Calculating the social impact of home automation for people with disability: A social return on investment study

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Abstract

Introduction: Home automation can deliver important outcomes for people with disabilities, including enhanced independence. Despite the millions of dollars spent on home automation in Australia and other developed nations, to date, there has been no economic evaluation of this type of assistive technology.

Method: A social return on investment analysis of home automation study was undertaken. Primary data were collected using qualitative interviews with home automation consumers and other key stakeholders, including occupational therapists, a spinal rehabilitation physician, peer support advocate, and managers and technical personnel from home automation providers (n = 17). The analysis was supported by (1) secondary data from a scoping review on outcomes from home automation and (2) additional literature searches to identify suitable financial proxies and to make estimates of the proportion of home automation users expected to experience each outcome. A scenario approach was used with three home automation scenarios developed with increasing complexity and costs to calculate the social return on investment.

Results: Eight outcomes from the use of home automation were identified, including reduced reliance on carers and family members, increased independence, and improved energy and comfort. The social return on investment ranged from $38.80 (low cost) to $15.10 (high cost) for every $1 invested across a 10-year benefit period, with the financial proxy for reduced care attendant hours contributing the most to the social return ratio. Even the highest cost scenario was repaid in social value within the first year of the benefit period.

Conclusion: This study suggests that home automation represents a sound investment and has a significant impact on the overall quality of life of people with disabilities. Focusing on the financial savings in care attendant hours alone should be compelling evidence for funders to recognise home automation’s value and continue to fund this assistive technology.
Consumer and Community Involvement: A consumer representative was a member of the project steering group, which supported the research team at all stages of the project.

Plain Language Summary: When people get injured, their disability can stop them doing things around the home that they used to be able to do. Technology can help people with disabilities do things like open and close doors and turn off taps by pressing a button, so they do not have to wait for someone to help them. This technology can be expensive, but no one has looked at if it is worth the money. We spoke to some people with disabilities who used this type of technology, and they told us their lives were better now they used this technology. For example, they told us they were able to do things for themselves, they did not need carers as much, and they had better mental health. We spoke to businesses about the costs of different types of technology that can be used in the home. We then put a dollar value on the ways people with disabilities told us their lives were better. For example, for better mental health, we worked out how much it would cost to see a psychologist for 1 year. We found that the dollar value of the ways in which people with disabilities’ lives were improved was at least 15 times more than the costs of the technology. This study therefore shows that this technology is worth the money and improves the lives of people with disabilities following serious injury.

KEYWORDS
assistive technology, disability, evaluation, home automation, social return on investment

1 | INTRODUCTION

For the one in six Australians with a disability and the 5.7% of Australians living with a severe disability (Australian Bureau of Statistics, 2019), their environment plays a crucial role in the extent to which impairment leads to experiences of disability (United Nations Convention on the Rights of Persons with Disabilities, 2006). Accessible environments can promote independence and social and economic participation, and inaccessible environments present barriers to achieving these goals (Imrie & Luck, 2014). There is no more important environment to navigate than one’s own home, and home automation has been shown to support the independence, safety, and well-being of people with disabilities (Bridge et al., 2021; Verdonck et al., 2018). ‘Home automation’ is technology that remotely controls or automates various household functions such as doors, doorbells and intercom systems, windows, heating and cooling, blinds, lighting, and entertainment systems (Haba et al., 2017; Varriale et al., 2020). Notably, many types of home automation are widely available for purchase and can be installed to promote energy efficiency or convenience rather than to support the needs of people with disabilities (Li et al., 2018).

Home automation for people with disabilities can be funded through government and private funding schemes, and in Australia, it is most commonly funded through the National Disability Insurance Scheme (NDIS) for those under the age of 65 years. The NDIS expects to spend over $1 billion annually on assistive technology, including $137 million on home

Key points for occupational therapy
- The social return on investment of home automation for people with disabilities was calculated.
- Several home automation outcomes were identified as valuable to consumers, including enhanced independence.
- The social return was between $38.80 (low-cost scenario) and $15.10 (high-cost scenario) for every $1 invested.
Occupational therapists play a pivotal role in the process of obtaining home automation through funders for their clients. Occupational therapists are responsible for assessing the needs of people with lifelong or acquired disabilities, as well as prescribing and supporting the implementation of appropriate assistive technology supports, including the use of home automation (Occupational Therapy Australia Ltd, 2021).

Home automation can vary in price from a few hundred dollars to thousands, and whilst there is some evidence of positive outcomes resulting from the installation of home automation (Cleland et al., 2023a), to date, occupational therapists have not been able to cite economic evaluation evidence to support their justifications for investment in home automation for people with disabilities. Indeed, a scoping review of economic evaluations of assistive technology identified only 32 international studies using a range of economic evaluation methods. Of these, only one was conducted in Australia (vehicle modifications) and none investigated the benefits of investing in home automation for people with disability (Albala et al., 2021). This study seeks to address this gap using a social return on investment analysis, an adapted form of cost–benefit analysis.

1.1 Home automation

Home automation is a form of assistive technology that automates or remotely controls household functions via a wired or wireless connection (Haba et al., 2017; Varriale et al., 2020). Such technology can assist with the control of doorbells and intercom systems, internal and external doors, blinds, lighting, heating and cooling, windows, taps and showers, and entertainment systems via tablets or smartphones as well as via eye gaze or voice control operation systems (Crockett, 2022). Home automation technology can therefore support independence at home after losing a wide range of physical functions. Typically acquiring home automation is a time-consuming and complex process involving a range of stakeholders, including the person with a disability, their family members, support staff, the funding body, medical and allied health professionals, rehabilitation engineers, equipment suppliers, installers, and other trades people. A range of factors needs to be considered, including system reliability, internet stability, battery back-up, cost, functionality, cyber security issues, and whether future functional declines may require upgrades to extend home automation functionality (Crockett, 2022).

Technological advances have served to increase home automation options and make technology cheaper and, therefore, more accessible. However, given the growing need for such assistive technology, the overall spending on home automation is considerable. One study reported that the cost of home automation globally would increase from US$61.6 billion in 2022 to US$95.1 billion by 2026 (The Business Research Company, 2022).

A recent international scoping review by the authors (Cleland et al., 2023a) found 11 studies that identified outcomes from home automation for people with disabilities. The outcomes included increased independence, improved mental health, greater social and community connectedness, improved safety, and support with daily activities. Several studies also reported that home automation reduced the reliance on others, including family carers and support workers (Cleland et al., 2023a). One study demonstrated that a simple environmental control system could reduce the need for a support worker by 1 h per day, resulting in savings to offset the installation cost (Rigby et al., 2005). Furthermore, a UK study investigating the intervention and societal costs of acquired brain injury estimated that care attendants constituted 80% of the overall costs of meeting people's ongoing support needs (van Heugten et al., 2011).

1.2 Social return on investment analysis

Social return on investment (SROI) analysis is an adapted form of cost–benefit analysis that was developed by the Roberts Enterprise Development Fund in the United States in 2000 (Millar & Hall, 2013) and was subsequently tested and further developed in the United Kingdom by the New Economics Foundation (Aeron-Thomas et al., 2004), a body that has been a powerful advocate for the methodology’s use in public policy settings. SROI allows for the valuation of personal, family, and community outcomes that are not typically included in other forms of economic evaluation. The SROI Guide published by the Office of the Third Sector in the UK Cabinet Office (Nicholls et al., 2012) is the most quoted resource to guide SROI analysis (Hutchinson et al., 2019). This guide outlines the six stages of SROI, which are (1) establishing scope and identifying stakeholders, (2) mapping outcomes, (3) evidencing outcomes and giving them value, (4) establishing impact, (5) calculating the SROI ratio, and (6) reporting findings (Nicholls et al., 2012). Traditionally many SROI studies were conducted by private SROI consultants and published in the grey literature (Banke-Thomas et al., 2015; Krlev et al., 2013; Nicholls et al., 2012), if available at all. However, in more recent years, there has been an increased number of SROI analysis studies reported in the peer-reviewed literature. A recent
systematic review identified 284 peer-reviewed SROI papers published in English, with the authors of 80% of these papers being optimistic about the contribution of the methodology (Corvo et al., 2022). There have been recent studies on the economic evaluation and social impact of assistive technologies using SROI methodology. Studies have been undertaken to determine the social return on vehicle modifications for people with disabilities (Hutchinson et al., 2020), virtual coaching for healthy ageing (Selva & Biasin, 2018), and robotic rehabilitation for people recovering from stroke (Pinelli et al., 2023). A report from the World Health Organisation examining global access to assistive technology highlighted the need for economic evaluations that use mixed methodology to support the incorporation of a wider range of outcomes and identified SROI as a methodology that would meet these aims (Layton & Borg, 2019).

1.3 The current study

This study investigates the SROI of home automation for people with disability using both primary and secondary data. This study seeks to analyse the social return on a type of intervention rather than a specific intervention. In doing so, we adopt a scenario-based approach reflecting low-cost to high-cost home automation, which may be more meaningful to people with disability and their families and more generalisable than studies focused on a single funder (Hutchinson et al., 2020).

2 METHODS

2.1 Ethics statement

This research received ethics approval from the Flinders University Human Research Ethics Committee at (ref: 5039). Informed written consent was obtained from all participants before interview. A semi-structured interview protocol was developed to guide discussions, and all interviews were recorded with participants’ permission and transcribed in full by a professional transcription service under a signed confidentiality agreement.

2.2 Positionality statement

The multi-disciplinary research team consisted of two researchers with experience of social return on investment methodology and prior experience of working with people with disabilities (CH and JC), an occupational therapist (KL), and a rehabilitation specialist (KM) who both had experience of prescribing home modifications and automation and an expert on assistive technology and software engineering (PW).

2.3 Participants

Primary data were collected from two sets of key stakeholders identified in Stage 1 of the SROI analysis (establishing scope and identifying stakeholders). Home automation users with disabilities had to be aged over 18 years of age, have a disability, and have at least one type of home automation. Consumers were recruited via the Lifetime Support Authority (a state government agency that funds home automation for people with severe disabilities following a motor vehicle accident), the National Disability Insurance Agency (NDIA), and the networks of the research team and advisory group using an opt-in approach. That is, participants had to state their willingness to participate in the research by contacting the research team directly (as opposed to an opt-out approach where participants might be contacted several times unless they stated an unwillingness to participate).

Home automation assessment, prescription, and installation require the expertise of many professional groups, including physicians, allied health professionals (e.g., occupational therapists), support workers, assistive technology developers, technical support staff, and home automation fitters. Using an opt-in approach, stakeholders were recruited via contact with appropriate professional bodies (e.g., OT Australia), disability organisations (e.g., Novita), and via the networks of the research team and advisory group. The project took a national rather than a state focus, and therefore, recruitment was Australia-wide.

Interviews were conducted in person where geography allowed, and was the participant’s preference, otherwise, interviews were conducted via video conferencing. An interview schedule was developed, which consisted of four sections: social-demographic questions, costs of home automation (inputs), activities of home automation (outputs), and the outcomes experienced by consumers and others. Negative outcomes were captured as well as positive outcomes. See Supporting Information A for interview questions.

2.4 Procedure

At the commencement of the project, a project advisory group was established. This group consisted of four researchers, one rehabilitation consultant, a home automation consumer, and representatives from the research...
funder, a home automation provider, and a disability support service. This group was consulted throughout the project and was established to provide expert advice to the research team, and accountability and transparency regarding each stage of the SROI analysis.

Key stakeholders who might be able to inform the SROI were identified (Stage 1: establishing scope and identifying stakeholders). These included consumers and other key stakeholders involved in the home automation process as outlined in Section 2.2. A theory of change was developed from interview data with consumers and other stakeholders and engagement with the project advisory group (Stage 2: mapping outcomes). A theory of change—or logic model—captures what investments are made in terms of finances and other resources (inputs), what activities are undertaken to deliver the intervention (outputs), and what outcomes result from the intervention (Nicholls et al., 2012).

The qualitative content analysis was inductive using open coding (Azungah, 2018; Saldaña, 2021). In the first round of coding, one researcher coded all transcripts (JC), and two authors (CH and KL) coded a sub-set of transcripts. The three researchers then met to review, consolidate, and finalise the codes. For example, the codes ‘privacy’ and ‘dignity’ created in the first round of coding were consolidated as ‘increased dignity’, as privacy was strongly aligned with dignity, for example, being able close the curtains using the home modifications in order to use a bedside commode. This process was followed to identify outputs (activities) and outcomes for the theory of change. Three scenarios were developed by the research team and confirmed in consultation with the advisory group to reflect low-cost to high-cost home automations. Two home automation providers costed the three scenarios, and mean costs were calculated. Additional costs to reflect other aspects of the process were added, including assessments by occupational therapists. Finally, an administrative overhead of 12% was added based on data from the Australian National Audit Office (2017) to account for the funders’ costs in determining eligibility, approving, and overseeing the fitting and maintenance of home automation installations.

Outcomes were evidenced (Stage 3: evidencing outcomes and giving them value) from interview data and a Scoping review of extant international literature on home automation conducted by the authors (Cleland et al., 2023a, 2023b). This literature was also used to inform the weighting of outcomes to reflect the percentage of consumers expected to experience each outcome. This was required, as there is no available data on how many Australians with disabilities use home automation. Usually, when SROI is performed on one intervention, the financial proxy value of an outcome is multiplied by how many of the participants experienced that particular outcome. With a scenario-based approach, the financial proxy is multiplied by how many people would be expected to experience the outcome; for example, if 80% were expected to experience the outcome, the value would be multiplied by 0.80 (Hutchinson et al., 2019).

Financial proxies were identified from a databank of over 200 SROI studies to determine how similar outcomes had been valued previously. Where more than one suitable financial proxy was identified, a decision was made via consultation with the wider research team regarding which one was applied to the analysis. For some outcomes, it was possible to determine a direct valuation, for example, the savings in home support assistant costs, and other financial proxies reflect replacement valuations. A benefit period of 10 years was selected given that some consumers who were interviewed had had home automation for this period without the need for upgrades or modifications.

Discounts were then applied (Stage 4: establishing impact) to account for deadweight (whether some of these outcomes have been experienced eventually without home automation), displacement (whether positive outcomes were displaced due to home automation), attribution (whether other services or interventions have contributed to the consumer experiencing the outcomes), and drop-off (whether the experience of outcomes dropped off over the course of the benefit period). These values were informed by the interviews, data from the literature where available, and via consultation with the research team and advisory group.

Finally, the SROI calculation was performed (Stage 5: calculating the SROI ratio). Outcomes were weighted according to the expected proportion of consumers expected to experience them and discounts applied to determine the net social value for Year 1. Social values were then projected across the 10-year benefit period with a 3.0% discount for Years 2 to 10. This discount accounts for the changing value of money over time—due to inflation, for example, as well as the notion that the certainty of money now is more valuable than money in the future, which may be less certain. When all these values were added together, this figure represents the net present value of outcomes (i.e., in today’s dollars). This total was then divided by the cost for each scenario to produce three SROI ratios. Following this, a sensitivity analysis was conducted to determine the impact of changed assumptions on the SROI ratio. Various methods can be applied to conduct sensitivity analysis. In the current study, financial proxy values were halved, each outcome was removed one by one from the calculation, weightings and discounts were halved, and the benefit period reduced to 3, 5, and 7 years. The SROI ratio for each of
the three scenarios was recalculated each time an assumption was changed.

3 | RESULTS

Primary data were collected from six consumers of home automation (Table 1) and two family members (a sister and a wife of two of the consumers). Data were also collected from nine other key stakeholders. These stakeholders were three occupational therapists, two managers of assistive technology providers, a spinal rehabilitation physician, two assistive technology support personnel, and a peer support advocate. Stakeholders had between 2 and 20 years’ experience of working in home automation. The interviews lasted between 18 and 75 min (mean 42 min).

The qualitative analysis identified five key activities in the installation of home automation with occupational therapists usually involved in all activities but the installation and maintenance of the home automation. Eight outcomes for people with disabilities were identified. See theory of change (Figure 1).

### 3.1 Identifying inputs

Three home automation scenarios were developed and costed by two home automation providers to reflect low cost (Scenario 1) to high costs (Scenario 3) (Table 2). These scenarios were based on data from the interviews and the scoping review (Cleland et al., 2023a, 2023b) to reflect the most common types of home automation. These costs included the cost of assessment, product purchase and installation, training, and an overhead to account from funder’s administration of an assistive technology scheme.

### 3.2 Valuing outcomes

Eight outcomes were identified in the theory of change (Figure 1). All of these related to the experiences of consumers of home automation, though one outcome also related to the experience of family carers, that is the outcome ‘reduced reliance on carers and family members’. The financial proxy for this outcome was based on direct valuation, that is, the hourly rate of a home support assistant based on NDIS pricing arrangements (NDIS, 2022).

### Table 1 Socio-demographic characteristics of consumer participants

<table>
<thead>
<tr>
<th>Gender</th>
<th>Age</th>
<th>Living situation</th>
<th>Disability</th>
<th>Type of disability</th>
<th>Years using home automation</th>
<th>Type of home automation</th>
<th>Source of funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Female</td>
<td>47</td>
<td>Shared house</td>
<td>Medical</td>
<td>Progressive physical and neurological chronic disorder</td>
<td>32</td>
<td>Lights, switches, door intercom, automatic door, heating and cooling, blinds, curtains, fan, media</td>
<td>NDIS, self-funded</td>
</tr>
<tr>
<td>2 Female</td>
<td>47</td>
<td>Husband and children</td>
<td>Medical</td>
<td>Multiple sclerosis</td>
<td>1</td>
<td>Lights, switches, door intercom, heating and cooling, blinds, curtains, fan, media</td>
<td>NDIS</td>
</tr>
<tr>
<td>3 Male</td>
<td>38</td>
<td>Brother</td>
<td>Medical</td>
<td>Limb-girdle muscular dystrophy</td>
<td>2</td>
<td>Lights, switches, door, media</td>
<td>NDIS, self-funded</td>
</tr>
<tr>
<td>4 Male</td>
<td>72</td>
<td>Wife</td>
<td>Accident</td>
<td>Bi-lateral amputation, burns, visual impairment,</td>
<td>7</td>
<td>Lights, switches, door intercom, automatic door, heating and cooling, blinds, curtains, fan, media, taps, shower,</td>
<td>State-specific funding scheme</td>
</tr>
<tr>
<td>5 Male</td>
<td>50</td>
<td>Alone</td>
<td>Accident</td>
<td>Quadriplegia</td>
<td>2</td>
<td>Lights, switches, heating and cooling, blinds, curtains, media</td>
<td>NDIS</td>
</tr>
<tr>
<td>6 Male</td>
<td>60</td>
<td>Alone</td>
<td>Accident</td>
<td>Quadriplegia</td>
<td>6</td>
<td>Lights, switches, door intercom, automatic door, heating and cooling, blinds, curtains, fan, media, smoke alarm</td>
<td>NDIS</td>
</tr>
</tbody>
</table>
with an estimated 14 h saved per week. The remainder of the financial proxies was based on replacement validations, in other words an estimate of what it would cost to buy that outcome in the open market of traded goods and services. For example, the financial proxy for improved mental health and wellbeing was based on the cost of accessing a Medicare mental health plan, including the two required appointments with a General Practitioner, 10 subsidised psychologist sessions, and a year’s supply of anti-depressant medication on the PBS subsidised medications list. The cost of these components reflects what the Australian government is willing to pay to ensure improved mental health for a qualifying person. The financial proxies of all outcomes are detailed in Supporting Information B.

### 3.3 Weighting outcomes

Weightings were used to reflect the percentage of home automation users expected to experience each outcome. These were based on interview data and data from the literature where available and subsequently agreed by the research team. Where there were multiple sources of data, the most conservative estimation was used to avoid overclaiming. For example, the interviews identified that two thirds of participants experienced improved psychological safety due to their home automation. Two other studies reported that 100% and 95% of participants experienced this outcome (Verdonck et al., 2018; Wallock & Cerny, 2021). In this instance, the weighting of 67% was applied. For this outcome, the financial proxy was the cost of installing a home security system ($13,470). With the weighting of 67% applied, this reduced the financial proxy to $9024.90. See Supporting Information C for outcome weightings.
3.4 | Discounting values

The primary data did not identify any positive outcomes that were displaced due to home automation. Furthermore, it was identified that the experiences of outcomes did not drop off over time, with consumers experiencing outcomes over the many years they had home automation. Therefore, discount values were only applied for attribution and deadweight. The discounts were informed by the primary data and expert opinion from the research team and advisory group.

For example, in terms of attribution (how much of the outcome home automation is estimated to be responsible for as opposed to other products or services), several of the outcomes were attributed in their entirety to home automation; these were reduced reliance on carers and family members, increased dignity, and improved energy and/or comfort. Other outcomes, such as improved mental health and wellbeing, were discounted, as some participants were accessing other services that contributed positively to their overall mental health; in this instance, a 50% attribution discount was applied. See Supporting Information D for discounts.

3.5 | Social return on investment ratios

To calculate the SROI ratio, the weightings are applied to the financial proxies to reflect the proportion of people expected to experience each of the outcomes. Following this, the discounts for attribution and deadweight are applied; this produced the social value for each outcome for Year 1. Finally, social value is projected across the benefit period of 10 years using a discount of 3%. This third step represents the net present value of the outcomes in today’s dollars.

Taking the outcome of increased physical safety as an example, the financial proxy (or social value) for this outcome was $2076. Based on data from the consumer interviews, a weighting of 67% was applied, and then, discounts of 25% were used for both deadweight and attribution, reducing the social value of this outcome to $782.39 for Year 1 (i.e., $2076 \times 0.67 \times 0.75 \times 0.75 = $782.39). The accumulated social value of this outcome over the 10-year benefit period, minus a further discount from years 2 and 10, was $6,847.89. Following this process for all the outcomes, the accumulated social value over the benefit period was $689,748.01. See Supporting Information E for details.

To calculate the SROI ratio for each of the scenarios, the accumulated social value of all outcomes was divided by the inputs (costs) for each scenario (Table 3). This resulted in a SROI ratio for the lowest cost scenario of $38.80 for every $1 invested and of $15.10 for every $1 invested for the highest cost scenario.

3.6 | Sensitivity analysis

The sensitivity analysis identified that changes to the assumptions regarding reduced reliance on carers/family members impacted the SROI ratios the most. However, even when this outcome was removed entirely from the analysis, the SROI for Scenario 1 (lowest costs) was still $15.85 for every $1 invested and $6.17 for every $1 invested for Scenario 3 (highest cost). When the benefit period was reduced to only 3 years, SROI ratios were still between $12.53 and $4.88. See Supporting Information F: sensitivity analysis.

4 | DISCUSSION

Home automation can assist people with disabilities to be more independent in their own home, yet there has been little evidence to date regarding the outcomes experienced by consumers (Cleland et al., 2023a). Furthermore, it has been unclear whether investment in home automation represents value for money from the perspective of funders or people with disabilities themselves who are self-funding. This study addresses this gap by confirming outcomes that are valued by consumers, as well as identifying additional outcomes, and by estimating the social return on investment of home automation using a scenario-based approach that aims to be more generalisable than a study focused on a single funding scheme.

Our SROI theory of change captured many of the outcomes previously identified in a scoping review of the outcomes from home automation for people with disabilities (Cleland et al., 2023a). Our study also identified that home automation led to elevated dignity for people with disabilities, increased energy and comfort levels, and...
provided a sense of psychological and physical safety (Cleland et al., 2023b).

The estimated social return on investment of home automation is considerable, with even the highest cost scenario delivering $15.10 of social value for every $1 invested over a 10-year benefit period. One of the most common reasons for initiating a SROI study is to demonstrate social value and to secure future funding for the intervention under investigation. Therefore, the evidence created by this study would seem to create a compelling case for future investment in home automation by funders. Even if a funder was more focused on financial evidence rather than evidence of social value for supporting home automation, this research has demonstrated that the savings from one outcome alone—reduced paid carer hours—more than covers the cost of all three home automation scenarios. For example, the cost savings in Year 1 from reduced paid carers with appropriate discounts applied are $46,621, which offsets the initial cost of the most expensive home automation scenario at $45,678.01, with savings continuing to accumulate beyond the first year. Given the NDIS funding scheme would also be responsible for paying for carers, there is an argument that home automation is considerably cheaper in the long term. Furthermore, taking all the outcomes together, home automation delivers better quality of life for people with disabilities, which is a core undertaking of the NDIS scheme.

As with any studies of this kind, some limitations need to be considered. Numerous combinations of home automation exist, and technology is continually changing. Therefore, the scenario approach captures a limited number of combinations, and the costs and value of outcomes represent a snapshot in time; as such, the SROI has a ‘shelf life’ and is not future-proofed. The scenarios included did not include any major remodelling of the consumer’s home, which would considerably increase the costs of home automation installation. Accounting for the potential overhead of a funder to administer a funding scheme is an estimate, and funders of home automation may have very different cost bases from this and from each other. Furthermore, the highest value in the SROI calculation comes from an estimate of reduced paid carer hours, and cost savings in this regard will vary between individuals based on their impairments and needs. The sample size of consumers was small; therefore, the outcomes they experienced may not be common across all home automation users. However, given that many of the outcomes did align with our previous international scoping review, this provided some validation that many of these outcomes would be generalisable to other consumers of home automation. The SROI process was supplemented by data from the literature where available to validate findings from our consumers, but we acknowledge that this evidence base is relatively small, and therefore, in some instances, we had to draw on the expertise of our advisory group.

## 5 | CONCLUSION

This study identified that consumers experience a range of valuable outcomes from having home automation that meets their individual needs. SROI is a process that captures the social value of outcomes across a pre-identified benefit period and can be used to justify future funding. In this study, we drew on the expertise of consumers themselves, their families, key stakeholders in the SROI process, advisory groups, and the findings of an international scoping review, and other relevant literature. The SROI ratio may represent a compelling argument for investment in home automation for people with disabilities, despite the acknowledged limitations. The cost of the estimated reduction in paid carer hours might be of particular interest to funders focusing on more traditional cost–benefit analysis.

### CONFLICT OF INTEREST

No conflict of interest was declared by the authors.

### ETHICS STATEMENT

Ethics approval for this study was provided by the Flinders University Human Research Ethics Committee at Flinders University (ref: 5039). Informed written consent was obtained from all participants.

### AUTHOR CONTRIBUTIONS

The study was conceptualised by Kate Laver, Claire Hutchinson, Patricia A.H. Williams, and Kisani Manuel. Jenny Cleland conducted the data collection and qualitative analysis. Jenny Cleland performed the SROI analysis under the supervision of Claire Hutchinson. Claire Hutchinson prepared the initial draft of the manuscript. All authors provided critical review and revisions and approved the submitted version of the manuscript.

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### DATA AVAILABILITY STATEMENT

All data relevant to this social return on investment analysis are contained in the article or supporting information.
DECLARATION OF GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES USED IN THE WRITING PROCESS
The authors did not use any generative AI or AI-assisted tools, software or services in the development of this manuscript.

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**SUPPORTING INFORMATION**

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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