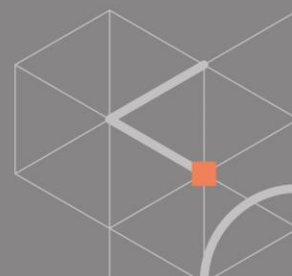


## Markets and the NDIS



## SUMMARY

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Recipients of NDIS support require access to the same types of goods and services required by all citizens. While markets exist to facilitate transactions in these services, they do not necessarily cater for the highly specific needs of consumers with disability. The evolution of markets to meet these needs has been crowded-out by the state-provided service model that preceded the NDIS. Market design principles, market design methodology and applications of computation, communication and coordination technologies can: expand the boundary of existing markets to consumers with disability; create new markets for services where they currently do not exist; and reduce transaction costs. These capabilities could transform the economic environment in which recipients of NDIS support transact to procure the goods and services needed to manage disability. This task is analogous to investments in physical infrastructure needed to facilitate access, inclusion and participation for those with disability.

## 1 INTRODUCTION

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The National Disability Insurance Scheme (NDIS) represents a fundamental change in the way disability services are provided in Australia. The key elements of the NDIS are: secure funding for recipients, choice and control over the use of funds and a transition to non-government service providers. This approach effectively relies on the emergence of markets to facilitate transactions between private service providers able to supply goods and services needed to support disability, and recipients of NDIS funding. It cannot be assumed, however, that such markets will “grow like weeds” (Roth, 2002) where they are missing, or facilitate efficient, fair, or efficacious transactions where markets already exist. This paper aims to identify the contribution that economics, specifically the field of market design, could make to assist transition of the NDIS from a centralised approach (where government provides services), to a decentralised model where services are procured from the market. A brief explanation of market design and the market design methodology is provided in the next section followed by an assessment of the interventions that might assist government to implement the NDIS vision.

## 2 MARKET DESIGN

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Markets for many goods and services evolve autonomously through a natural selection process in which buyers and sellers choose between competing transaction formats<sup>1</sup>. This selection process leads to the creation of markets that are: i) efficient – they maximise the value created for buyers and sellers including transaction costs; ii) efficacious – deliver the goods or services purchased and ensure suppliers are paid according to the contract; and iii) fair with respect to the distribution of value. Markets for different goods and services are defined by the rules, conventions and codes of practice that govern behaviour, lead to truthful revelation of information, discover efficient prices, facilitate coordination and scheduling, thicken markets and facilitate participation by brokers, financial intermediaries and legal experts (see McMillan 2002).

From an economic perspective, markets are understood through the lens of game theory in which the rules, processes and incentive structures constitute the ‘game’ that governs the way self-interested actors (buyers and sellers) interact to transact. Where markets evolve autonomously, the structure of the ‘game’ is *given* (it is

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<sup>1</sup> For example, consumers can freely choose between eBay and a physical shop to purchase a range of goods and services.

determined through evolutionary processes) and outcomes are *observed* as rational responses to the rules of the game. Under specific conditions, it is widely accepted that evolved markets lead to efficient allocation of resources and prices such that it is not possible to identify any changes to the rules of the ‘game’ (the market) capable of increasing total value created. Framing markets in this way has opened-up the prospect of a ‘reverse engineering’<sup>2</sup> approach in which the economic environment and the goal is *given* (e.g., a public policy objective) but the rules, processes and incentives (the ‘game’) needed to achieve the goal is to be *determined* (designed). This is referred to as mechanism design Hurwicz and Reiter (2006), or more generally as economic/market design (see Roth, 2002); This market design methodology opens-up new possibilities to design mechanisms (markets and other institutions) that have the economic efficiency properties normally associated with evolved markets, but which can be used to achieve specific public policy goals<sup>3</sup>. Market design is now used to design a wide range of mechanisms for situations where the motives of the economic actors do not naturally align with the objectives of the program/policy. This process clearly applies to public policy problems where individuals /private businesses are motivated by self-interest/shareholder value but government is motivated to maximize welfare across all (or a specific set of) citizens. Roth (2002, 2015) identifies a wide range of practical applications of the market design approach including: matching markets (such as those developed to facilitate efficient kidney, liver, and other human organ transplants, matching of students to kinder, school and tertiary institutions); auctions (used to allocate resources, procure goods and services where there are few participants); incentive structures in contracts; bespoke markets for goods and services where markets have not evolved.

## 2.1 MARKET DESIGN METHODOLOGY

A scientific methodology has also developed to apply the market design approach. The elements of the market design methodology are summarised below and in Figure 1.

**Step 1: Clarify and define the objectives** – The design process commences by clarifying the objectives of the relevant program. In public policy applications, the objectives are established from the relevant legislation. The objectives of the NDIS, for example are set out in the *NDIS Act 2013* and second reading speech.

**Step 2: Define the economic environment** – The economic environment refers to the context in which private agents make decisions. It includes characteristics of the good or service in question including the rights and obligations embedded in property rights, the origin and nature of risks associated with transactions, the types of actors participating in transactions, and complexities that impede transactions. Plott (see Nemes 2008) and Milgrom (2017) identify a range of complexities that might be considered in designing mechanisms. Including: the type of information to be revealed (information complexities); the regulatory environment in which the mechanism operates (policy complexities); locational requirements for the goods or services to be provided (spatial complexities); timing complexities; strategic complexities etc. These complexities define issues that the designer of the mechanism must address.

**Step 3: Mechanism design** – The role of the mechanism designer is to identify the best set of rules and processes given an almost unlimited choice of such rule. Fortunately, this task can be streamlined by considering just those mechanisms that: systematically address the complexities relevant to transactions; lead to truthful revelation of

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<sup>2</sup> Also referred to as reverse game theory.

<sup>3</sup> See maiden speech of Daniel Mulino to Parliament. Commonwealth of Australia (2019). Parliamentary Debates House of Representatives, Official Hansard. Thursday, 1 August. FORTY-SIXTH PARLIAMENT, FIRST SESSION—FIRST PERIOD.

relevant information (in private values problems); are incentive compatible<sup>4</sup>; and correctly match participants to transactions (the adverse selection problem).

**Step 4: Test bed** – Before mechanisms are implemented, it is important to test that they achieve the objectives defined and that the ‘best’ set of rules and processes have been chosen. Depending on the mechanism, testing can be performed in an economics laboratory, field pilots and or through simulation. Experimental economics laboratories (see Plott and Smith, 1978) are an important capability that allows economists to observe the economic efficiency and other properties of a mechanism.

**Step 5: Implementation and monitoring** – Transaction processes must be supported by a range of information, communication, engagement settlement, regulatory and legal processes needed to safely complete transaction at low cost. These support processes must be created and linked to the mechanism to minimise transaction costs. An on-going evaluation and refinement process to allow the mechanism to be refined from real world experience.

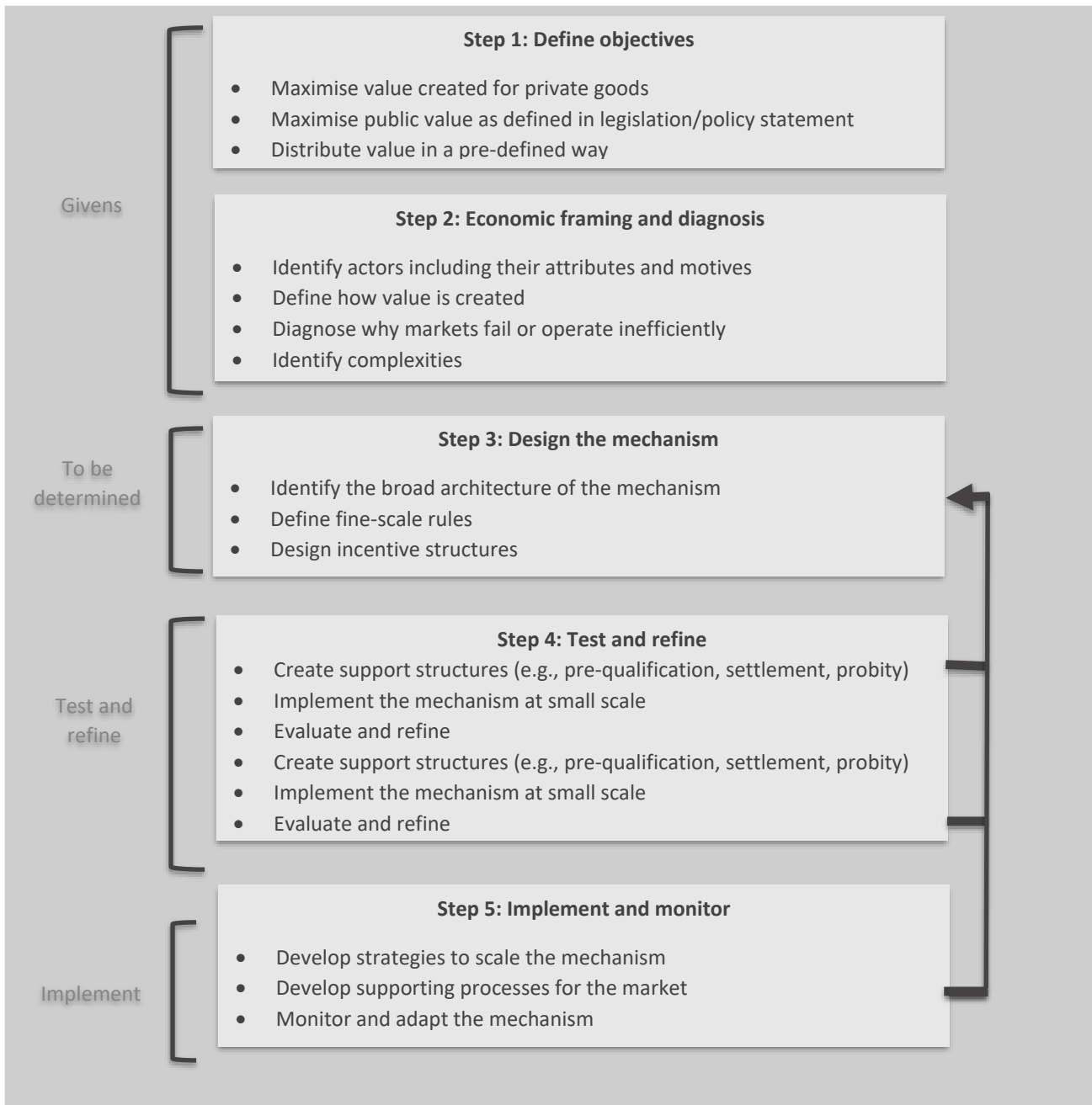
Some important learning have from practical application of the mechanism design approach include:

- Economic theory is an essential starting point.
- Mechanisms must be designed to overcome specific complexities relevant to the problem at hand. In this sense, any compromises to the rules, processes and incentive structures embedded in the mechanism risk compromises with respect to the efficiency and effectiveness of the mechanism.
- Mechanisms must be able to be implemented and a range of factors can impose constraints on the mechanism. Where this is the case, it is important to know what is given up when design compromises are made.
- Complexity should be hidden from participants as far as possible. Modern computational and communication technology allows even complex economic concepts to be implemented through simple, intuitive interfaces.
- Test-bedding new mechanisms can mitigate mechanism failure.

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<sup>4</sup> Incentive compatible mechanisms align the actions of private actors with the objectives of the principal.

**Figure 1: Mechanism design methodology**



### 3 MISSING MARKETS FOR GOODS AND SERVICES FUNDED BY THE NDIS

Recipients of NDIS support require access to the same types of goods and services required by all citizens including: transport, housing, energy, entertainment, health, personal care etc. While markets exist to facilitate transactions in these services; they do not necessarily allow consumers with disability to efficiently procure and safely transact services relevant to their specific needs and circumstances. Some of the needed markets are missing whilst others exist but do not cater for the needs of NDIS clients. One of the reasons for this is that the previous, centrally planned, service provision model “crowded out” the evolution of markets (or market adaptation) relevant to the highly specific needs of consumers with disability. These problems give rise to economic disadvantage (for clients of NDIS) through uneven market power, poor quality services and high transaction costs.

**Uneven Market power** - Where the supply-side of markets are thin, suppliers of disability services are likely to be well-informed, well-organized and commercially experienced relative to buyers, allowing them to capture a greater share of value created from transactions. In this economic environment, NDIS clients (buyers) will pay too much for goods and services purchased resulting in unfair distribution of value created from transactions.

**Poor quality services** - The second problem with transactions completed in the absence of well-functioning markets is a quality problem. Such transactions can lack the fundamental building blocks that have evolved to taken for granted in more familiar markets, such as commodity markets. Examples include the absence of: metrics needed to describe the specific attributes that define quality; regulations needed to safeguard consumers’ interests; contracts designed for specific classes of goods and services; and legal institutions to enforce contracts. These and other problems can result in the supply of goods and services that do not meet buyers’ expectations.

**High transaction costs** - A third problem with missing or inefficient markets is that the cost/effort of: searching for the required goods and services, negotiating with potential suppliers, completing settlement, organising after sales service and executing legal rights can be high. In well-functioning markets, processes evolve to minimize these and other transaction costs. A range of complexities are evident in markets for disability services that can impede the search and bargaining processes needed to efficiently price and allocate goods and services. Complexities can arise from: information problems (i.e., asymmetric information and missing metrics), timing problems (e.g., asynchronistic arrival of goods and services), strategic behaviour (e.g., unwanted behaviours, such as delaying tactics, cheap talk etc., that impede price formation); and policy complexities (e.g., complex regulations and trading rules).

These and other problems are partly responsible for the following outcomes:

- Under-utilisation of funds – NDIS package utilisation is around 74 per cent resulting in around \$1-1.5 billion under-spending<sup>5</sup>.
- Non-sustainable supply – Some service suppliers are not viable under the current pricing policies and supply is problematic in rural and regional areas. In some regions supply of some services has not met demand.

<sup>5</sup> National Disability Insurance Scheme, Annual Financial Sustainability Report, 2020-21.

- Low self-management of NDIS packages - 90 per cent of recipients do not self-manage their NDIS funds relying instead on panels of accredited suppliers managed through the NDIA. This suggests that participants are not exercising the full level of choice and control that is possible under the Scheme.
- Over-charging for services.

These problems may be resolved through the market evolution process noted above. However, government has a strong fiscal incentive to invest speed up this process given the recent cost projections of the NDIS<sup>6</sup>.

### 3.1 THE ROLE FOR MARKET DESIGN IN THE NDIS

The first point to be made is that the NDIS cannot be expected to function efficiently and effectively through administered pricing of goods and services, bilateral negotiation (the default mechanism for self-managed participants) and regulation of service quality. Instead, decentralised processes will be needed to: systematically reveal information relevant to each transaction; discover prices through competitive interaction (structured bargaining); identify efficient matches between service providers and individual customer needs; and incentivise service quality.

**The problem with administered prices for services** – It is not sensible or feasible for government agencies (such as the NDIA) to calculate or otherwise establish prices for services (a centralised approach) because of:

- The hidden information problem - information about the cost of providing services is not known by government officers. This is private information that is hidden from bureaucrats. It not possible for government agencies to determine prices for services based on techniques such as the building block methodology or marginal cost approaches. Prices determined in this way will be systematically too low and too high.
- Heterogeneous services – NDIS clients generally require personalised services according to their individual needs and circumstances and costs will vary with service attributes.

These information problems cannot be determined by surveying suppliers or through the creation of panels of service providers. These mechanisms do not systematically harness competition (needed for truthful revelation of information) and do not include processes needed to establish the ‘best’ matches between NDIS client and service provider.

**The problem with bilateral negotiation** – The fundamental problem with bilateral negotiation (i.e., between a recipient of financial support from the NDIS and a supplier) is that suppliers have more information about the cost of service provision than buyers of services. This leads to the ‘market for lemons’ problem in which the uninformed party will always be disadvantaged in transactions.

Market design principles and the market design methodology could be applied to address these and other problems that lead to market inefficiency and service quality problems in the disability services domain of the economy. The objective of applying these principles is to create an efficient, safe and trusted transaction environment for recipients of NDIS financial support. Roth (2015) identifies two broad classes of such mechanism.

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<sup>6</sup> The National Disability Insurance Scheme: Annual Financial Sustainability Report 2020-21 estimates the plausible cost of the NDIS in 2024-25 at between \$39.0 billion and \$47.8 billion, whilst the plausible range estimated in 2029-30 is estimated at between \$53.2 billion and \$74.2 billion.

- *Mechanisms where price does **all** the allocation work* - This refers to double-sided mechanisms (e.g., markets<sup>7</sup>) and single-sided mechanisms (e.g., auctions<sup>8</sup>). Such mechanisms are characterized by processes that: harness competition between participants as a means of revealing relevant information (*information efficient*); incorporate metrics needed to direct effort to items/actions with the highest value; maximise value created from transactions by match high value buyers to low-cost sellers; include incentive structures that align the actions of individuals with overall objectives (*incentive compatible*); and are robust to strategic behaviour (*strategy-proof*).
- *Mechanisms where price does **none** of the allocation work* –For some goods and services, we specifically do not want allocation to be based on price (who can pay the most) but on need, ability or other criteria. The mechanism developed for these types of problems are referred to as *matching markets* which also can be one-sided or two-sided. Matching markets have been developed to allocate human organs, school and university placements, interns to hospitals, public housing etc. (see Roth 2002). These mechanisms must also be designed to be information efficient, incentive compatible and strategy-proof.

The following sections set out a range of activities that could improve the efficiency and efficacy of the NDIS through the application of market design principles and methods.

## 4 EXPANDING THE BOUNDARY OF MARKETS TO INCLUDE DISABILITY SERVICES

This task expanding the boundary of markets and or modifying existing markets is analogous to the transformation of physical infrastructure needed to improve access, inclusion and participation for citizens with disability. In this instance it involves engineering economic infrastructure in the economy. A range of interventions can be made to: expand the boundary of markets/modify existing markets so that recipients of NDIS support can procure the goods and services needed to manage disability; improve service quality, and lower transaction costs.

Examples of the type of interventions that might improve the efficiency and efficacy of markets for disability services include:

- *Information asymmetry and metrics* - For some services additional information about the specific nature, type, and level of assistance is needed to ensure that the service provided matches the specific needs of the client. Developing metrics for these service attributes will be an important aspect of the information sharing problem.
- *Designed contracts for classes of disability service* – Contracts are a key component of transactions – they embed incentives for suppliers to meet quantity and quality specifications. While efficient contracts (with respect to incentive structures) exist for many goods and services, they have not necessarily evolved to meet the needs of consumers of often highly bespoke disability services. Adapting existing contracts for disability services could improve service quality issues observed in this domain of the economy.

<sup>7</sup> A double-sided mechanism is one in which there is competition on both the supply- and demand-side and prices are formed from the interaction of both sides.

<sup>8</sup> Auctions are a single-sided mechanism in which one side (the demand-side in the case of procurement and the supply-side in the case of an asset/item/right sale) and competition is harnessed on the other side of the market.



- *Thin markets* – With few participants and a broader spread in types of services needed, markets for disability services are often thin leading to inefficient pricing (and allocation) of goods and services and unfair distribution of value. A range of strategies might be applied to address thin market problems. Auction theory (developed specifically to mitigate thin market problems) offers scope to improve the price formation process in thin markets. Other interventions, such as to address asynchronous arrival of market participants (e.g., clearing houses and transaction platforms) can also be considered.
- *Technology* – Communication, computation and coordination technology in particular can be harnessed as part of the market design process to address specific complexities that otherwise impeded efficient and effective transactions.

#### 4.1 POTENTIAL CLASSES OF MECHANISM RELEVANT TO THE NDIS

Each market design problem requires a bespoke solution that emerges from the market design approach – it is not a one-size-fits-all exercise. Four types of intervention are noted below as examples of the scope for market design relevant to the NDIS:

- **Modifying existing procurement processes to improve service quality** – Market design principles can be applied to incorporate service quality outcomes that are not considered in existing government procurement programs. A pilot conducted by the Centre for Market Design<sup>9</sup> demonstrates the improvement in transport service quality achieved for students attending the Northern School for Autism (NSA) in Melbourne. In this pilot, market design techniques were used to redesign the allocation process previously used to create a transport network for students attending the NSA. Key outcomes achieved include: 68% reduction in aggregate travel time across all students, reduced maximum travel time – the maximum travel time for any student was reduced from 2 hours (the previous travel network) to 1 hour under, timely arrival at school, less disruptive bus routes (direct route to school avoiding the previous two-stage route), no increase in the cost of service.
- **Modifying existing markets for NDIS services** – Governments currently rely on panels of private service providers to provide a range of professional and technical services. Market design principles could be applied to transform panels into an efficient market for different services. This would involve interventions needed to: harnessing competition between individual service providers, improve matching of individual service providers to clients based on skills and needs; improve the incentive properties in contracts for services; and reduce transaction costs through on-line hosting of the market and other interventions.
- **Creating matching markets** – Some services needed to support disability can be improved by creating matching markets. The allocation of personal carers to NDIS clients is an example where ‘price should do none of the allocation work’. For this and a range of other human services, allocation should be based on compatibility, proximity and other highly specific attributes and preferences on both sides of the market. Matching market theory has direct application to these types of services.
- **Minimising transaction costs** – Transaction costs refer to the costs required in searching, researching, negotiation, monitoring and other effort needed to execute transactions. Whilst there are natural incentives for private investment to reduce transaction costs in markets (i.e., transaction pathways that have lower

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<sup>9</sup> CMD working paper – Stoneham et al., missing markets for disability services. Available from the CMD.

transaction costs are actively selected by market participants), these processes do not necessarily extend to consumers with disability. As noted earlier, market evolution in this domain of the economy has been interrupted by the crowding-out problem. Specific interventions can be made to reduce transaction costs. These could be organised through a centralised trading platform for disability services. Such a platform could reduce transaction costs by including functions that: address information asymmetry (e.g., listing market participants and their specific requirements /capabilities); establish standardised metrics for disability services, embed bargaining rules and processes needed to promote efficient transactions including thin markets and other complexities; create reputation for market participants.

## **4.2 POTENTIAL BENEFITS**

The potential benefits of the interventions noted above include:

- Fair/efficient prices for disability services – Improvements to the efficiency and efficacy of markets will give confidence to consumers (and the public who fund the NDIS) that disability services are priced in a competitive market environment in which market power and other complexities are mitigated - if not resolved.
- Improved quality of services – Improved contract design and dispute settlement processes developed for NDIS clients will create incentives for suppliers to meet client needs with respect to the quality and quantity of services.
- Reduced transaction costs – Transaction costs for disability services can be reduced through the intervention of government to overcome or mitigate complexities that cause friction in the transaction process. can be reduced High transaction costs; and
- Minimise NDIS costs – Interventions that improve competitiveness, minimize transaction costs, incentives quality and harness technology will place downward pressure on the cost of disability services funded through the NDIS.

## **4.3 A STRATEGIC APPROACH**

While the mechanisms needed each specific service will be different because of the underlying information, matching and incentive characteristics, it is possible to identify broad classes of mechanism needed for different classes of service. Four classes of services are identified in Table 1 where each class of service is defined by the type of mechanism needed to address relevant complexities. Table 2 summarises activities that will reduce transaction costs for consumers with disability.

**Table 1: Taxonomy of mechanisms**

Class of service	Description	Mechanisms design tasks	Potential applicaiton
<b>Services where markets exist</b>	Markets exist but do not necessarily reflect the specific requirements of consumers with disability.	<p><i>Identify additional information needed to improve the economic efficiency of markets for different services needed by consumers with disability</i></p> <ul style="list-style-type: none"> <li><i>Collaborate with IT specialists to develop personalized re-useable electronic service profiles.</i></li> </ul> <p><i>Design efficient matching processes between consumers with disability and suppliers of services</i></p> <ul style="list-style-type: none"> <li><i>Re-engineer existing transaction mechanisms (markets) to improve matching efficiency for consumers with disability.</i></li> </ul> <p><i>Develop processes that reduce transaction costs for consumers with disability</i></p> <p><i>Develop reputation system and incentive structures to reflect service quality attributes relevant to consumers with disability.</i></p>	Personal transport, health, entertainment, food, non-personal assistance.
<b>Services involving thin markets</b>	Markets exist but there is limited competition and or standardised prices.	<p><i>Identify services where markets are thin</i></p> <ul style="list-style-type: none"> <li><i>Apply <b>auction theory</b> to harness competition where there are few participants.</i></li> <li><i>Address issues related to <b>asynchronistic arrival</b> of market participants (e.g., call market). Re-engineer the service panel process to harness competition in the panel formation process.</i></li> <li><i><b>Expand the market place</b> – Create platforms (e.g., electronic platforms) that expand the marketplace so that every buyers can</i></li> </ul>	Professional services such as therapy, accounting, financial, trade services, brokers, personal equipment (tailored to specific disability) etc.

		<p><i>see all sellers (e.g., eBay style)</i></p> <ul style="list-style-type: none"> <li>○ <i>Incorporate search algorithms</i></li> <li>○ <i>Incorporate safe settlement processes</i></li> <li>○ <i>Incorporate processes to establish reputation of buyers and sellers.</i></li> </ul>	
<b>Personal services</b>	Services where quality and compatibility are important considerations.	<p><i>Design efficient <b>matching processes</b> between consumers with disability and suppliers of services.</i></p> <p><i>Create process to <b>establish reputation</b> profiles and link with incentives to improve service quality.</i></p>	In-home care and assistance.
<b>Shared services</b>	Services where coordination, lumpy capital and network externalities are observed.	<p><i>Design and create <b>new mechanisms</b> where markets for <b>network services</b> are missing.</i></p>	Transport services to school, recreation, appointments etc.

**Table 2: Transaction costs**

Transaction activity	Processes to reduce transaction costs
<b>Information revelation</b>	<p><i>Demand-side: Design and create individualized profile of information needed to improve the efficiency and effectiveness of transactions.</i></p> <p><i>Supply-side: Design and create a mechanism that reveals information needed to reveal service attributes relevant to consumers with disability.</i></p>
<b>Matching and price discovery</b>	<p><i>Existing markets - Design and create mechanisms to improve matching of consumers with suppliers of services in existing markets.</i></p>

*Personal services - Design and create matching market for personalized services where compatibility is more important than cost.*

*Thin markets - Apply auction theory to design a panel formation process where markets are thin.*

<b>Service quality</b>	<i>Design and create a mechanism to establish reputation of service providers.</i> <i>Design and create incentive structures in relational contracts to reward suppliers for reputation.</i>
<b>Transaction</b>	<i>Develop menu-based transaction platforms that include demand-side information for individual consumers with disability.</i>
<b>Settlement</b>	<i>Link transaction platform with established financial systems.</i>
<b>Financial management</b>	<i>Link transaction platform with existing individualized financial monitoring of NDIS funds.</i>

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## 5 REFERENCES

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Hurwicz, L. and Reiter, S., (2006). *Designing Economic Mechanisms*. Cambridge University Press.

McMillan, J., 2002. *Reinventing the Bazaar*. North & Company, New York.

Milgrom, Paul, 2000. "Putting Auction Theory to Work: The Simultaneous Ascending Auction." *Journal of Political Economy* 102, no. 2, 245–72.

Nemes, V., Plott, Charles R., Stoneham, G., (2008). *Electronic BushBroker exchange: Designing a combinatorial double auction for native vegetation offsets*. National MBI Pilot Program Rd 2. Project Final Report. July.

Roth, Alvin, E., 2002. *The Economist as Engineer: Game Theory, Experimentation, and Computation as Tools for Design Economics*. *Econometrica* Vol. 70, 4, 1341-1378.

Roth, A. E. (2015). *Who gets what--and why: the new economics of matchmaking and market design*. Houghton Mifflin Harcourt.