

Coming back from #censusfail: reflections on the 2016 Australian Census, Marriage Equality Survey and rebuilding at the Australian Bureau of Statistics

The 2016 Census was much more eventful than expected for the Australian Bureau of Statistics (ABS). Although online forms had been available since 2006, the Bureau pursued a 'Digital First' strategy for this cycle, strongly encouraging Australians to submit their census data via the ABS website instead of using paper surveys. Despite a number of denial of service attacks on August 9, Census Night was progressing smoothly until about 7.30pm when another suspected attack saw collection grind to a halt. Users were unable to access the website or complete their surveys, causing confusion and frustration which instantly spilled over to social media. Inside the ABS, concerns that personal data may have been extruded led the Australian Statistician David Kalisch and colleagues to shut down the census website, pending further investigation. Over the following days, there was a deluge of negative coverage and commentary, ranging from ridicule to outrage, as staff worked to restore the system. Would they be able to salvage the 2016 Census with all its essential data? How would the ABS repair the reputational damage and regroup as an organisation? And could the Bureau handle a controversial new assignment?

Key topics/learning concepts: Census, cyber security, privacy, organisational transformation, outsourcing, leadership, statutory agencies, crisis management, risk management, Australian Bureau of Statistics, ABS, social media, communications, resilience.

Key findings/learning outcomes: This case provides a vivid example of an organisation plunged into a sudden crisis on two fronts - operational and reputational – at the worst possible time. It was particularly painful for an agency with a strong track record as competent and trustworthy. The very public breakdown of the 2016 Census website left the ABS with nowhere to hide and little time to respond to the situation, exposing deficiencies in its census preparations and communications strategy. The case explores some of the antecedents to #censusfail, including long-term funding shortfalls, blind-spots and heightened cyber-security concerns. The Epilogue, meanwhile, focuses on changes made in the wake of Census 2016 to guard against a repeat disaster and other potential threats. Readers will gain an insight into managing a highly challenging situation, as well as the less public but equally vital process of rebuilding capability and trust.

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Census Night: 9 August 2016

Although the online form had been live for over a week, it was around 7.30pm on Census night when many households in the eastern states finished dinner and began reaching for their laptops, and other devices, to fill out the census. So far, the system was dealing with the surge in responses, with plenty of spare capacity. Prime Minister Malcolm Turnbull and his wife Lucy announced they had completed the census electronically, with ease. Then Australian Statistician and ABS head, David Kalisch, got a call: 'There's been another DDOS¹ attack. The website's inaccessible.'

Under attack: Part I

Kalisch quickly gathered with ABS officials, including Census Program Manager Duncan Young and his team. They were joined by IT staff and IBM contractors (who had developed the online census forms and data collection system). It was a scene of confused and crestfallen faces. There was more bad news: the alternative router was not available and IBM monitoring suggested that some census data had been exfiltrated. Earlier in the day, the on-line census system faced three DDOS attacks which were successfully thwarted and international access to the census website cut. The Australian Signals Directorate (ASD)² had been in the background, watching internet activity for anything unusual, but was not proactively engaged.

Following a brief discussion, ABS leadership decided to pull the census website at 7.45pm – just as demand was expected to peak. Although the access issues were likely resolvable, they considered the potential loss of personal data too great a risk. Moreover, they were still uncertain what data may have been extruded, if any, and how to best safeguard the system.

As ABS and IBM staff worked to unravel the technical problems, Kalisch and his colleagues had to devise a public statement – a task complicated by the fact that there was no communications strategy prepared for such an event. Unfortunately, social media advertising encouraging use of the on-line form was still locked in for three more hours. The ABS would also have to notify Michael McCormack, the new Small Business minister responsible for the ABS, and get approval for any statement. So began a protracted relay of messages between ministerial advisors, ABS management and communications staff.

At 8.50pm, the ABS officially announced the outage and advised the public to try again later. A couple of hours later (11pm), the ABS issued an update advising that the census form would be offline for the rest of the night. ABS staff, working with IBM and the ASD, confirmed at around 2.30am on 10 August that no data had been lost or compromised – the IBM monitoring system had set off a false alarm. ABS conveyed this news to the public in an early morning press release. However, the census form would remain down until further

¹ DDOS (Distributed Denial of Service) attacks are a type of cyber-attack where a website is flooded with traffic from many different sources at once. The idea is to overwhelm the system and prevent legitimate visits. DDOS attacks usually last for several hours but can stretch into days.

² The Australian Signals Directorate (ASD) is a national security agency involved in defending Australian telecommunication systems from a variety of threats.

notice. The ASD did not establish a source for the DDoS attack, though suspected that it likely originated overseas.

Kalisch recalled that the government was eager to see website access restored as soon as possible, believing that the ABS had been overly cautious. The ABS was more circumspect, 'I think on the balance of risks, the Prime Minister probably felt that he was more exposed by not having the website running, while we [the ABS] felt that the long-term reputation of Australia's national statistics agency was at risk if data got out,' he said. In the end, Kalisch observed, 'you've got to make a decision at the time with incomplete information' and lingering questions about data extrusion made him comfortable pulling the online census.

Beyond the ABS's immediate concerns, Kalisch was mindful of the need to maintain public trust in the ABS as a steward of sensitive personal and business information. The ABS was also concerned that the census system might still be vulnerable to attack – the only thing worse than one successful attack would be another one over the coming days.

'Too important to fail'

The ABS is Australia's national statistical agency, with origins dating back to 1905. From early on, it established itself as a well-respected institution producing essential and trusted information. Designed to provide independent, reliable economic and social data, along with analyses, ABS statistics are used by all levels of government, and the broader public, in a huge range of applications. However, the Agency was probably best known for producing economic indices such as labour market statistics.

Duncan Young described the census as 'the largest peacetime logistical exercise in Australia', involving 40,000 staff and producing 3 trillion cells of data (Ziolkowski, 2021). Held every 5 years across Australia, the data collection phase typically runs for around eight weeks, starting a couple of weeks prior to the census reference night, and continuing for a further 6 weeks afterwards. Once the data is collated, the analysis phase begins, with the main results produced after 10 months, and other complex statistics produced later still. The ABS reports on the results as analyses are completed, including comparisons with previous censuses. At the same time, planning for the next census is already underway – the ABS reviewing feedback and consulting with stakeholders regarding changes to questions and improvements to data collection.

Quantifying key features of the nation supports policy development, guides business decisions and aids democratic processes (ABS 2005, ABS 2016a, Senate Economics Committee 2016). For example, census data informs infrastructure planning, including housing, transport, education and health services. The census also provides the only reliable national snapshots of small communities and demographic groups. Census population estimates provide the basis for the distribution of House of Representative seats between the states and regular electoral redistributions within each state and territory. They also underpin the calculation of Commonwealth financial grants to states and territories. According to one estimate, each \$1 spent on the census produces around \$6 of economic value (Lateral Economics, 2019, p.52). In short, noted Kalisch, the census was too important to fail.

However, generating accurate and useful information relies on high completion rates and good coverage, especially when it comes to smaller population centres and groups. Australia was well placed in that regard with dwelling response rates exceeding 95% in both 2006 (95.8%) and 2011 (96.5%) (ABS, 2017). This compared favourably with similar nations such as New Zealand which had a response rate of 92.9% in 2013 and gaps in several key areas (StatsNZ, 2014).

In a departure from previous cycles, the 2016 Census pursued a 'digital first' approach to the collection of household information. Most households were sent a letter with a code to access the on-line census form, with paper versions available on request. Paper forms were also delivered to households in regional or demographic areas where digital activity was much lower – accounting for approximately 20% of the Australian population. Although on-line completion had been an option for a decade, the response rate was low – 10% in 2006 and 33% in 2011 (ABS, 2016a, p.40). The ABS hoped that figure would rise to about 2/3 of households this time around, with expectations that online data collection would also improve the quality of the census data.

Prior to the 2016 census, the ABS also announced that it would retain name and address information for 4 years. Previous Australian censuses retained names and addresses for around 18-24 months. This differed from Australia's statistical peers, such as New Zealand and Canada, where name and address information from each census is kept indefinitely. The justification was that it would improve the quality of some essential statistics (for example, estimates of Indigenous life expectancy) and allow new statistics to be produced, such as socio-economic outcomes for small population groups.

This change generated some controversy. The 2016 Census was conducted in the backwash of a lengthy, robust and very close 2016 Federal Election. The political atmosphere remained volatile, Kalisch recalled, with political parties still essentially in campaign mode in the lead up to the census, even though the election count had been finalised. Responding to privacy concerns, a number of independent and Green (party) MPs and senators indicated that they intended to either withhold their names or boycott the census altogether.

The community was also increasingly aware of cyber-attacks, including ones on prominent organisations such as Yahoo, Sony, Verizon and Ashley Madison. In many of these instances, personal information had been exfiltrated, often including financial details. The 2016 Census brought greater awareness of cyber risks into the realm of Australian households.

[Under attack: Part II](#)

As the night wore on, people across Australia tried and failed to complete the census online. The ABS 'dropped the ball on customer service' admitted Young, with millions of calls to the census hotline going unanswered (Easton, 2019). Some vented their frustration on social media; sites like Facebook and Twitter lit up with negative commentary, memes and hashtags like #censusfail – which began trending globally (Exhibit A). ABS staff were taken aback by the level of vitriol. The next day, old media joined the pile-on properly. Morning newspaper headlines included: 'Census farce', 'ABS loses its Census' and 'Worst Census

ever' (Exhibit B). Compounding the embarrassment was the 'digital first' approach which encouraged online completion.

Political and media commitments for ABS officials began very early on Wednesday 10 August, after working through most of the night. A 5am teleconference call convened by the Prime Minister's Office was followed by an interview with ABC Radio, and then an 8am teleconference with the Prime Minister, other ministers, officials and IBM representatives. Around mid-morning, the new ABS Minister, the Prime Minister's Cyber Security Adviser and Kalisch fronted a crowd of expectant journalists at Parliament House to explain the situation, apologise for the inconvenience and point the way forward. The ABS also reframed census advertising and publicity to apologise for the outage and notify the public that the online form was being fixed but that they could obtain paper census forms, if they wished.

At midday, senior ABS officials held a town hall meeting at ABS headquarters. Kalisch knew staff were hurting after the events of August 9. Employees had a great deal of professional pride, evidenced by the Bureau's track record, 'The ABS is a relatively optimistic organisation, it has a strong, strong sense of success. And it delivers – 99 times out of 100 – without any sort of any issues,' Kalisch said. Out of the approximately 500 statistical releases from the ABS each year, it was uncommon to find errors in more than one. Significant problems with key statistics were even rarer, occurring roughly once every 4 or 5 years. Staff, Kalisch observed, were not accustomed to failure and especially not to such intense public criticism and ridicule.

Kalisch addressed the assembly, offering reassurance that all was not lost: 'I wanted to provide a message of hope, that this was just something that had happened on one night, and that there were still 6-to-7 weeks of data collection for us to deliver a quality census.' He also wanted them to know that the current turmoil would eventually pass, the media caravan would move on, 'Myself and a couple of the deputies had worked in other agencies, and had a bit more war room experience,' he said.

Recognising that census staff had been working late into the night, Kalisch and Young made sure that census staff got some rest and ate something besides pizza. Avoiding social media was recommended. Over the next few days, senior managers made themselves visible and available, 'We tried to spend as little time as possible within our offices and regularly engage with staff,' Kalisch recalled. For Young, it was important to 'come together and be open about the fact that it's tough and we're having hard days'. Encouraging honest expression and acknowledging difficult emotions also built solidarity and helped the team regroup to focus on the task ahead (Ziolkowski, 2021).

The ABS approach to the census crisis was methodical: determining the day's priorities, deciding where to deploy ABS staff and figuring out what external expertise to bring in to the census team. The ASD and Telstra assisted with this process. On 11 August, precisely 1 day, 18 hours and 44 mins after going offline, the census form was restored. While there were no guarantees, the ASD now considered the census website to be as robust as possible. Encouragingly, the public came back online shortly after the census form did.

Encouragement was sorely needed. Earlier in the day, the Prime Minister blamed the census mishap on the ABS and IBM during a radio interview and declared that ‘heads would roll’ (Turnbull, 2016). He also announced a review of the Census events to be conducted by his recently appointed Cyber Security Advisor. Opposition MPs and senators, meanwhile, also lined up to have a swipe at the Government over the census, though the blows landed most heavily on the ABS.

Turnbull later described the 2016 census as a ‘humiliating debacle for a government that was promoting innovation, agility and the promise of the digital era’ (Taylor, 2020). Turnbull had marketed himself as the Innovation PM, one that recognised that innovation often brought risks – though by Census 2016, his risk tolerance seemed substantially diminished (Harris 2016). There would be other technical problems for his Government in coming months, such as a number of outages in Australian Tax Office systems, but the 2016 Census was the first.

Fixing the census form saw the stream of negative commentary taper off. By the weekend (August 13-14) media reporting was much reduced and more measured (Crabb 2016; Parkinson 2016). Response rates were rebounding rapidly, however, the work of reckoning with Census 2016 and restoring the Bureau’s reputation had just begun.

Understanding what happened and why

Young described Census 2016 as ‘a crucible moment’ for both himself and the ABS – one that prompted them to ask: ‘How do we how learn from this experience and how do we make sure that good comes of that that helps us in the future?’ (Ziolkowski, 2021). Answering these questions involved delving beyond the technical difficulties that afflicted the ABS on August 9 to undertake an unflinching examination of the factors underpinning the shutdown. However, it was important to avoid scapegoating, ‘Once the blame game gets underway’ Kalisch said, ‘It just harms an organisation rather than helps it.’ This was particularly true for a national statistics agency where small mistakes could easily snowball if staff didn’t feel able to raise issues.

Revisiting the preceding few years, it became apparent that ABS was not well placed to conduct the 2016 Census. A 2013 capability review suggested the ABS needed a transformation of its leadership, strategy and delivery, as well as a significant technology upgrade, to stay relevant and grasp future opportunities (APSC, 2013, pp.5-10). Although changes were underway, successive funding reductions over previous years were adding up, resulting in further cuts to its statistical program in 2014 (ABS, 2014, p.1).

At the same time, the Bureau’s statistical systems – some of which were over 40 years old – were putting the reliability of Australia’s national statistics at risk and affecting the ability of the ABS to collect new information and use emerging data sources. Said one ABS official: ‘Systems were broken and...the band-aiding or the technical capability that you needed to be able to run a particular process sat with one person and that person left and the system would fall over,’ (Howard, 2021, p.67). However, a strong ‘deliver or die’ ethos amongst the Bureau’s close-knit teams (APSC, 2013, pp.16-17) meant that staff were willing to put in the extra time and effort to develop a work-around.

One contributor to ongoing budget shortfalls was what some viewed as an excessive focus on independence and autonomy by past ABS leadership (Howard, 2018). Compounding the problem was the Bureau's historical tendency to fill its senior ranks with people who had deep technical expertise in complex statistical methodologies but not necessarily the breadth of skills required for management roles (Howard, 2021, pp.66-67). As a result, practical and strategic considerations were often sidelined. This included engaging productively with external stakeholders – particularly those outside treasury – some describing the Bureau as 'insular', 'inflexible', 'isolated' and unresponsive to their needs (APSC, 2013, pp.9,13).

Meanwhile, treasurers and Treasury had little interest in the Bureau's funding woes, so long as economic statistics were prioritised. Major errors in ABS labour force estimates for August 2014 didn't improve matters. A steady turnover of ABS ministers (seven) and treasurers (four) since the 2011 Census also frustrated attempts to push the case for greater funds. Meanwhile, the government left the position of Australian Statistician, (head of the ABS) vacant from late 2013 to December 2014, complicating forward planning.

Further government pressure on ABS funding in 2014 reportedly led Young to warn colleagues that Census 2016 might have to be considerably reduced in scale or scope to proceed (Martin, 2016). Deciding against half-measures, the ABS put forward a proposal to abandon the 2016 Census in favour of a 10-yearly census (from 2021) and a major social survey every five years. When it was clear that this plan would not receive Parliamentary support, the federal government committed to the 2016 Census in the May 2015 Budget, providing a funding boost to update ABS systems. However, uncertainty over the 2016 Census had been disruptive and undermined preparations.

Past failures to invest in ABS' IT infrastructure, alongside reduced funding from successive governments, had also led to a reliance on outsourcing but not an increase in capacity to manage such contracts. With the 2016 Census looming, the ABS spent considerable time and effort exploring re-use of its existing systems for the 2016 Census. Eventually assessed as unfeasible, there was a rushed and limited procurement process for 2016 Census systems, awarded again to IBM in mid-2014.

ABS did not oversee IBM contract well. It was too trusting that IBM would deliver a successful e-Census, as they had in 2006 and 2011, Kalisch observed. The environment and the stakes had changed, with greater reliance on the digital census and increased cyber security concerns. Independent expert verification of the IBM approach was not undertaken anywhere near enough, and ABS had not upgraded its internal capability. For the ABS it was a painful reminder of the adage that government agencies ultimately cannot outsource risk.

Despite the many constraints, work had begun from early 2015 to transform the Bureau. The ABS improved partnerships with government and the research community, put more effective risk management measures in place, increased internal collaboration, and enhanced its workforce capability and culture. Yet it simply wasn't enough. 'The 2016 Census showed the ABS transformation needed to go much deeper and quicker,' Kalisch observed.

Public communications compounded the Bureau's troubles. Failure to prepare for a systems breakdown delayed the ABS's response. Advance publicity surrounding Census 2016 did not effectively convey that the form could be completed prior to Census night and afterwards, up until late September. 'I think there was such a fuss around the website going down on census night partly because traditionally many families completed the census on that date and Census advertising promoted completion on Census night,' Kalisch said.

'The decision to retain identifying information longer was also not communicated as well as it could have been for such a significant change, especially given the developing digital and cyber context,' added Kalisch. The ABS undertook a Privacy Impact Assessment but relatively late and over a shorter time-frame, preventing effective consultation with key interest groups. Media reporting of the policy change (Greber, 2016; Martin, 2016) was then picked up by the privacy lobby and several federal politicians in the lead up to the census.

Negative commentary about the changes, including that from a former Australian Statistician (McLennan, 2016), was little challenged in the media, regardless of validity. Few supporters outside the ABS were publicly advocating for greater use of data or the potential of new, improved statistics. That said, those in favour found it difficult to get media attention. Privacy concerns ended up consuming a lot of the communications team's energy prior to Census 2016 and diverted focus from other messages the ABS needed to get across. The ABS strategy, Duncan Young noted, was also flawed:

'With Census [2016], we ended up in a difficult position where people weren't 100% trusting the ABS,' recalled Young, '[and] our only solution to that problem was to put out an ABS spokesperson, usually me, to say: "Well, you can trust us." Well, if your issue is trust with the ABS, then you don't believe an ABS spokesperson,' (Easton, 2019).

Salvaging the census

After the events of August 9, the ABS focussed on ensuring the response to the Census would be as high as possible. The Bureau stepped up its community information and advertising efforts to encourage responses, and field staff shifted to areas where household response rates were comparatively lower. Issues were prioritised and delegated among the senior team. Staff from outside the Census team were brought in to assist. The message was that 'this was an ABS problem, not just a census problem,' said Kalisch.

It didn't take long to see results. Just four days after Census Night, the census collection process was back in line with ABS expectations, and then well ahead of schedule over the following weeks (Exhibit C). Estimates suggested that the 2016 Census was still on track to achieve a 95% completion rate (ABS, 2016b, p.72). Preliminary data also showed high response rates to more sensitive census questions. ABS, meanwhile, took extra care to ensure that other major economic, social and environmental statistics were all released on time and to the usual high standard. The ABS could not afford any additional reputational damage.

Following the Census Night experience, Kalisch initiated an Independent Review of 2016 Census Data Quality, to be undertaken by a panel of experts. The Government and the

Senate then also launched their own reviews, both finalised in October 2016 long before census outcomes would be known (MacGibbon, 2016; Senate of Australia, 2016). Nonetheless, the ABS was able to provide preliminary response estimates showing that Census 2016 was shaping up well.

The Australian Privacy Commissioner had early on described the decision to take the census off-line as a pro-privacy precaution (Pilgrim, 2016) and others would soon endorse the ABS' approach. The MacGibbon Review of the 2016 Census, commissioned by the Prime Minister, recommended that the ABS improve the security of census data, privacy practices and ICT procurement, while also supporting the ABS decision to withdraw the census on-line form on August 9. MacGibbon also had recommendations for cyber and central agencies to improve cyber awareness and support across government (MacGibbon, 2016, pp.3-12).

The Senate Economics References Committee came to a similar conclusion stating that 'the decision taken by the ABS on the evening of 9 August to close access to the eCensus website appears to be justifiable, understandable, and entirely correct,' (Senate Economics References Committee, 2016, p.71). The Committee found that although the ABS had failed to monitor the IBM contract effectively, the agency also had to contend with less than ideal circumstances. It recommended that the government provide adequate resources for Census 2021 (Senate Economics References Committee, 2016, p.72).

In the end, the 2016 census surveyed a total of 10 million dwellings and 23.4 million people across Australia – almost 60% of responses were submitted online (Harding et al., p.21). With a response rate of 95.1%, it was somewhat below the 2011 figure (96.5%) but well within normal parameters (Harding et al., p.57). In June 2017, the Census Independent Assurance Panel report on Census 2016 confirmed ABS' initial assessment, finding that the 2016 data was of comparable quality to previous censuses and would support all intended uses (Harding et al., 2017, p.46).

Second chance or poisoned chalice?

When the main census data was released in June 2017, the media focussed on the insights provided by the data rather than the circumstances of Census Night.

However, the ABS was not clear of controversy yet. In early August 2017, exactly a year from the ill-fated census, the Federal Government directed the ABS to carry out a survey of registered Australian voters to gauge support for legislating same-sex marriage. The allocated budget was \$122 million and the process was to be completed by 15 November 2017 – less than 100 days away.

Though same-sex marriage had widespread community support it was still an emotive and often divisive issue: many people (both for and against) were opposed to the mere existence of the survey. Commentators and advocacy groups immediately questioned whether it was an appropriate task for the ABS or whether the agency was up to it. 'A Sydney tabloid headline, that I'll never forget is "Census Bunglers from Hopeless Bureau of Statistics to Run Plebiscite",' recalled Young (Ziolkowski, 2021).

However, the ABS had little time to dwell on such issues with mere weeks to get a national survey up and running. It was an early but high-risk opportunity for the ABS to demonstrate what it had learned from Census 2016 by delivering a seamless user experience and a reliable result for the Australian community. At the same time, the ABS had to continue implementing organisational reforms whilst laying the groundwork for the next census in August 2021. After the turmoil of Census 2016, Young, 'secretly hoped to slide into a quiet back office somewhere in the ABS in Belconnen and maybe have a nice spreadsheet to play with,' he said, 'but it wasn't to be,' (Ziolkowski, 2021).

Exhibit A: Examples of #censusfail tweets

 **Ben Eltham** ✓
@beneltham

Sorry, but I couldn't resist
[#CensusFail](#)



9:04 pm · 9 Aug 2016 · TweetDeck

239 Retweets 9 Quote Tweets 435 Likes

 **Leeya**
@leeyaorca

Keep calm everyone @ABSCensus IT team are on it
[#CensusFail](#) [#census2016](#)



8:31 pm · 9 Aug 2016 · Twitter for Android

50 Retweets 4 Quote Tweets 70 Likes

Source: Twitter. (2016, August 9). twitter.com.

Exhibit B: Census 2016 media coverage

Growing census boycott risks quality | **Down for the count: census thrown into chaos**

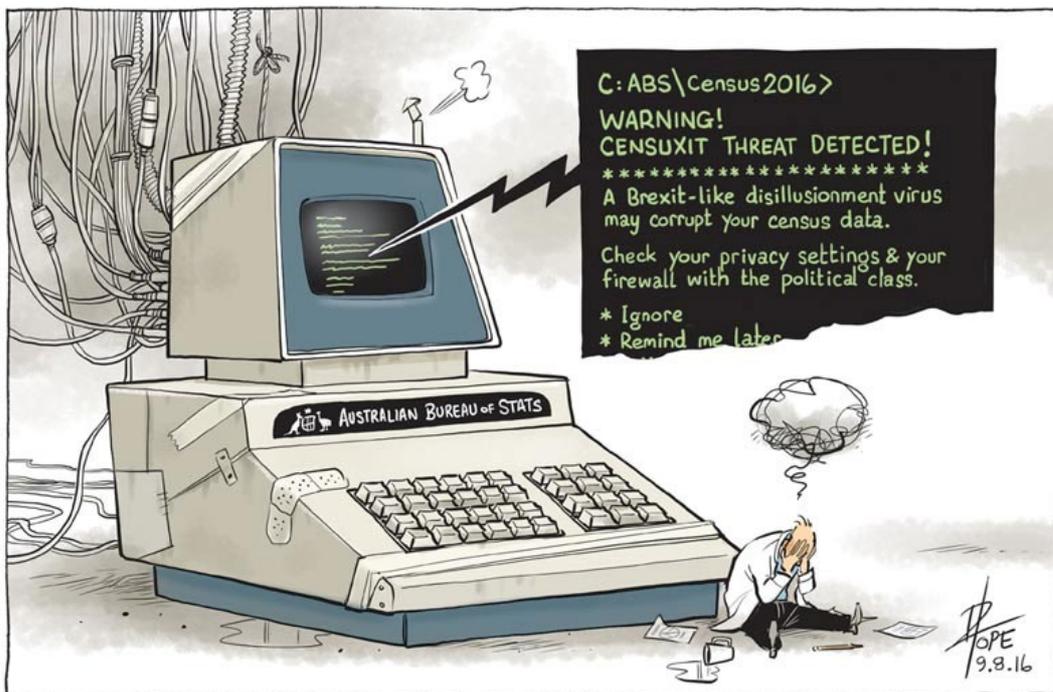
MELTDOWN
Anger as fail makes no census

Thousands vent their anger over website meltdown
ABS LOSES ITS CENSUS

CENSUS FARCE 
Turmoil as website fails its biggest test

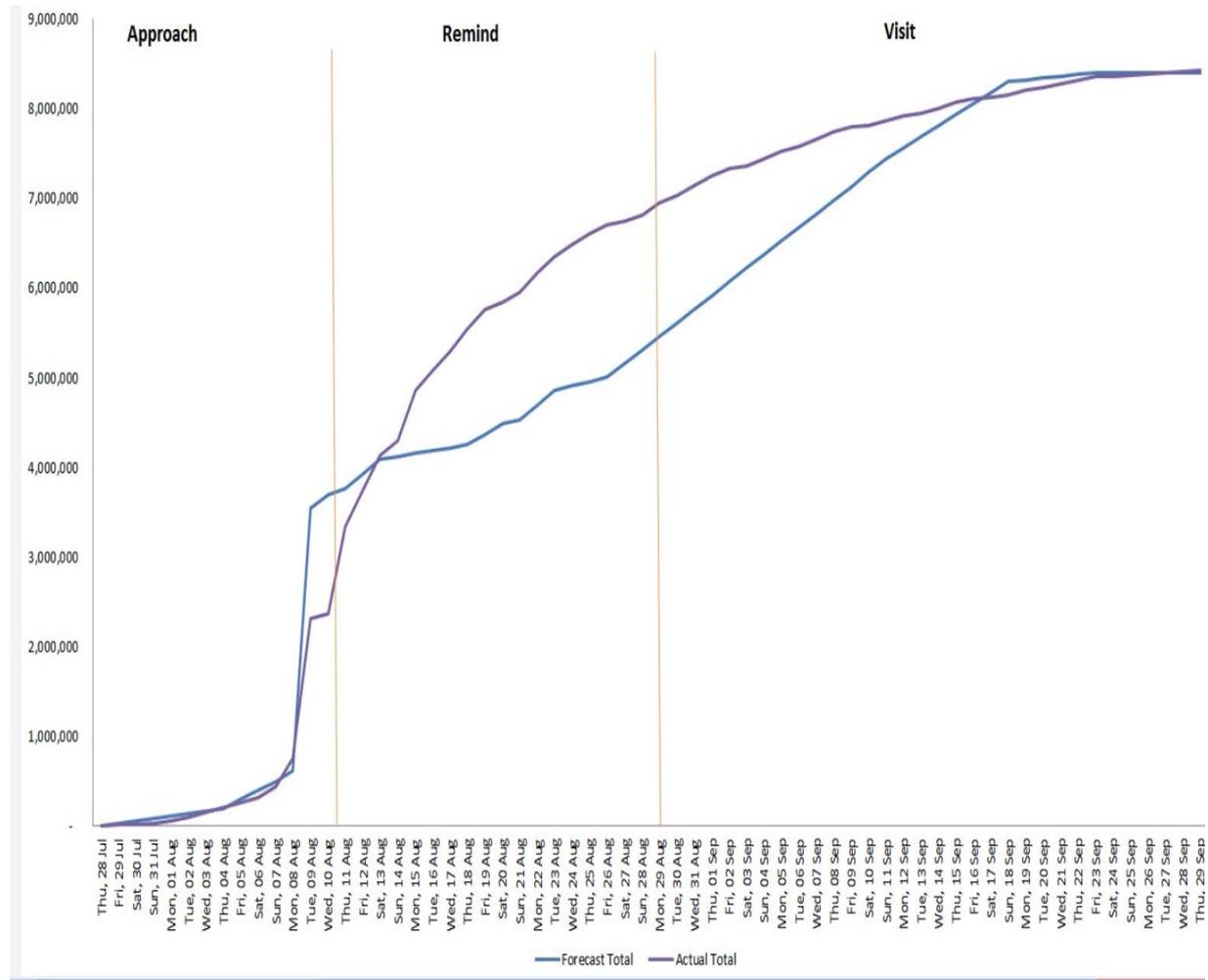
The Bureau of Statistics endangers the census by asking for names

Source: Kalisch, D. (2021) Census Headlines, [Collage].



Source: Canberra Times. (9 August 2016). canberratimes.com.au.

Exhibit C: Profile of 2016 Census response during the collection period: anticipated and actual



Source: Kalisch, D. (2017, September 13). 21st Century Leadership in the Public Sector and Learnings of Census 2016 [Conference presentation]. IPAA Tasmania AGM, Institute of Public Affairs Australia, ipaa.org.au.

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