lower on knowledge diffusion. Knowledge diffusion is described as the ‘mirror image’ of knowledge absorption (Cornell University, 2016, p.54), being the degree to which knowledge generated in one country provides economic benefits through rent receipts when exported to other countries. This metric is derived from ‘intellectual property receipts as a percentage of total trade . . . high-tech net exports as a percentage of total exports; exports of ICT services as a percentage of total trade; and net outflows of FDI as a percentage of GDP’ (Cornell University, 2019, p.209). In short, it reflects the degree to which Australia’s innovative efforts are having an impact on the world.

Australia’s government is keen to participate in, and reap the benefits from, a science-driven transformation of the Australian economy. Science and technology, the government says, contributes to ‘building knowledge, solving problems and seizing opportunities, and improving the wellbeing of citizens’ (Australian Department of Industry, Science, Energy and Resources, 2017). But while both imported and locally developed technological innovation may provide productivity improvements for farmers, or improvements in the extraction rates in mines (thereby improving the economic conditions for citizens involved in these activities), Australian innovation is developed mainly for local industry consumption, rather than for a global market.

In essence, Australian researchers appear to be punching above their weight in terms of knowledge generated, but this knowledge is not readily applied by industry either nationally or internationally. Industry either does not value the knowledge generation activities of research providers, or the innovation that is developed has very specific applications. This is of concern given the high levels of funding that Australian governments have provided over the years to collaborative research programmes, such as the Cooperative Research Centres programme, and the Linkage scheme administered by the Australian Research Council. Both are meant to promote collaboration between industry and academia (Sinnewe *et al.*, 2016). In particular, the ranking of 88 in knowledge diffusion appears to be a damning indictment of such collaborative endeavours, and suggests that industry is not always meaningfully involved in research projects (Noble *et al.*, 2017). It may be that outputs have little applicability beyond the needs of a handful of industry partners.

In addition, a significant problem appears to be that Australia’s basic and even applied research have been expected to lead to almost immediate innovation, and therefore a quick return on investment, most of which is economic rather than social (Dodgson *et al.*, 2011). An example is the shift from longer term research through Australia’s flagship collaborative research programmes to shorter, more pragmatic and SME-centric research programmes. The implication is that applied short-term research for highly-specific problem areas is valued in the twenty-first century above what used to be called ‘blue-sky’ research. While Australian researchers might produce a great deal of knowledge, this knowledge is, for the most part, not being translated into things, services or processes that are exported to generate economic or social value. This is an obstacle to Australian participation in the global innovation economy. Australia is still behaving as the Lucky Country. Despite some recent outliers in IT innovation, such as software for mining applications, Australia develops innovations only within the context of existing industries, thereby fine-tuning extractive industries and improving agricultural output, but not truly venturing into high-technology, value-added services.

Theories of Australian national identity

As Dixon (2000, p.18) points out, the identity of Australians derives from three broad streams, the Indigenous, Anglo-Celtic and ‘new ethnic’ Australians. The Anglo-Celtic narrative coloured Australia’s national identity through the late nineteenth century and into the twentieth, and is still

highly influential today, despite the nation's much greater multicultural and multiethnic makeup. Other predominantly Anglophone countries, such as the United States, Canada and New Zealand, have a family heritage anchored in the cultures of the British Isles. Inglehart (1997, p.336) argues that Australian culture, in a general sense, is very similar to that of Britain and Canada. Yet, this broadly similar heritage has revealed itself in different ways. To explain these differences, Hartz (1955, p.50) looks closely at the founding generations of British settlement in the United States and concludes that the United States was founded by a victorious middle class. In contrast, white Australia was founded by the British working classes. Dixon (2000, p.22), borrowing Hartz's theory, concludes that Australian culture represents a fragment of a British whole. There are obviously problems with such a broadbrush theoretical framework, but there is something inherently useful about this explanation of what makes Australia what it is. Dixon (2000, p.25) goes on: since colonization, there has always been a tension between, on the one hand, 'convicts, free poor and very poor Irish' and, on the other, 'the founding middle-class strata both rural and urban', with the latter, over time, 'leaning in the direction of the former' and helping to mythologize their supposed character traits. The result 'gave Australian national identity a type of masculinity which was, and perhaps remains, distinct in flavour and unusual in intensity' (Dixon, 2000, p.25).

In the context of a nation that grew on the basis of resource exploitation and agribusiness, both of which are tied to a largely masculine work narrative and fed the factories of the increasingly industrialized mother country, the link to innovation is clear. Max Weber, with his Eurocentric outlook, argued that the Western middle-class individual could be understood as the bearer of modernization – innovation in our context (Baehr, 2002, p.194). But the Western middle classes were not associated with the Australian national identity that took root towards the end of the nineteenth century; rather, it was the 'worker', a person not inherently interested in modernization, who became the bearer of Australian national identity. Despite the rise of a large, educated section of Australia that would provide an alternative to this proletarian bearer of national identity, it is the narrative of the blue singlet-clad worker of Australian legend that remains intact and influential, not the knowledge-based narrative. This egalitarian working-class narrative is still prominent in mainstream political discourse, particularly with respect to the 'average' Australian.

Let us start with what Hirst (1992, p.14) describes as the pioneer legend propagated by white Australia. This was a conservative version of left-wing historian Russel Ward's Australian legend, which argued, in the 1950s, that Australians were inherently left-leaning. This, as Brett (2003, p.203) points out, was a result of 'distinctive Australian character traits forged from the nineteenth-century worker's experience of the land'. *Prima facie*, Australia surely shares such a tradition with other countries colonized by white Europeans, such as the United States and Canada. But the particular landscape of Australia, its contrasting climates together with the need to overcome this wildness to produce crops, all contributed to the notion of Australia being savage, difficult to tame, even alien. Yes, it was recognized that the land could reward the hard worker, but this reward seemed to come at a greater price than in other lands appropriated by white Europeans – or so those who did come to Australia and their immediate descendants imagined. This pioneer legend drew largely on the supposed hard-working and egalitarian values of the bushman, though the mythic qualities of the bushman owed as much to urban journalists writing for *The Bulletin* as they did to actuality (Rutherford, 2000, p.182).

It might be argued that the formation of what would eventually become Australia's national identity occurred in the late 1800s as the various colonies marched slowly and fitfully towards federation and the Commonwealth of Australia. At the core of this national identity, which reflected Anglo-Celtic values at the expense of those of other cultural backgrounds, and those of Indigenous Australians in particular, was the triumph of the white European settler over the harsh and mysterious land. The developing national identity emphasized Australian individuality within the overarching embrace of the British empire. Still rooted in the concept of empire and reinforced by the white Australia policy, the national identity was further underpinned by concerns relating to distance, with a strong Australia, instead of merely a loose collection of British colonies, serving as

a defence against the imperialist designs of other European powers active in the Asia Pacific region and – worse – the designs of non-white Asian powers, including a strengthening Japan (White, 1981, p.81). It was at this time that the semiotic language of Australian nationalism developed. This language, both visual and verbal, both published and unpublished, still underpins national discourse with respect to what it means to be truly Australian.

Australian identity in popular culture

‘Studies of popular culture offer a broader conception of public understanding’, with popular culture referring to ‘literary, auditory, and visual artwork that is intentionally created for mass consumption’, and which is ‘easily understood and enjoyed by everyday people’ (Burgess, 2015, p.229). Cultural studies also ‘provide a thicker conception of law, politics, and society that illuminates culturally held beliefs and the role that they play in producing broader ideological shifts’ (Burgess, 2015, p.229). Hattam and Lowndes (2007, p.204) also point to the importance of reflecting on popular culture as an arena of socio-political discourse in the context of understanding political change. Here we look at some of the manifestations of Australian national identity in popular culture, beginning with the late nineteenth century, the era which seems to serve as a logical starting point for any investigation of Australian attitudes to work and innovation. Here we look at those cultural artefacts that are particularly salient, especially those which White (1997, p.18) describes as dealing with the question of ‘Australianness’.

The development of a clear national identity was evident by the late nineteenth century. For the previous century, white Australia, conveniently ignoring the millennia of Indigenous history, had linked its identity to that of Great Britain. But as an increasingly self-satisfied white Australia began to gain the upper hand over what was still regarded as a harsh and hostile natural environment, and as its urban areas, now isolated from this savage land, began to take on an identity of their own, the links to Britain no longer seemed as relevant. Now was the time for reflection on what made Australia different. A clear theme began to form in the popular consciousness, moulded by urban intellectuals unhappy with accepting the notion of Australia as an outpost of Britishness in the southern hemisphere, and more comfortable with an Australia that recognized and celebrated its roots in an egalitarian struggle of the hard-working ‘battler’ against a hard-hearted nature.

The uniquely Australian national identity became emblematic in what was soon to emerge as a significant art movement, the Heidelberg School. Such artists as Tom Roberts, Arthur Streeton, Charles Conder, Walter Withers and Frederick McCubbin are credited with producing quintessential Australian artworks (Elder, 2007, p.183). The Heidelberg school, whose artists often painted *en plein air* (White, 1981, p.93), sought to escape from the overly mannered and Eurocentric portrayals of the Australian bush, and aimed to present human characters in a more naturalistic setting. This was often characterized by a relentless Australian sun and subjects overcoming a harsh environment (Rutherford, 2000, p.181). Tom Roberts wanted to avoid urban themes and ‘paint the national life of Australia’, an intention encouraged by art critic Sydney Dickinson, who wanted ‘our artists to present on canvas the earnestness, rigour, pathos and heroism of the life that is about them’ (Splatt and McLellan, 1998, pp.84–5). Some artists, such as Streeton, achieved this through depicting the ‘heroism’ of the landscape itself, while others, such as McCubbin and Roberts, achieved it by depicting the activities of those who had to contend with the landscape, as in Tom Roberts’s painting, *The Wood Splitters* (1886).

The Pioneer (1904) by Frederick McCubbin is one of the most famous works of this movement.¹ The artist uses a triptych, now held in the national gallery of Victoria, to take the viewer through three temporally separated but closely interrelated scenes. In using the triptych format,

¹ That said, this artwork was executed in the surrounds of Mount Macedon, some time after the Australian impressionism movement had begun.

often found in religious artwork, McCubbin raises his pioneering theme to something of reverence (Clark, 1986, p.149). In the first scene, a free-selector is shown arriving at his plot of land, while his wife, seated, appears deep in thought, all amidst the enveloping Australian bush. In the second scene, a cabin has been built, and the pioneer has time to rest on a log, with his wife and new child looking on. In the final enigmatic scene, we see a 'country youth, with reverent fingers' (Allen, 1997, p.79) visiting a grave, seemingly of the pioneer and his wife, with the city of Melbourne now brightly visible in the scene's upper-right quadrant, a luminescent cityscape no longer enclosed by the dark, alien and mysterious bush. The narrative is clearly one of taming the unruly land, an effort that will ultimately result in civilization and mastery of the natural state.²

Consider, too, possibly the most instantly recognizable of all Australian paintings, Tom Robert's *Shearing the Rams* (1890). This work, also held in the national gallery of Victoria, and another representative of the Heidelberg School, depicts vigorous men with rolled-up sleeves, hard at work shearing in what is presumably a hot, uncomfortable environment, while a golden sunny glow penetrates the shed, emphasizing the heat of the Australian bush. A man in the background can be seen drinking lustily from a mug of water – a small but satisfying reward for all his sweaty work. Despite the unpleasant conditions, nobody looks particularly pained. Two children assisting in the shearing have smiles on their luminous faces, and the men embody 'heroic masculine labour' (Elder, 2007, p.185). Here, hard work is almost a reward in itself for it leads to progress, and enduring physical strength. Overall, the image is of a pervading national identity based on sweat and toil, 'hard yakka' as it became known. Artwork such as this points clearly to Australia's national identity being built on physical toil, a visual mnemonic to the oft-cited statement that Australia, particularly before the depression of the 1890s, 'rode on the sheep's back' (Clark, 1986, p.132). 'Heidelberg School art told new or emerging Australians that being Australian was about hard work and a love of the land' (Elder 2007, p.185).

Such attitudes are also inherent in much of the literature viewed as a core part of national folklore. Poetry, such as *The Man from Snowy River* (1890) by Banjo Paterson, speaks clearly to an obsession with the rugged outdoors, and the people who make their living from this hyper-masculine environment. Such folk not only engage in hard work, they revel in it. As Paterson tells us, 'the bushmen love hard riding where the wild bush horses are'. The eponymous man from Snowy River was to become a national legend, the rough and daring Australian who would go the extra mile to get the job done properly – the kind of man who might well have been admitted to the *Geebung Polo Club* (1893), whose ponies were trained by 'wheeling cattle in the scrub'. Perhaps even more telling is the same bush poet's *Clancy of the Overflow* (1889), where the town-bound author, an accountant with cashbook, reminisces on meeting a drover named Clancy along the Lachlan River.³ He laments the 'foetid air and gritty of the dusty, dirty city' and fantasizes about exchanging claustrophobic urban life for the freedom of the bush. Instead of having to mingle with townsfolk, their eyes 'eager and greedy, and their stunted forms and weedy', he yearns for 'the vision splendid of the sunlit plains extended', to meet with the bush folk and the kindly voices that will greet him. To writers such as Banjo Paterson and Henry Lawson, 'The city and the country were established as separate moral universes' (Davison, 1992, p.200). The clear implication is that city life is polluting to the soul, and results in flaccid bodies unequal to the rugged form of the true worker, for hard work gave the white (male) Australian 'the right to feel he belongs in and to the land he has fought with' (Allen, 1997, p.81). The view excluded Indigenous Australians (Elder, 2007, p.187).

It is often said that this mythologized Australian national identity, from its beginnings in the late 1800s, was forged (to use a time-honoured but fitting cliché) in the crucible of war, and the First

² Many of McCubbin's works are of the pioneering white settler who must use physical toil to overcome the harsh and forbidding Australian bush (Dixon, 2000, p.102). Notable examples include *On the Wallaby Track* (1896), *Down on His Luck* (1889) and *Bush Idyll* (1893).

³ A drover is roughly equivalent to the cowboy of North American cultural lore, although he is arguably less associated with lawlessness and moral ambiguity.

World War in particular. Under incompetent British generals who saw their rugged colonial troops as expendable (Laffin, 1986, p.218) – or so the trope goes – Australian soldiers, plucked from the farms and having ridden horses and wielded firearms from childhood, were sent into the mud and horror of a very European war, far from the bright sunlight of home.⁴ But the legend which has entered national myth (Tranter and Donoghue, 2007, p.166) is not of the Anzac in courageous action, but rather the stoic Anzac with dark humour and dry wit in the face of mechanical death (Laffin, 1986, pp.252–73).⁵ The Anzac is thus the ‘digger’, the noble bushman at war (Ward, 1978, p.277). As the name digger implies, he uses the earth as a resource for his own protection and that of his comrades. He works towards victory through unrelenting toil, his shovel and egalitarian humour more useful than any Lee Enfield rifle, although he could, when conditions were at their harshest, and when the need arose, be innovative. The periscope rifle for trench warfare, and drip or pop off rifles to cover an evacuation were his creation.

With Anzac Day, observed annually on 25 April, Australians, unlike Rudyard Kipling, do not celebrate the evocative daring-do of *The Charge of the Light Brigade* at Balaclava, much less Nelson’s *Victory* breaking through the enemy line at Trafalgar, immortalized in dozens of pieces of British maritime art. Australians might have celebrated the charge of the Australian Light Horse at Beersheba, in the dust of Southern Palestine, but it does not loom especially large in the national story. Rather, Australians commemorate mateship on Anzac Day (Day, 1998, p.86), a very working-class characteristic, with roots in Irish egalitarianism (Carroll, 1992, pp.143–4). While there were friendship and camaraderie among British officers, schooled in war on the playing fields of Eton, there was mateship among young Australian soldiers (Horne, 1964, p.32). As national legend goes, the digger, unbroken in the First World War at Fromelles, Passchendaele and Ypres, dug (rat-like, according to Nazi propaganda in the Second World War) to fill sandbags at Tobruk, and trudged in steaming mud along the Kokoda Trail. Two decades later in another conflict, again in the mud and against the odds, Australian soldiers overcame a vastly superior North Vietnamese infantry force at Long Tan. Such tales of bravery and mateship, which have taken on mythic properties (Nicoll, 2001, p.4), still loom large in the national consciousness.

Emblematic of the fitful formation of an Australian national identity is the struggle to find a truly national anthem. Australia did not have its own anthem until 1984 when *Advance Australia Fair* was finally adopted, following a number of plebiscites, referenda and competitions, instead of *God Save the Queen* (Warhurst, 1993, p.116). But the song had been in regular use since the late nineteenth century. First performed in 1878 in four verses, and sung in modified form by a choir of around 10,000 to usher in the Commonwealth of Australia on 1 January 1901, the day of federation, it was composed by Scottish-born schoolteacher Peter Dodds McCormick (Southcott, 2010, p.48). Although the lyrics have been tweaked over time, a number of lines speak clearly to our themes. In particular, ‘We’ve golden soil and wealth for toil’ manifests the national predilection of privileging hard work over cerebration – despite having been written by a schoolteacher. That the land is there to plunder is encapsulated in ‘Our land abounds in nature’s gifts’. The original third verse tips its hat to the nation’s English, Scottish and Irish heritage and now comprises the official anthem’s second verse. Then came a verse that redounds on the theme of hard work: ‘Beneath our radiant Southern Cross; We’ll toil with hearts and hands; To make our youthful Commonwealth, Renowned of all the lands.’⁶ In effect, the nation’s national anthem is a sort of paean to manual labour and resource exploitation.

Of similar vintage is one of Australia’s most beloved poems, Dorothea Mackellar’s *My Country*. A homesick Mackellar wrote *My Country* aged 19 while in England. It first appeared in

⁴ Despite that fact that roughly half of First World War diggers had urban origins.

⁵ Anzac (properly ANZAC) is an acronym of Australian and New Zealand Army Corps, part of the Mediterranean expeditionary force formed in Egypt in 1914 which was heavily involved in the disastrous (for the Allies) Dardanelles campaign. Anzac is now often used collectively to refer to any Australian or New Zealand combatant in any war or conflict.

⁶ This is now the second verse of the official anthem, which has only two verses.

the London *Spectator* in 1908 with the title *Core of my Heart*. Although born into a professional urban family in Sydney, Mackellar had spent time on her family's farms in Gunnedah, in the rural north-west of New South Wales, and Torryburn, a cattle property in the broader Hunter region (Matzenik, 1987, pp.5–6). An anthology, *The Closed Door*, was published in Australia in 1911 and contained the poem, in slightly modified form. The poem's first stanza reflects on the pleasures of the English countryside, before the poet admits that her heart yearns for something rather different: 'I love a sunburnt country' filled with 'droughts and flooding rains', with all of 'her beauty and her terror'. The poem reflects, in particular, on the trials and tribulations of agriculture, for despite the land's inherent beauty, it has a 'pitiless blue sky' which results in savage drought in which we have to 'see the cattle die'. As Mackellar tells us, it's a 'wilful, lavish land'. Yet the poem evinces a certain optimism, the cleansing, life-bringing rains being redemption for the land's wilfulness: 'For flood and fire and famine, she pays us back threefold'. The message should be quite familiar by now – the land is foreign, alien but beautiful, and it rewards those prepared to toil.

In more recent times, popular culture has continued to see the worker as the true Australian. Particularly emblematic of this is the popular music that emerged in the early 1980s. This was an era when Australian national identity, confused and somewhat downtrodden in the wake of the nation's involvement in the controversial Vietnam war, the dismissal of prime minister Whitlam's government by the governor-general of Australia in 1975,⁷ and the economic pessimism and introspection that marked the prime ministership of Malcolm Fraser,⁸ started to revive and reimagine itself as it surged with renewed vigour towards the bicentenary of white colonization in 1988 (Ray, 1981, p.60). This was also the era of Bob Hawke, the prime minister who had been head of the Australian union movement for many years, and who held a record for beer-drinking prowess; the era of Alan Bond, an English-born entrepreneur who helped Australians beat the Yanks in the America's Cup yacht race.

At the same time, resource-exploitative Australian companies, such as BHP and Elders IXL, began to swagger onto the world stage – despite Midnight Oil's critique of Australia's resource-based economy in *Beds are Burning* (1987) and *Blue Sky Mine* (1990). Indeed, this was an era in which Australia, and being Australian, were celebrated with songs such as Ice House's *Great Southern Land* (1982) and Men at Work's *Down Under* (1981) being understood as manifesting Australian pride, even if the latter song acknowledges the plunder associated with national resource dependency. The Australian legend was resurrected in popular culture in the 1980s, possibly as an early reaction to globalization, which brought with it a need to position Australia as a unique offering for international consumption (Brett, 2003, p.203). As a result, 'rural work-clothes like Drizabones, Akubras and riding boots' were appropriated by urbanites as fashion items (Brett, 2003, p.203), films and mini-series embodying the Australian legend, such as *Gallipoli* (1981), *The Man from Snowy River* (1982) and *All the Rivers Run* (1983), enjoyed considerable domestic popularity, while the legend was exported for foreign consumption in the form of *Crocodile Dundee* (1986) and its first sequel (1988).

But more important is Scotland-born singer Jimmy Barnes's *Working Class Man* (1985), written by US musician Jonathan Cain, a song which eventually came to be regarded, despite its Scottish-American origins, as a celebration of the sorts of Australian values discussed in this paper. Barnes himself has said that 'Most people thought [the song] . . . was written about me, but it was actually written about my audience – staunch, honest people, who work and who care' (Jenkins, 2007, p.303). The eponymous hero, 'a legend of his time', has 'blue denim in his veins' and is a 'steel town disciple'. He is the first to put his hand up for overtime because he is saving up for a little woman that he will someday make his wife. But, in the minds of most Australians, he is not the heteronormatively coded working-class hero of the songs of Bruce Springsteen or even Bon Jovi, even if 'He did his time in Vietnam'. No, he is the same bloke, the same weary driver you

⁷The governor-general is the Crown's representative in Australia.

⁸Recall Fraser's famous maxim: 'life wasn't meant to be easy'.

could probably find cruising his faithful Australian-made Holden sedan down a street lined with the Illawarra flame trees made famous in Cold Chisel's *Flame Trees* (1984) (also sung by Jimmy Barnes). He is the same bloke who ponders whether the 'young factory auto worker' will leave the never-changing town, or stay with the 'girl falling in love near where the pianola stands'. The video of *Working Class Man* further cements the worker as a legend, with Barnsie hollering away in a sweat-soaked white singlet in front of steel-working scenes at Port Kembla, and burning cane fields in far north Queensland. There's plenty of dust, sweat and heat here to remind you of the heroism of the working-class man's toil. As one commentator on the YouTube video of the song pithily states, 'Please rise for the national anthem'.⁹

And if *Working Class Man* or *Waltzing Matilda* are not Australia's other national anthem, this might very well be the television advertisement for the mass-produced lager Victoria Bitter, or VB as it is commonly known. Various versions have appeared since 1968, all set to sweeping orchestral music strongly reminiscent of American composer Elmer Bernstein's main theme from *The Magnificent Seven* (1960). The advertisement augments the nuance of hard work as a kind of heroic, legendary activity by depicting working-class blokes carrying out a range of typically sweaty duties. The overall message is that a 'hard-earned thirst needs a big, cold beer' and that the 'best cold beer is Vic – Victoria Bitter'. Thirst arises in a number of ways; for example, you can get it 'riding [a horse]', 'fixing the trains', 'in a hole [while digging]', 'on a plank' (a labourer wheels a wheel barrow up a plank), 'lifting', 'shifting [an entire house]', or 'feeding a fire [on a cane farm]'. The images revolve around the primary industries sector, such as farming, commercial fishing and livestock-rearing, the construction sector and mining. Here is Australian national identity writ large, propped up by one of its more enduring working-class institutions – beer (Fiske *et al.*, 1987, p.1).

National identity's influence on contemporary attitudes

A 'real' Australian worker is therefore traditionally seen as one who exchanges his – note the gender – hard, physical work for monetary gain to make a living. He is anti-authoritarian, sometimes cheekily ill-disciplined, revels in the role of underdog and despises the airs and graces of the well-educated, who think of themselves as his betters (Rutherford, 2000, p.7). This is a worker who builds, digs or grows things out of the resources provided largely by nature. As Davison (2012, p.430) observes, this worker, who grew out of the bushman of national legend, is also an anti-intellectual. His input is more brawn than creativity or the application of knowledge. Indeed, artist Norman Lindsay (in Nicol, 2001, p.106) once said, 'The Australian has a fine head for action. When he allies ideas to action this will be a fine country to live in'. He might maintain or fix, he might integrate resources to some degree, but he does not normally strive to develop something with global application, and when he does, it is generally in a field or sector regarded as sufficiently representative of the Australian ethos discussed above – agriculture, the mining sector and construction.

In short, it is the mastery and exploitation of Australia's natural environment and its manifold resources that underpins much of the nation's present attitudes towards innovation, and science and technology policy by extension. As far back as the 1880s, one commentator on what was termed the 'coming Australian', which Thomson (1989, p.464) describes as a 'nationalistic romanticisation of an urban, industrial society for a lost or imaginary way of life', noted that this figure was characterized, aside from loving field-sports and being disinclined to respect authority, by 'a grievous dislike of mental effort' (White, 1981, p.77). To this day, the quintessential Australian worker, in the minds of much of the population, is not a person of ideas. He – again, note the gender – is more likely to be thought of as some sort of labourer or tradesman. And his industry is not likely to be related directly to science or technology; it is more likely to be a sector where he can be 'on the tools', the domain of the 'tradie' (tradesman). In Australia, it might well still be said that nothing is as precious

⁹ <https://www.youtube.com/watch?v=erSJGrpfnOI>

as a hole in the ground, and those who work in the mine are still accorded a status in popular culture over and above that of the city-bound, soft knowledge workers (Midnight Oil, *Blue Sky Mine*, 1990).

These values, once the bastion of the left on account of their working-class origins, became appropriations of the centre-right during the period when John Howard was prime minister. Despite their working-class origins, terms such as ‘mateship’, ‘battler’ and ‘fair go’ found new meaning under the aegis of individualism (Brett, 2003, p.204). In any case ‘Mateship in the ‘bush legend’ was . . . largely an urban construction, reflecting the desires and imagined values of the bohemian city dwellers’ (Dyrenfurth, 2007, pp.212–13). For all that, Howard was not one to let a bit of revisionism get in the way of his fight against political correctness (Department of the Prime Minister and Cabinet, 1999): ‘if there’s one thing we need to get rid of in this country it’s our tall poppy syndrome. We have to be a nation that believes in achievers as well as being a nation that believes in battlers.’ But this discourse inevitably leads back to the notion that hard work is more important than harnessing knowledge and technology. Howard’s achievers were more likely to be those investing in a coal mine than in some paradigm-shifting technology.

The identification of Australian identity with sporting prowess (Tranter and Donoghue, 2007, p.180) also underpins the superiority of physicality over intellectual achievement. ‘Most Australians’ agree that ‘sporting heroes comprise an important aspect of Australian identity’, while 90% of Australians view the Anzac soldiers ‘as part of the national identity’ (Tranter and Donoghue, 2007, p.179). By way of contrast, those who contribute to the nation’s knowledgescape remain more or less anonymous, with very little real growth in innovation funding over recent decades (Australian Department of Industry, Science, Energy and Resources, 2019). Moreover, Australia’s great scientists and innovators, such as Nobel Prize winners Howard Florey, Peter Doherty and Elizabeth Blackburn, will likely remain forever in the shadow of sporting heroes, such as swimmer Dawn Fraser or cricketers Shane Warne and Sir Donald Bradman.

Finally, one might well reflect that a desire to move on from a brawn-based nation to one that embraces science as a means to social and economic advancement is hardly new. As far back as 1916, Prime Minister Billy Hughes envisioned such an outcome:

Science can make rural industries commercially profitable, making the desert bloom . . . Science can develop great mineral wealth . . . Science will lead the manufacturer into green pastures by solving for him problems that seemed insoluble. It will open up a thousand new avenues for capital and labour. (Hughes cited in Alexander, 1967, p.67)

Australian politicians seem to be saying much the same thing today. War historian C. E. W. Bean, writing in 1911, prophetically wrote:

The Australian, one hundred to two hundred years hence, will still live with the consciousness that, if he only goes far enough back over the hills and across the plains, he comes in the end to the mysterious half desert country where men have to live the lives of strong men. And the life of that mysterious country will affect the Australian imagination much as the life of the sea has affected that of the English. It will always be there to help the Australian form his ideals.

Once again, the same can be said today, with the politics of non-urban Australia, and its narrative of farming and resource extraction still front and centre of contemporary attitudes towards the economy. The Australian bush still informs the ideals of modern Australia, despite attempts over a long period to ingrain a discourse of knowledge and innovation. And it is in these contexts that Australia does embrace science most strongly: ‘Australia is moving towards more digitally-enabled, service-oriented industries, on the back of its strength in mining’ (Office of the Chief Economist, 2020). The challenge is to involve other sectors in this innovation story.

Although Australia’s political parties and Australian governments look to the modernization of the Australian economy to cope with fluctuating commodity prices, the political debate has also focused on job creation. The following quotes reflect the previous analysis of the work agenda in Australia:

Well, I certainly have an enormous amount of respect for the people who are out there having a go. They are the backbone of any society. They are certainly the backbone of any strong economy. (Former prime minister Tony Abbott, 2015)

When [deputy prime minister Barnaby] Joyce talked about jobs and growth it was in the context of specific infrastructure projects. The construction of dams. Building a second airport in Sydney. The need to proceed quickly with a Melbourne-to-Brisbane inland railway. Trendy stuff about innovation, even defence projects, hardly got a look in, because it was not seen as connecting with the daily lives of people in the regions. (Oakes, 2016)

We gotta [*sic*] think of the carpenters, the plumbers, the farmhands who won't get a degree and they are paying taxes [for students to go to university]. (Tehan, 2017)

The notion of the 'real' Australian worker being involved in manual labour, or at least working in the resources or agricultural industries, is still strong in contemporary political discourse, with the 'tradie', a kind of urban bushman, still embodying what it means to be an Australian worker in popular and political discourse.

Concluding remarks

The Australian variant of the prevailing global R&D and innovation discourse is characterized by national identity and the myth of the Australian worker in particular. This bush legend lauds hard physical yakka as a primary virtue: intellectual pursuits are regarded with suspicion. The myth flourishes despite Australia's undoubted achievements in intellectual and creative domains. In a nation replete with those wont to cut down tall poppies, there has always been a tendency to make light of intellectual and creative achievements, and to make much of the product of physical labour. The attitude is evident in Australian sporting culture that values 'good blokes' over 'eggheads'. There are other factors contributing to Australia's low ranking in international measures of R&D and innovation, but there is an overarching need to incorporate intellectual and creative achievement in the contemporary Australian legend. If this does not happen, Australia, which continues to be a nation of immigrants, runs the risk of inculcating the same tired and outdated mores in its new inhabitants. This would result in Australia's continued reliance on resource extraction and agrarian endeavour at the expense of policy and meaningful investment in a genuine knowledge economy. Therein lies a challenge. Australia continues to be a prosperous nation according to most metrics, but the country remains disadvantaged by its dependency on natural resources. One day soon, Australia's famous luck may run out.

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