KEY MESSAGES

MAKING COMPLEX INTERFACES WORK FOR THE NDIS

Analysis of online organisational networks and relationships in the NDIS

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Context

The National Disability Insurance Scheme (NDIS) is expected to stimulate diverse organisational networks and new service markets[1,2]. Still, providers will need to work together to coordinate the various supports required by participants and to avoid ineffective, inefficient, and fragmented responses to people with complex needs[3]. Participants of the scheme will also need quality information to exercise choice and control and self-manage funded supports[2].

Organisational online presence will be increasingly essential for collaboration and communication in the marketised sector. Websites and hyperlinks between them are mechanisms to connect providers and NDIS participants. Online linkages to some extent indicate the presence and absence of important relationships. Mapping websites and linkages are important for understanding the organisational structure of the disability sector and connectiveness between organisations.

Understanding how various government, non-government and commercial agencies are interconnected online provides some insight into the emergent structure and important relationships. In turn, this may help stimulate discussion and questions, and generate practical responses regarding collaboration among NDIS registered and mainstream services, both online and offline.

In this study, digital research tools were used to create, map, visualise and understand the online relationships between disability, health and community organisations providing supports to NDIS participants. The analysis sought to answer two main questions:

1. What does the online NDIS network look like?
2. Which are the important websites in this network?

What does the online structure look like?

Network of NDIA and provider organisations

Figure 1 (below) provides a visual map of the 216 seed websites and their hyperlink relationships to each other. The seed websites were comprised of predominantly (69%) private organisations, with non-government organisations (17%), government (11%), social enterprise (1%) and peak bodies (1%) accounting for the remaining organisation types. The selection of seed websites were 22 purposively selected government and disability service organisations, 15 Hospital and Health Services providers and 179 randomly selected Queensland NDIS registered service providers. The randomly selected providers incorporated various types, sectors (e.g., disability, health, social services, aged care) and foci (e.g. advocacy, support services).

As shown in Figure 1, the NDIA website has the most linkages (66) among the 216 seed websites. Many organisations link to the NDIA website, but the NDIA website itself links users to only a few specific organisations. Of the 66 links, 60 were incoming links from private (48%), non-government (28%), government (20%), peak (3%) and social enterprise (1%) organisations. The remaining 6 links were mutual, suggesting interdependent relationships. Mutual links existed between the NDIA and: the NDIS Commission, Department of Social Services, Disability Connect Queensland, National Disability Services, First Peoples Disability Network, and Carers Queensland.

[1] Carey et al. 2018, *Soc Pol Admin*

[2] David & West. 2017, *Aust J Soc Iss*

[3] Hodges et al. 2013, *Aust Soc Work*

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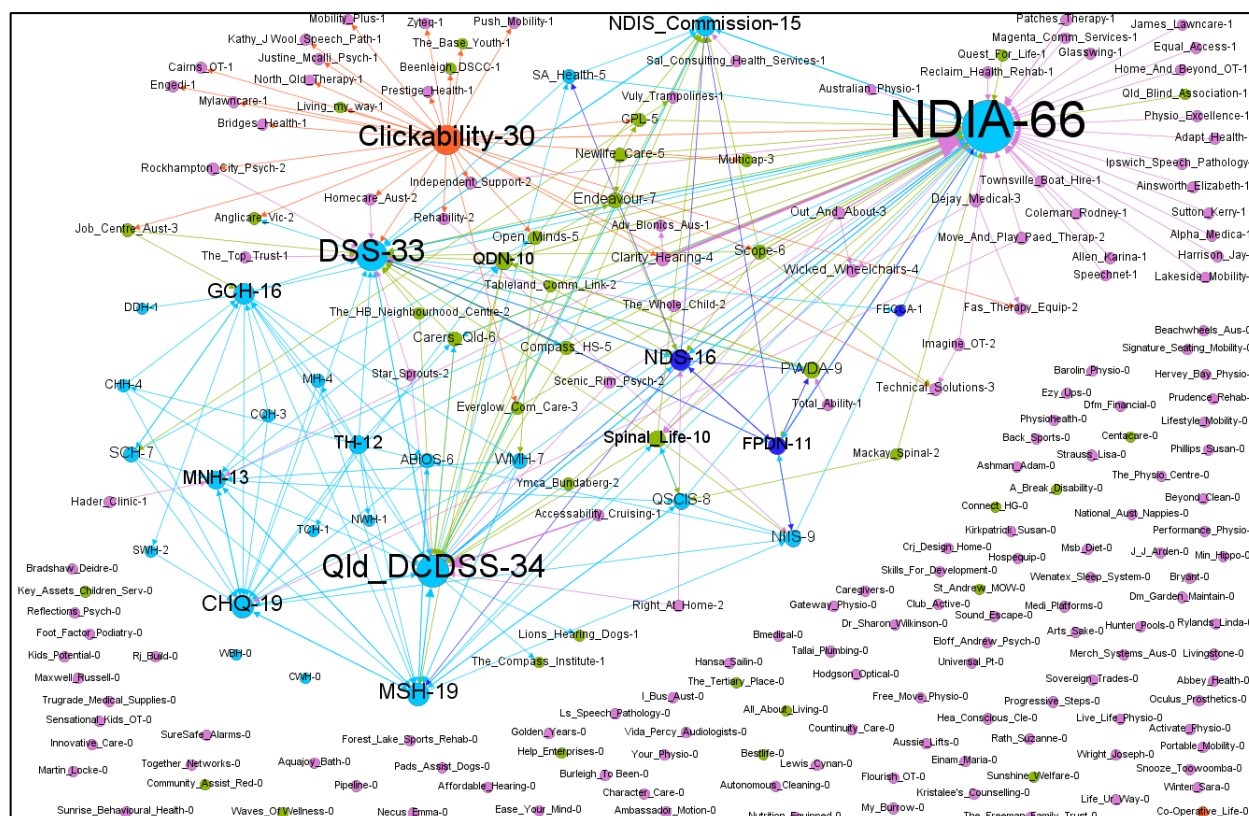Twitter   twitter.com/hopkins_centre

Figure 1. Visualisation of hyperlink relationships between 216 seed websites.
Note. Number attached to each websites indicates direct ingoing and outgoing links within the 216 websites.
Colour denotes organisation type: purple=private organisations; green= non-government organisations; light blue= government; dark blue=peak bodies; and orange=social enterprise.

Reflecting their important role in representing other organisations, peak bodies including National Disability Services, Disability Connect Queensland and People with Disability Australia, have high outgoing connectivity to other seed websites. Outgoing links were to mainly commercial (.com, 36%), not-for-profit (.org, 29%) and government (.gov, 25%) organisations. These peak bodies are also recognised by government and non-government organisation seed websites via incoming links.

A majority (51.4%, n=111) of the 216 websites crawled did not connect with any of the other 216 organisations. This suggests that although these are registered NDIS provider organisations they do not find the NDIS network relevant to their primary work, including the NDIA. These organisations are visualised at the bottom area of Figure 1. Isolated websites were predominately private organisations (87%) and were typically specific professional or technical services (e.g. audiology, psychology, plumbing, etc.), with limited explicit inter-organisational engagement. The remaining websites were 11% non-government organisations, 2% government and 1% social enterprise.

Full network

In order to develop an understanding of the broader online community, all the websites that the 216 seed websites are connected to were identified. An additional 8,421 websites were identified, establishing a combined full network of 8,637 websites. Nearly 50% of the full network were commercial labelled websites (.com), 27% not-for-profit (.org), 15% government (.gov) and the remaining a combination of education and other domain types (e.g. .net, .edu). The most active and connected websites within this broader network include Clickability, Department of Social Services, and the Gold Coast and Metro North Health and Hospital Services (all seed websites).

Similar to what was seen among the seed websites, the NDIA website also had few outgoing links within the full network, pointing to only 2% (214 of 8,637) of websites. The NDIA's website pointed to 40% government, 32% commercial websites, 21% organisational websites, and a small number of education or network websites.

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Some organisations act as online information brokers, providing external linkages to service providers and other organisations. Clickability's website particularly facilitates users in finding other organisations or information, as does many advocacy groups: National Disability Services; People with Disability Australia and Queenslanders with Disability Network. Established in 2014 in response to the NDIS, Clickability has 1,418 outgoing links within the full network. These outgoing links are predominantly to commercial (63%) and not-for-profit (27%) organisations. No seed organisations linked to Clickability from their websites, suggesting that Clickability is yet to be seen as important by others in the NDIS online network.

Which are the important websites in the NDIS online network?

Determining the most important websites helps understanding of the NDIS online environment, but the use of network measures.[4] In a network, important websites can be either those that other websites see as authoritative and demonstrate this by linking to; while other websites are important to the network because they act as connectors as denoted by high linkages to others in the network.

The top 100 authoritative websites within the full network are presented in Figure 2. Social media platforms (Facebook, Twitter, YouTube, LinkedIn and Instagram) accounted for the top five highest websites. Such sites are generally deemed 'important' due to the frequency with which organisational websites link to their social media accounts, an observation mirrored in the UK online government network.[4] Government websites are generally the next most authoritative websites, often mirroring their importance in offline governance structures, whereby federal government websites are ranked higher than those of state or local governments. A quarter of the top 20 authority scores were for federal government websites (including the Department of Health and My Aged Care). The remaining top 20 important websites were comprised of mental health services (e.g. Beyond Blue) and regulatory agencies (e.g. Australian Health Practitioner Regulation Agency).
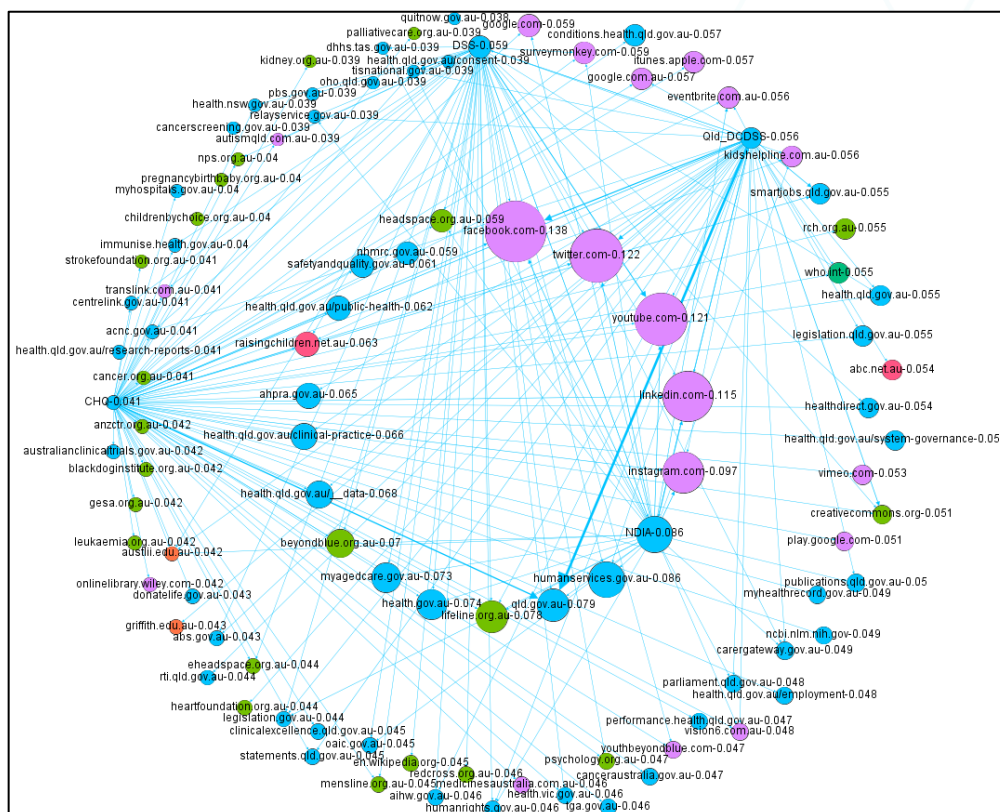

Figure 2. Top 100 authoritative websites within the full network (8,637 websites)

Note. Authority is determined on a scale of 0.0-1.0, with higher scores identifying important websites. The inner circle represents the 20 most important websites (clockwise).

Hub scores reflect the value of a website's connectivity to others within the network, and as such can be regarded as referrer websites. Clickability, an Australian disability service directory website, was among the top highest hub sites. Health and Hospital Services websites accounted for half of the top 20 referrer websites. Other state and federal government services, and prominent disability-focused organisations were also among the top 20 highest hub sites including the Department of Social

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[4] Kleinberg. 1999, *Journal of the ACM.*

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Services, Queenslanders with Disabilities Network, Scope and Spinal Life. These highly connective websites reflects their offline importance in linking people to other organisations.

Implications

Websites provide organisations with the opportunity to present who they are and what they can do. However, the development and use of websites often has many purposes, for example, providing the public with information or for establishing operational links to other organisations.

Many small, private entities providing NDIS services are isolated with the wider NDIS online network, with limited visibility and connections. These types of entities could consider their capacity and capability to link into the NDIS network, such as enabling their clients to understand NDIA benefits.

This analysis also highlights that organisations could consider the value of social media platforms and the various roles exhibited by these, including for video hosting (YouTube), distributing information updates (Twitter) and interacting with users (Facebook and Instagram). As there is increasing progression towards the online world, organisations failing to operate online or through social media platforms may be limiting their online visibility which can affect offline visibility and their sustainability.

While online presence is increasingly essential for information and service delivery in the NDIS environment, complementary exploration of offline relationships is necessary to fully comprehend organisational relationships and interfaces. Everyday analysis of inter-organisational relationships will also help discern the nature of relationships, e.g. informational, advocacy or service-related, how relationships are changing and what challenges arise in the NDIS service delivery environment.

Methods

Digital research tools were used to map and analyse the online organisational links and networks, based on 216 seed websites. A purpose built web crawler in R was used to crawl seed websites for: (1) hyperlinks between seed websites and (2) all other outgoing hyperlinks from seed websites to other websites. The resulting websites created a full network. Data visualisation using Gephi aided the analysis of the hyperlink data. Kleinberg's Hyperlink-Induced Topic Search (HITS) analysis was used to identify websites with high value of webpage information (authority scores) and important referrer websites (hub scores).

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