

**JOINT STANDING COMMITTEE ON THE NATIONAL DISABILITY INSURANCE SCHEME
SENATE INQUIRY - NDIS ICT SYSTEMS**

SUBMISSION BY:

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Background

I am the Managing Director of the Centre for Digital Business, a digital services and artificial intelligence company.

My background includes extensive public and private sector experience in Australia and internationally. This experience covers policy and strategy, major programme delivery; operational service delivery of call centres; web and digital services; face to face client services; large scale technology services; and global innovation.

For two and a half years, I was the Head of the Technology Authority for the National Disability Insurance Agency. I was responsible for the NDIS Full Scheme technology business case; and led the co-design and co-creation effort with people with disability to deliver "Nadia". Nadia is an AI powered co-designed digital human that is an essential component of the NDIA's multi-channel capability for communicating with participants and suppliers.

I have immediate family members with disability engaging with the NDIS and providers.

I present a somewhat unique perspective across the business case, architecture, co-design, health sector innovation, technology industry and the lived experience of family members with disability.

Further details on my background is provided in the attached CV; online at www.centre-for-digital-business.com; and at LinkedIn <https://www.linkedin.com/in/mariehjohnson/>.

The discussion provided in this submission is based on information in the public arena including industry briefings, a great many NDIS conferences, my own professional opinion, and my lived experience with family members with disability. Further detailed information and references is in the report: *"Technology Authority Handover Report 9 June 2017"*.

Introduction

In late 2014, I was engaged by the NDIS to review and redraft the NDIS ICT Full Scheme Business Case (referred hereafter as business case), and shepherd this through the Budget process securing \$143 million in the 2015 Australian Government Federal Budget. For the following two and a half years, in the role of the NDIA Technology Authority I led a phenomenal small innovative team of world class technologists and disability entrepreneurs working on the NDIS innovation programme and co-design initiatives.

This work programme encompassed the co-design and development of the end-to-end participant experience pathway (2016); the strategy and design leadership of the NDIS emarket initiative to facilitate the interaction between disability services providers and NDIS funded participants; and the concept development, co-design and delivery of "Nadia". Nadia is an AI powered digital human that is an important part of the NDIA multi-channel strategy that I proposed in the business case. The work programme also involved the planning, design and construction of the NDIS Solution Design Hubs to support the collaborative co-design of services together with people with disability. The NDIS Solution Design Hubs are the only facilities of its kind in Australia, where every aspect of the facility was co-designed with and for people with disability.

Within two years, the number of participants in the NDIS will more than double from 180,000 to almost 460,000. Doubling the number of staff will not meet this challenge; nor will more traditional ICT investments such as websites and portals or the outsourcing of the call centre. As the 2011 Productivity Commission Inquiry Report into "Disability Care and Support" (hereafter the PC Report) first stated and then in response to the Harper Review into competition policy, the 2016 Productivity Commission Study Report into the "Introduction and Informed User Choice into Human Services: Identify Sectors for Reform" (hereafter Harper Review), a different result will not come from the continuation of the same failing approaches.

All the challenges currently being faced were forecast in the PC Report, the business and other reports. This submission looks at the current challenges which are the focus of this Senate Inquiry, all of which were predicted, predictable and preventable. The new capabilities needed were provided for in the business case and the Inaugural NDIS Board and Executive were strong supporters and advocates of innovation and co-design.

However, it appears from statements at Senate Estimates that with the focus on "the basics", innovation, new capabilities and co-design are seen perhaps as lesser priorities. I believe that the root cause of the current predicted challenges is the apparent absence of these.

This submission draws on public information from the past several years to provide traceability from the foundational description of systemic challenges, to the Budgets, strategies and new capabilities necessary to prepare and respond.

This submission offers for consideration recommendations of remedial strategies and actions.

Background to the Business Case

The background and context to the business case was provided at a great many industry briefings and NDIS conferences, in a close engagement with the industry, community and stakeholders.

The business case described two parallel strategies: new capability and innovation to deliver a contextual participant experience, and also the re-use of established, existing, and mature technology service capabilities. The business case described the delivery of capability over three phases (transfer, transform and transcend). DHS was responsible for the technology services, and the NDIA was responsible for innovation and co-design and teams in both agencies undertook a herculean effort which needs to be recognised.

There are considerable differences in approach between established standard technology services and innovation and co-design. Both of these approaches are essential in an endeavour that is a rapidly scaling and complex social change - not a steady state operation. Focussing on today's basics does not prepare for the turbulent challenges unfolding.

It is important to understand the concept of the "contextual participant experience" from a policy, strategy and delivery perspective. Issues that this Senate Inquiry is examining – appropriateness of infrastructure, the portal and website etc all relate back to this fundamental concept of the "contextual participant experience".

In this submission, I will describe this concept in some detail, and then thematically go through key areas of interest to give my opinion that the "contextual participant experience" has not been adopted as a design principle, and the current operational consequences of this. To be clear, the "contextual participant experience" is a fundamental design principle – it is not about the NDIA organisational structure. It is also not about digital service standards promulgated by the Digital Transformation Agency which are inadequate to this challenge.

The Contextual Participant Experience – A Question of Human Rights

Central to the business case was the concept of the "contextual participant experience", drawn from the UN Convention on the Rights of Persons with Disability as well as the PC Report. With approximately 60% of the NDIS participants having some form of intellectual disability or autism, the objective of choice and control compelled a different approach and one that by necessity had to be grounded in co-design. The traditional and templated approaches to service delivery have not worked: this point has also been emphasised in the Harper Review.

In recommending the creation of the National Disability Insurance Scheme in March 2011, the Productivity Commission outlined a national model for a single agency to oversee the NDIS that would, "... *explicitly encourage innovation and test its benefits... [and] genuine cultural change across all Australian jurisdictions will only be achieved by disrupting existing institutional arrangements*".

UN Convention on the Rights of Persons with Disability refers to "*augmentative and alternative communication*", "*...modes and formats of communication of their choice...*" and "*receive and impart information and ideas on an equal basis...*".

The NDIS and government overall is far from achieving this.

Here is the reality of the experience of dealing with government, and the participant experience of dealing with the NDIS:

For many people, accessing government and commercial services, including of course healthcare, can range from just plain difficult to frightening and isolating. As a mother and grandmother of family members with disability and chronic health problems, I know this first hand.

The NDIA sends letters to people who physically can't open them, and to people with a cognitive disability who cannot understand the bureaucratic language. Letters, forms and brochures point to the website which is not searchable; to the portal which does not meet the communication and accessibility needs of a great many people; and call centre which cannot meet the needs of people who are non-verbal or have cognitive impairment.

Many people with psychosocial disability find it traumatising to call the call centre, even the prospect of doing so. Many participants with a cognitive disability are not able to remember what was said to them over the phone, and either call up multiple times or are too afraid or anxious to call at all.

Similarly, participants with a cognitive disability or intellectual disability, have a very confronting experience with the website: complex and confusing navigation; complex language; and complex forms that are not accessible.

Participants and prospective participants, as well as their families, support networks and the disability providers, all seek the same information and answers to their questions,

Forty percent of the questions asked are the same questions, just asked in lots of different ways and not in government speak. This forty percent figure is a common and known factor in the call centre industry: 40% of general enquiries in any industry are about the same questions.

The call volumes are a function of the NDIS complexity, the search for contextual information, and the NDIS participant demographics. So, while the call centres volumes are escalating, as predicted, there is also a significant and growing unmet demand.

With this combined complexity of demographics and complexity of information, the call centre channel - the primary contact point for participants - will not be able to sustain the growth in call volumes. By some measure, it could cost \$70m per year at Full Scheme to run the call centre based on the number of *general enquiry calls* per participant.

Outsourcing does not address this: outsourcing shifts costs; obscures accountability; limits operational intelligence; and very significantly for the NDIS, impacts the participant experience and potentially their human rights.

The traditional siloed channel approach is not working and for most people and their families and carers, it is a confronting experience.

Even with the hundreds of millions of dollars invested in technology and systems, the experience of people with disability is traumatic to the point of systemic discrimination, potentially in breach of the UN Convention.

And the various circumstances described above, is what is meant by the “contextual participant experience”, and why co-design was described in the business case as a core capability to address this challenge.

The contextual participant experience approach as described in the business case is a *driver of benefits* when co-designed is systematically applied.

Significantly, *the absence of a co-designed contextual participant experience capability would drive costs and dis-benefits*: participants would not understand the letters; would not be able to fill in forms; would not understand the content on the website or be able to navigate it; and call centre demand would escalate with people struggling to find and understand basic information.

The current challenges were predicted and are almost completely due to the fact that a traditional siloed approach continues to be followed - websites, CRM, portal, call centre - and not from the perspective of the contextual participant and provider experience.

The current service offerings are already outside even minimum standards of quality and access, and this is particularly an issue for people with intellectual disability. This situation is not likely to improve by simply repeating the same patterns of service delivery.

Co-Design

The business case was about more than an “IT” solution. It described co-design as a core capability, and that digital innovation and co-design together were necessary capabilities for the Scheme to scale to Full Scheme, noting that 60% of participants have some form of intellectual disability.

Co-design is not about “user testing” or “business requirements”. It is not about coming up with an app or a new website design and getting people to comment on it. Co-design does not assume a solution or a particular service paradigm. It is a continuous life-cycle process of exploration, design and improvement driven by the lived experience of participants and providers – not a government bureaucracy.

One of the most important forums established from the outset, was the Digital Innovation Reference Group (DIRG) – chaired by a person with disability; members including people with a range disabilities; disability

entrepreneurs; technologists; and advocates. As part of the co-design efforts of the DIRG, the University of the Sunshine Coast psychology faculty supported co-design activities with people with intellectual disability. This was a deeply inclusive and immersive programme of co-design led by people with disability.

It has long been recognised that co-design with people with disability and inclusive of people with intellectual disability, drives innovation. Unfortunately, in my experience of government “digital” strategies globally, this is a rare instance of this approach being adopted by government. Such a radically different approach to the participant experience is not only necessary in terms of the purpose of the NDIS in achieving choice and control, and in line with the UN Convention, but is necessary to achieve efficiency.

The success of the NDIS depends on the NDIA’s ability to deliver a world-first scheme that provides participants with choice and control; that builds data intensity; and through the co-design of services to achieve a contextual participant experience.

The DIRG was deeply involved in the co-design of Nadia and the cognitive conversational dialogue; the design principles of the emarket; the co-design of the Solution Design Hub network; the engagement with industry; and the detailed co-design of the 2016 participant experience journey map.

Nadia – A Question of Human Rights

All the challenges currently being faced were forecast in the PC Report, the business case and other reports. These challenges were predictable and preventable with the new approaches and capabilities provided for in the business case. Without these new capabilities – described in this submission – the challenges that were predicted and now being encountered, will magnify as the Scheme scales.

The business case proposed a new capability – the omni-channel. This drew upon the evidence base and call to action for a new approach to cut through the confusing search for information, as described in the PC Report.

The “Nadia” digital human (or avatar) is part of this omni-channel capability, with the avatar itself described in the business case.

An omni-channel capability and strategy is different to an “integrated channel strategy”. The omni-channel strategy focusses on the *participant experience* and the seamless interaction *across* channels - whereas the integrated channel strategy focusses on how the channels interact and the design of channels, not the experience.

The development of Nadia involved a very deep co-design and co-creation effort based in market and community research; academic research, support and engagement with networks of people with intellectual disability; the development of the operating model within the Agency; and the research and development activities of strategic partners.

The initial use case was documented in the PC Report (described as “*confusopoly*”) and in the business case: the search for information and all the general questions and answers that people ask.

The only way to remove and avoid complexity is through the targeted co-design of participant facing and provider facing processes, tools and information. This is what Nadia is all about.

The Nadia innovation started first and foremost as a question of human rights.

Early in 2015, I led a small but highly capable team that began to investigate what it would take to achieve what the UN Convention describes as ‘*augmentative and alternative communication*’ and the ability for people to be able to ‘*receive and impart information and ideas on an equal basis.*’

I was interested to understand from the World Wide Web Consortium (W3C) what this would mean for the directions of the web. Together with colleagues, I spent time in 2015 with Sir Tim Berners-Lee, W3C Director and inventor of the World Wide Web, and his team discussing the Human Accessible Web initiative.

The work of the Technology Authority team eventually led to the creation of Nadia, the first digital human for service delivery and co-created with people with disability. Few people outside the team are aware that Nadia’s origins and its very purpose was in the Convention: it did not start as various technologies looking to solve a problem.

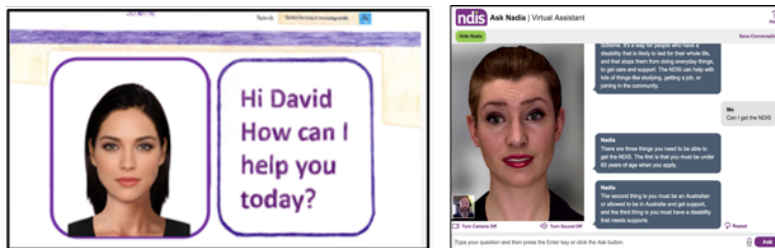
How could it be that people with disabilities, including those with an intellectual disability, could receive and impart information in their own context, and independently?

Had anyone ever asked or involved them? Had anyone ever acknowledged that the unique insights, skills and experience of people with disability could be imbedded as determinants of design? And that these new design determinants could quickly become mainstream universal design and benefit everyone?

The Convention is remarkable drafting. It calls out this paternalistic view of treating people with disabilities as “objects of charity” to “subjects with rights” based on informed consent. The realisation of augmentative and alternative communications could only be achieved through the imagination and co-design of people with disability, as demonstrated by the following images.

The image on the left is a co-designed sketch of *the experience that people with disability imagined*; drawn on paper and coloured with crayons well before any of the technologies were brought together.

The experience depicted in this sketch, was that people did not want to deal with confusing websites or call centres; *they simply wanted to have a face to face conversation* and not necessarily with another human person who might be impatient, judgmental or not available. This was many months before the Nadia face was identified: the face in the sketch was a composite face whose features were chosen through co-design.



Next to the sketched image is the final co-designed and tested Nadia interface, the product of twelve months of deep and iterative co-design. This human rights inspired co-design process established the blueprint through which the component technologies – including the AI system and expressive digital human – were brought to life.

This co-design blueprint encompassed personality, gestures, conversational model, knowledge and market research. University psychology faculty were deeply involved in supporting the co-design with people with intellectual disability, so that the words, expressions and conversational tempo was empathetic and natural.

Importantly, this supported co-design process ensured that information conveyed through the conversation was understood by people with intellectual disability in their context.

For the first time, instead of people having to adapt to systems and channels, this was a vision to have systems adapt to people and so go some way to achieving the objectives of the Convention.

Nadia was an empathetic embodied intelligent digital human, with a deep contextual body of knowledge, able to have a conversation. This was not the case of a simple question and answer chatbot.

Nadia – Current Status

A co-designed working Nadia conversational cognitive system was delivered by the NDIA (December 2016), ready for the traineeship phase to commence.

On 16 February 2017, the NDIA communicated with stakeholders via email, announcing the introduction of Nadia.

Nadia is not a Siri or Alexa – answering questions on any topic from the general population. Nadia is a “bounded system” and would only be able to have a conversation based on the conversational model of NDIS information. So, the comments from the bureaucracy about needing to be careful that Nadia didn’t go “rogue” are a little alarmist, and demonstrate a shallow populist science fiction view of AI.

Furthermore, Nadia – as with any AI system – is based on continuous training. Nadia is a new type of system, built on a unique combination of technology and co-designed with participants and stakeholders, underpinned by a cognitive platform. The nature of cognitive systems means that the learning and improvement process is never finished, which means co-design, testing and review for Nadia will be a continuous and ongoing lifecycle.

This system has been continuously co-designed and tested not only across the technology stack, but through to cognitive dialogue interaction and participant experience, including the experience of people with intellectual disability.

Functional development of the traineeship Nadia was achieved through rapid cycles of innovation and an agile approach to developing Nadia's capabilities through extensive co-design, co-creation and testing with the disability community and Nadia technology and academic partners.

Nadia understands 10,000 question variants, is capable of complex expressions (co-designed with people with intellectual disability), understands spoken and typed questions, speaks with Cate Blanchett's voice, and can already offer conversations on general NDIS information. To achieve this outcome, the NDIA has worked on the boundary of academic research, technology innovation and project delivery capabilities, to infuse co-design and community engagement through all parts of this project. The support and ownership from the community and the DIRG is significant, with members of the DIRG writing blog posts regarding their experience and encouraging this work.

Nadia – Readiness

As stated above, a working and tested Nadia system was delivered ready for the extended traineeship to commence.

I disagree with various statements since made by commentators and the bureaucracy, that Nadia was "not ready", and provide the following commentary presented in various public forums during the Nadia programme.

Nadia was built on a foundation genuine co-design, and early and continuous testing, with a comprehensive testing approach that has included usability testing, accessibility verification testing, performance and stress testing, penetration and security testing, machine learning progress testing, unit and system testing. Significantly, the co-design and testing approach has encompassed avatar gesture and emotion testing, and question and answer language testing with academics, psychologists, and people with intellectual disability.

Hundreds of current and future participants, carers, support workers, parents, and agency staff, as well as advocacy groups, disability community groups, and non-for-profit organisations were involved in this consultation, co-design and testing approach. Hundreds more current and future participants were involved in the question gathering activities to train Nadia, as well as through market testing focus groups and surveys. This includes:

- 71 current and future participants, and 7 carers, support workers, and advocates who were directly involved in co-design and usability testing of Nadia in 22 separate co-design and testing sessions, including extensive usability testing in live environments using Nadia's full technology and capability stack.
- 13 different organisations, covering sensory, physical, brain injury, intellectual, and psychosocial disabilities, with participants from NSW, Victoria, Queensland, South Australia, Western Australia, and the ACT.
- 60% of current and future participants who participated in live usability testing have an intellectual disability, reflecting the expected proportion of NDIS participants at full scheme who have an intellectual disability.
- Current and future participants in the NDIA and DHS staff participant networks contributed hundreds of questions to the training process for Nadia.
- Over 30 focus group participants, and a market testing survey distributed to 10,000 people (with links to videos of actual interactions with Nadia) with nearly 2000 survey respondents, who made direct contributions to question training along with survey responses and focus group participation.
- Over 400 of the 2000 survey respondents explicitly gave their consent to participate in ongoing co-design, training and testing of Nadia.

Nadia was co-designed and tested for use with seven of the most popular assistive technologies for screen reading, screen magnification, speech recognition, and machine speech. Nadia was also tested in all five major web browsers.

Nadia - User-focused Functional Testing

To be successful, Nadia is required to answer all frequently asked and repeated questions in a conversational format; understand a range of natural language and respond in plain English (not government jargon) with appropriate expressions.

These success factors have driven the approach to building Nadia, including the gathering of real questions to train Nadia's natural language capabilities, building in diversity by getting input from people with different disability types, from different regions, and with different skills, and testing early and continuously. The specific activities in this highly user-focused approach to consultation, design and testing are based on the three key tasks that Nadia performs when someone types or asks a question.

- **Understanding.** Nadia uses the natural language capability to interpret the question and form a hypothesis through cognitive reasoning as to what the person really meant. This was tested using continuous regression testing and testing with participants in live environments, examining how accurately Nadia identifies the underlying intent from a set of questions.
- **Answering.** Nadia's dialog capability then returns the corresponding answer, all of which have been written by specialist conversation writers and review team. This was tested with experts in intellectual disability from the University of the Sunshine Coast psychology faculty, and with participants in live environments, examining how useful Nadia's answers are, in terms of accessibility of language and content.
- **Communicating.** The avatar engine turns the answer text into speech, using the voice library recorded by Cate Blanchett, and then produces the corresponding facial animation which matches the speech and the co-designed "emotion" appropriate for each answer. This was tested by examining participant responses to the range of expressions used by the avatar, to test how closely the intended emotion being conveyed by the expression matched the perception of participants, and then testing the expressions and content in pairs with participants in live environments.

Nadia - Progressive Introduction (i.e. "traineeship") Planning

While the co-design and testing foundation on which Nadia has been built is extensive, additional risk mitigation was factored into the introduction strategy for Nadia. This includes:

- **Phased, staged introduction strategy.** This included an extended "traineeship" during which the focus was to be on continuing to expand Nadia's natural language and answer capabilities. This approach was to mitigate some of the key reputational risks to Nadia by managing expectations about her initial natural language and answer capabilities, and by promoting the idea that Nadia will continually learn and improve through interaction.
- **Comprehensive communications and stakeholder engagement strategy.** This progressive introduction strategy supported by a comprehensive communications plan in conjunction with the disability grassroots community. The communications strategy was to build awareness of Nadia and her capabilities as well as offer the ability for more people to become involved in her ongoing co-design and learning process.
- **Continuous and rapid issue identification and resolution.** Nadia's introduction was to be supported by an operating model which focuses on using the technology platform capabilities to proactively identify issues with Nadia's performance, both in terms of natural language and answer capability and technology availability and performance, and resolve them.
- **Conducted privacy, security, performance load, and launch readiness reviews.** Nadia's technology platform was extensively tested, with performance and stress testing (including a live test with a real, rather than simulated user audience), and external independent penetration and security testing. This was supplemented by formal security and launch readiness workshops and review, attended by all the industry and government partners involved in building Nadia, and standard compliance activities, including an external independent privacy impact assessment, and security threat and risk assessment.

Nadia – Issues

Nadia was the strategic omni-channel capability that government agreed to fund through the business case – to reflect the intentions of the PC Report – that new innovative capability is essential. Furthermore, the Nadia capability was seen as a demonstration of the government's innovation agenda.

The PC Report referred to the challenge of “confusopoly” confronting people with disability and their families, of the confusing and ever changing landscape of government policy and information.

It is now almost two years since the Nadia work was concluded, delivered on time and on budget. It has been on-hold for almost two years, and there is no coherency in the argument as to why the government direction has been put on hold by the bureaucracy.

In addition to the “Nadia not ready” argument which is not defensible, there appears to be several other factors:

- DHS. Notwithstanding the fact that Nadia was delivered by the NDIA to meet specific NDIA requirements, DHS considered this a whole-of-government capability and the Nadia capability roadmap would be determined by the DHS technology roadmap. From the outset, Nadia was only ever an NDIS capability – co-designed together with people with disability. Cate Blanchett agreed for her voice only to be used for the NDIS, not whole-of-government. My advice was that the Nadia capability roadmap could only be determined by the needs of the NDIS participants and this was not a DHS IT role. Obviously, there are indeed whole-of-government learnings and insight from this new capability, including policy. But Nadia was not an IT project, and its progress and roadmap should not have been constrained by DHS IT contracting arrangements.
- Government “IT” projects failures. During this period, there were a number of high profile government IT project failures: Census, robo-debt, ATO. A number of commentators have suggested that the government and the bureaucracy became increasingly risk adverse as a result. I believe that this was a contributing factor – but not a reasonable factor – in delaying the introduction of Nadia. The greatest risk in delaying the introduction of Nadia – as forecast in the business case – is being realised: the continuation of “confusopoly”, the impact on operational performance, and the impact of the participant experience and their human rights.
- NDIS political. Recent reporting in the media and from Senate Estimates, indicates that the NDIA focus is on getting the basics right – i.e. attending to the website, portal and call centre. The problem is, the basics are the problem – and this was described in considerable detail in the business case in support of the PC Report. No amount of additional staff, or work or investment on the website, portal and outsourcing the call centre addresses the fundamental “problem”. The fundamental challenge is the circumstances of people with disability and their experience in being supported seamlessly across channels at any time to find information and understand it. The PC Report – and the Harper Review – called for innovation, new capability and new ways of doing things. The traditional siloed channel by channel approach currently being adopted perpetuates the wicked problem of systemic discrimination so well extolled in the PC Report.

Nadia – an Australian Innovation

The Nadia innovation – putting a face onto artificial intelligence through co-design – spoke to a common service delivery challenge world-wide: the unsustainable burden of servicing through traditional channels.

I came across Professor Mark Sagar’s research work at the University of Auckland on Baby X, and saw this as an opportunity to combine his work on the human realistic face and neural networks with the IBM Watson cognitive platform, to create a conversational empathetic digital human service agent. The work on Nadia triggered the opportunity for Dr Sagar to spin out his research into a high-tech start-up called Soul Machines.

The three technology companies involved with Nadia – Soul Machines, FaceMe and IBM – have each gone on to deliver AI digital human in various sectors globally.

FaceMe for example, one of the world’s leading digital human platform companies, has deployed a range of AI digital humans commercially and to government, and most recently delivered the digital clone of the UBS Chief Economist Dr Daniel Kalt, for UBS Switzerland.

[Reference: <https://www.ubs.com/magazines/innovation/en/wealth-innovation-lab/beta.html>]

And Soul Machines for example, showcased one of their AI digital humans last year at Davos. I know of no other innovation, initiated from an Australian humanitarian cause, that has ever been showcased at Davos.

I myself am leading other humanitarian applications of AI digital humans in healthcare and education with parties in Europe and the US. An example of this is outlined in the book “Augmented Health(care): The End of the Beginning” by Dr Lucien Engelen from The Netherlands. [Reference: <https://lucienengelen.com/book/>]. I contributed Chapter 48 “Digital Humans in Health(care)”.

And whilst the AI digital human innovation is being deployed by major brands, companies and other governments worldwide, people with disability themselves are told to wait.

And it is regrettable, that in a desire not to attract too much attention to Nadia, the bureaucracy ordered the withdrawal of the iAward nomination for Nadia, the day the winning iAward for Nadia was to be announced at a major awards event last year (2017). (The iAwards are the premier Australian national innovation awards.)

So, whilst this innovation was celebrated at Davos, the people with disability who had driven and inspired Nadia's design were denied recognition and acknowledgement of their remarkable roles in this ground-breaking global achievement. This recognition would have provided the people with disability involved in the co-design and more broadly, with potential employment opportunities and growth in the technology sector. And this is the immense social and economic value of the iAwards, as many other people over the 25 years of the iAwards have experienced. Being effectively excluded from the recognition and potential employment opportunities through the iAwards is deeply regrettable treatment of the people with disability involved, and the community.

Nadia - Recommendations

For all the defining reasons outlined in the PC Report and in the business case, the Nadia omni-channel capability is increasingly urgent.

It is almost two years since any co-design and development work has been done, and in that time the research and technology advancement has accelerated exponentially. It is not a simple case of flicking the switch on and activating Nadia, as some in the political sphere and in the IT areas of the bureaucracy might believe. A complete programme of co-design and the resourcing and skilling-up of an operational model would need to be implemented.

Furthermore, both Soul Machines and FaceMe are now offering sophisticated digital humans and therefore vendor selection provides further options to government.

The Nadia programme should be reinstated and run by the NDIA as a strategic capability, as envisaged by the business case, independent of DHS.

The eMarket

The need for an NDIS emarket was first identified in the PC Report as an essential support to people with disabilities to ensure control and choice when planning for the services and products that best meet their needs.

The NDIS emarket is essential to the rollout of the NDIS and overall Scheme sustainability. The PC Report identified that a key factor in the successful transition from the block-funded and service-centred models of delivery to a person-centred model was the ability for participants to genuinely exercise choice, and also the development of a properly operating market of providers.

The NDIS emarket will positively affect the estimated 460,000 NDIS participants, their families and carers, and the over two million people with disability in Australia that would be able to use the services of the NDIS eMarket (referred to as Tier 2 or Information, Linkages and Capacity Building) (ABS 2009 Survey of Disability, Ageing and Carers (cat no. 4430.0)).

Approximately 6,000 Australian businesses comprising small, medium and large enterprises would also be positively affected through their ability to trade in the NDIS emarket.

According to the Parliamentary Budget Office, the NDIS is the single largest contributor to growth in spending in the social security and welfare category, with spending projected to grow to 1.1 per cent of GDP in 2025-26 (\$32 billion) (Parliamentary Budget Office, 2015-16 Budget, Medium-term Projections, Report, 02/2015, PBO, Canberra, June 2015, Table 3-1).

In NSW alone, the NDIS is expected to generate up to 28,930 extra jobs and double the size of the disability services market to nearly \$6.8 billion during the next three years (NDIA NSW Market Position Statement, March 2016).

For Australian businesses, the NDIS emarket presents broader exposure to a purchaser provider ecosystem that will demand industry innovation and expand opportunities to establish new trading partners and collaborative business arrangements. This will provide economic benefits that will flow through to job opportunities and business sustainability.

An emarket with cognitive intelligence capabilities will provide choice for individuals in how they interact with government and the market beyond traditional channels such as call centres and government shopfronts. Traditional service delivery channels such as the web and telephone have proven deficient in meeting the needs of people with disabilities and their families.

The data and business intelligence that will be made available through the NDIS emarket will be essential for ensuring the Scheme sustainability. Sharing and monitoring information on disability market growth and services gaps will enable effective actuarial analysis of the Scheme performance, reporting and compliance requirements.

The Productivity Commission also noted that market evolution would be a factor in the pace of adoption of self-directed funding. Should the NDIS emarket not proceed, there is a risk that the delays in transitioning to a genuine person-centred model with choice and control, will impact the rate of adoption of self-directed funding, which will in turn drive higher costs. The Commission also noted evidence of the benefits of an efficient market to the budget in the long term, with the combination of informed participants and a competitive and effective market ultimately leading to better outcomes for participants through more timely, targeted and better quality supports, which ultimately supports Scheme sustainability through downward pressure on lifetime costs.

The establishment of the NDIS emarket is consistent with the move to consumer directed services as recommended by the Harper Review.

The ANAO report on the Management of Transition of the Disability Services Market (November 2016) also noted that availability of market information and participant capacity to act as informed consumers are key measures to address barriers to a successful market transition. Further, the report noted the Scheme Actuary's perspectives on the connection between market activity data, and the ability of the NDIA to support its operational and market stewardship responsibilities.

The NDIS emarket will make it easier and more efficient for NDIS participants to find and access the services they need to support their daily lives, and will enable NDIS providers, businesses and community organisations to showcase their services and products to people with disabilities through a highly accessible online community market place, underpinned by an information platform that supports information discovery, encourages industry innovation, and builds local community capacity.

eMarket - Current Status

There has been detailed discussion in the public arena, including industry briefing sessions and numerous conferences, as to potential models for the NDIS emarket – i.e. government owned and operated or via services delivered by an experienced emarket operator.

I led the NDIA Technology Authority in the detailed planning and documentation of requirements in preparation for a commercial engagement.

There was a view held in some areas of government that the NDIS emarket should be part of a broader whole-of-government emarket. The argument for a government run model is that this platform or infrastructure, would provide an emarket capability across government programmes with common templates. NDIS would be one of the “tenants”. It is unclear how this generic approach would incorporate co-design with people with disability, and in particular, people with intellectual disability.

This view contemplates an emarket narrowly as an IT function or architecture. As with Nadia, the NDIS emarket strategy is not an “IT” function but rather requires a comprehensive operating model to support the engagement between people with disability, their families and providers.

I personally believe that it is not the core business of government to build, own and operate an emarket of this magnitude. Government does not have the commercial or operational emarket experience or expertise. In contrast, there is deep commercial and service delivery operational emarket expertise in the private sector. In my opinion, a decision to proceed with a government owned and operated model would add extraordinary risk to an already high risk and challenged NDIS rollout.

The capability that the NDIA needs to implement is an emarket that connects commercial suppliers to individuals, not commercial suppliers to government. The latter has been the subject of much research, promulgation of standards, panels of eProcurement software providers and reviews over 20 years by government organisations such as NOIE and AGIMO, pre-cursors of the DTA. Yet another revisiting of this government-centred approach will not yield the emarket capability required by the participants in and suppliers

to the NDIS. The commercial operation of the emarket is necessary so that the commercial expertise is deployed: the latest search algorithms and software to aggregate suppliers, hide catalogue complexity from customers and simplify their searches, and provide the transactions, reporting and analysis required.

eMarket - Recommendations

The NDIS emarket should be delivered through experienced commercial emarket operators and this arrangement could be put into effect within three to six months.

A commercial NDIS emarket arrangement would require a core of common APIs to enable the exchange of data between the NDIS systems and the commercial emarket operator. The APIs will require business process co-design (not just technical design) with participants, providers and the Agency.

NDIS Cognitive Capability Strategy

The Nadia conversational cognitive capability for general questions and answers, described earlier, is but one stream of the overall cognitive capability envisaged in the business case. The cognitive capability was intended to underpin all the NDIS operations: Nadia Q&A omni- channel; personalised Nadia (connected to the CRM); the actuarial cognitive capability; and the emarket cognitive capability.

A consistent cognitive platform across all these streams is critical to achieve an optimum participant experience; build a cohesive corpus of knowledge; maximise operational intelligence; and avoid unnecessary costly and complex integration between different cognitive platforms.

Procedural decisions made on an IT contracting basis outside the control of the NDIA undermines the integrity of this strategy. Without this capability of a consistent cognitive platform, the NDIA will continue to lack intelligence in the participant experience and operational performance. This would mean that as the Scheme continues to scale, the lack of operational intelligence would significantly constrain strategic decision making in critical areas.

The inability to address the current challenges with infrastructure, the web and the portal is an example of this risk being realised.

NDIS Cognitive Strategy - Recommendations

The NDIS cognitive strategy needs to be urgently implemented. Decision making regarding strategy, roadmap and cognitive platform contracting arrangements needs to be within the control of the NDIA.

Technology Innovation – New Capability

A focus on the basics to the exclusion of future capability (already shown to be historically problematic) has compromised the adoption of new and necessary capability, critical for the Scheme to scale.

It is insufficient for this Inquiry to look at infrastructure, website and portals without a discussion about what the near future brings and about how new servicing models redefines what is and is not required.

In this day and age, it should not even be necessary for the Australian Parliament to spend time looking at website and portal issues. This demonstrates how compromised the future operations has become.

It was for this reason in anticipation of a continuous cycle of new capability adoption, that the business case envisaged partnerships with the Australian and global innovation and technology ecosystem.

An ecosystem of global technology and innovation was identified as essential by the PC Report, to the scaling and sustainability of the Scheme.

Of significance to the NDIS, are the research efforts across the global technology and innovation ecosystem into the economic impact of the demographic convergence of disability and ageing populations. This is a significant concern and remains for the US and economies globally one of the biggest economic, human capability and budget issues.

Emerging from the R&D efforts underway, breakthroughs in computing power and design are driving the convergence of technology solutions for people with disability and ageing populations with considerable mutual benefits, and the two can no longer be treated in isolation of the other. This is the importance of NDIA's engagement with the technology and innovation ecosystem.

This research is showing that all people experience functional – or situational – disability in different circumstances. Situational disability is a term used to describe a temporary state imposed by a person's current environment that results in an accessibility issue, such as the inability to use one's hands on the phone when driving. It is not physiological or pathological like other disabilities.

Situational disabilities impact all people universally and there are opportunities and unrealised potential for all people to benefit or leverage technology advancements that were initiated to reduce the impact of physical or cognitive disability.

These examples include closed captioning, which was originally meant to benefit people with hearing impairments and this now helps people who have trouble with auditory information processing, as well as for people watching television in noisy locations. Another example is SMS – now pervasive – but its introduction into Australia was accelerated as a result of the intervention of the Human Rights Commission so that people with hearing impairment and their families could communicate with one another – with the same access opportunities as the general population – as mobile technology and devices became mainstream.

The need to address situational disability means that suppliers of technology have far greater commercial incentives for improving the usability of their products and lessen the impact of situational disabilities for all people.

The move towards addressing situational disabilities as a design best practice brings significant benefits to people with disabilities.

This means that improved features, functionalities and user design are beneficial to all consumers and not just for a smaller market segment. From a Scheme sustainability and Human Rights perspective, accessibility becomes a mainstream driver of innovation, affordable for all, and not bespoke or special.

Accessibility is now a significant global commercial opportunity and the broader concept of accessibility positions the NDIS as a catalyst for the mainstreaming of new innovations.

The business case proposed the establishment of a “*Council of Advanced Innovation*” by the Agency through which the Agency could shape, influence and engage local and global research and development in standards and technology innovations.

Connection with global innovation system achieved

With the support of the NDIA executive and Inaugural Board, the Technology Authority led the NDIA innovation strategy and established significant relationships, partnerships and networks across the global technology and innovation industry.

- NDIA was one of the founding partners of the SAP Global Institute for Digital Government.
- NDIA was a sponsor of the Massachusetts Institute of Technology (MIT) Centre for Information Systems Research.
- NDIA established collaboration with the World Wide Web Consortium (W3C), specifically the human accessible web initiative with the NDIA addressing the global W3C forum in Perth in April 2017.
- The NDIA partnered with the University of the Sunshine Coast psychology faculty for academic research in cognitive systems and co-design support with the intellectual disability community. The University of the Sunshine Coast considered this work so ground-breaking, that a PHD scholarship programme has been awarded to develop academic research in this area.
- The NDIA established a formal partnership with the Australian Information Industry Association (AIIA), encompassing the NDIA sponsorship of the National iAwards, the Navigating Digital Government Summit, and the NDIA engagement at events in Queensland, NSW, ACT, South Australia, Western Australia, and Victoria.

It is estimated that of the \$22 billion at Full Scheme, approximately \$1.06 billion will be attributed to assistive technology (NDIA Assistive Technology Strategy). A greater proportion of expenditure on AT would optimise the whole \$22 billion, enhance outcomes and drive sustainability. This will require an ecosystem of innovation in interfaces and digital services to augment physical products, devices and traditional services. For the Australian technology and innovation industry this is a very significant innovation and new jobs opportunity – including jobs opportunity for people with disability - which is yet to be fully comprehended.

It is not clear if these strategic global innovation partnerships have continued.

In Closing

I have made firm statements in this submission because I was an executive with a detailed inside view of the subject matter of the Inquiry, and have the deep government and technology industry knowledge experience required to interpret what has transpired. Furthermore, as I said, I have family members with disabilities that are being severely affected by the lack of progress in many areas pertinent to the Inquiry.

Despite these statements and my concerns, I remain of the belief that the NDIS is of paramount importance to all Australians. Secondly, I cannot emphasise enough the great value of the ideas, insights and efforts contributed by the disability sector, especially the members of the DIRG, and the many APS staff within the NDIA, DHS and other agencies. I also want to acknowledge the technology and other partners who contributed so freely and willingly to the co-design process in the early days when any opportunity for revenue was outweighed by a belief in the importance of what we were trying to achieve and the excitement of being at the cutting edge of human machine conversation.

Finally, I also acknowledge the leadership of the Inaugural Board, Inaugural ICT Steering Committee and senior executives of the NDIA who have driven the NDIS from day one and who were willing to listen to and support innovative approaches.

Summary of recommendations

The challenges with the infrastructure, website and portal are not IT issues. These are fundamentally symptoms of a lack of service design innovation to support the contextual participant experience, and lack of co-design with people with disability and the disability services sector. These challenges were predicted, predictable and avoidable.

- Co-Design Capability

An expert co-design capability should be established in the Agency, as envisaged in the business case. This would provide APS staff with the opportunity to upskill in an exciting and strategic practice and skill set that is in high demand. As originally envisaged, co-design is a strategic core capability and this function should be resourced with APS staff and most importantly, including people with disability. Trying to retrofit the NDIA to some elsewhere designed and developed common government platform or standards will not work. However, a platform and standards co-designed by and for people of disability would be usable by all agencies for all Australian citizens.

- Industry Taskforce

There too many challenges with the participant and provider experience and interaction to be resolved internally by the Agency and DHS. From my experience, the only way to really break through these challenges is to establish an industry taskforce led by a major player in the sector – such as National Disability Services (NDS). The purpose of the NDS led taskforce would be to bring together experienced operators, participants and DHS/Agency staff, and high calibre subject matter experts to drive breakthrough re-design in key processes. The taskforce should also look at alternative operational and service models (i.e. non-government) and API framework. The timeframe for the taskforce should be a fairly aggressive three months. This is essential before any technology or systems work is commenced.

- Nadia

It is almost two years since any co-design and development work has been done, and in that time the research and technology advancement has accelerated exponentially. It is not a simple case of flicking the switch on and activating Nadia, as some in the political sphere and in the IT areas of the bureaucracy believe. A complete programme of co-design and the resourcing and skilling-up of an operational model would need to be implemented.

Furthermore, both Soul Machines and FaceMe are now offering sophisticated digital humans and therefore vendor selection provides further options to government

The Nadia programme should be reinstated and run by the NDIA as a strategic capability, as envisaged by the business case, independent of DHS.

- eMarket

The NDIS emarket should be delivered through experienced commercial emarket operators and this arrangement could be put into effect within three to six months.

A commercial NDIS emarket arrangement would require a core of common APIs to enable the exchange of data between the NDIS systems and the commercial emarket operator. The APIs will require business process co-design (not just technical design) with participants, providers and the Agency.

- NDIS Cognitive Capability

The NDIS cognitive strategy needs to be urgently implemented. Decision making regarding strategy, roadmap and cognitive platform contracting arrangements needs to be within the control of the NDIA.

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## MARIE JOHNSON



Marie Johnson  
Managing Director and  
Chief Digital Officer  
Centre for Digital Business Pty Ltd



Marie is the Managing Director of the Centre for Digital Business, a digital services and AI company. Within the global digital community, Marie is recognised as an innovator, skilful executive and thought provoking commentator.

Marie conceived and led the global co-design and co-creation effort with people with disability to deliver "Nadia" the first AI digital human for service delivery, which has attracted worldwide interest.

With extensive public and private sector experience in Australia and internationally, Marie has led the strategy and implementation of significant social and economic reforms to the digital machinery of government across service delivery, revenue, identity, payments, immigration and disability services. These initiatives involved multi-jurisdictions, other national governments, and international research, technology and standards organisations.

The diversity of roles covers service delivery operations, global technology strategy, Chief Information Officer, Chief Technology Architect, Technology Authority, board director and advisor, and mentor to start-ups.

The US Government awarded Marie an *O-1 Visa* (Individuals with Extraordinary Ability or Achievement) to take up the role leading *Microsoft's Worldwide Public Services and eGovernment business*, including Microsoft's Identity Strategy in Government. Microsoft noted Marie's egovernment knowledge "...is unique in the world and is of particular interest to Microsoft as we pursue our egovernment strategies".

In addition to large scale service delivery operations, Marie has led the strategy and implementation of significant reform programs across the digital machinery of government:

- ABN registration in joint task force with the ATO.
- The Business Entry Point, initiative of the three levels of government.
- Chief Technology Architect for the \$1billion Health and Human Services Access Card programme.
- Initiated and delivered BasicsCard.
- Collaboration with the Reserve Bank of Australia on innovation in payments and information services industry task force.
- Service Delivery Reform technology business cases bringing together Centrelink, Medicare and Child Support.
- Delivery of the \$700 million Visa Pricing Transformation (VPT) programme; and delivery of the Global eMedical system to 100 countries in partnership with Citizenship and Immigration Canada at Department of Immigration and Citizenship (DIAC).

The government and digital initiatives Marie has led have been also been recognised globally.

- These include the *United Nations Public Service Award* in the category "Application of ICT in government: government" for the Business Entry Point ([www.business.gov.au](http://www.business.gov.au)) which she led for 5 years.
- In 2006-2007, Marie was named "*Innovative CIO of the Year – Australia*".
- In 2013, Marie was named one of Australia's "*100 Women of Influence*".

For many years, Marie was an invited member of the Accenture Global CIO Advisory Council; an Independent Member of the Australian Federal Police Spectrum Programme Board; and an elected National Board Director of the Australian Information Industry Association.

Marie is currently a member of the New South Wales Digital Government Advisory Panel; and NZTech.

**Qualifications:** MBA (Melbourne Business School); Bachelor of Arts; Harvard University Kennedy School of Government Senior Executive Fellows Program; and Graduate of Australian Institute of Company Directors.