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RESEARCH ARTICLE



# Responsible innovation as transformational entrepreneurship by disabled people

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## ABSTRACT

Responsible innovation (RI) has emerged as a powerful idea concerning the effective governance of science, technology and innovation. While much attention has been devoted to understanding and promoting RI within science and research policy addressing grand challenges, far less is known about the nature and implications of RI for business. This paper marshals qualitative insights from UK-based disabled entrepreneurs to examine how comparatively ordinary innovations arising in a ‘bottom-up’ manner can respond more inclusively to otherwise overlooked societal needs. The entrepreneurs initiate three specific innovation types to positively transform the lives of their intended beneficiaries: (1) transforming inaccessible practices within mainstream organisations; (2) enhancing personal powers of disabled people; and (3) changing mainstream societal attitudes towards disability. The paper demonstrates how RI principles can be realised through transformational entrepreneurship, highlighting a myriad of niche and distributed entrepreneurial activities, quite different from high-tech, big science innovations conventionally discussed in RI studies.

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Disability; inclusive entrepreneurship; inequality; responsible innovation; transformational entrepreneurship

## Introduction

How do ‘bottom up’ innovations by disabled entrepreneurs respond to otherwise overlooked societal needs to transform for the better the lives of disabled people? And, in what ways does such ‘transformational’ entrepreneurship contribute to ‘responsible innovation’? To answer these and related questions this paper explores synergies between ‘responsible innovation’ and ‘transformational entrepreneurship’ undertaken by marginalised groups of entrepreneurs. In doing so, the paper contributes to emerging debates on the implementation and institutionalisation of responsible innovation in the context of industry and competitive market environments (Blok et al. 2015; Chatfield et al. 2017; Garst et al. 2017; Long et al. 2020; Lukovics et al. 2023; Poel et al. 2017; Poel et al. 2020; Martinuzzi et al. 2018; Thapa and Iakovleva 2023).

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The 2010s saw extraordinary growth in the prominence of responsible innovation (RI), in both research and in European policy-making. In research, foundational contributions – variously referring to ‘responsible innovation’ or ‘responsible research and innovation’ – were published (Owen and Goldberg 2010; Owen, Macnaghten, and Stilgoe 2012; 2013; Stilgoe, Owen, and Macnaghten 2013; von Schomberg 2012) and this journal established. This emergence of RI saw increasing institutionalisation within the EU research policy (Albertson et al. 2021; Owen, von Schomberg, and Macnaghten 2021); RI provided the governing principles informing the Science with and for Society programme of Horizon 2020.

Arguments for RI have been framed in terms of its potential to generate better alignment between technology development, societal needs and the democratic governance of science and innovation, drawing on longstanding concerns which go back to at least the 1930s (Collingridge 1980; Genus and Stirling 2018). Early contributions conceive of RI as anticipatory and inclusive governance of science and technology in the fields such as biomedicine, nanotechnology and geoeengineering. Typically, it is argued that RI fosters technology which will be more responsive to societal needs when those likely to be affected by technology development play an active, early role in debates about the kinds of lives people want to live and the role of candidate technologies therein (Owen, Bessant, and Heintz 2013; Stilgoe, Owen, and Macnaghten 2013).

Articulations of key dimensions of RI concur on the importance of anticipation, reflexivity (regarding the assumptions one holds), inclusive deliberation, and responsiveness (of actors to one another and of technology to societal needs). Proponents argue that these dimensions of RI are interdependent (Owen, Bessant, and Heintz 2013; von Schomberg 2013), so that anticipation entails a process in which stakeholders collectively search for, create and reflect on alternative visions of technologies and their use(fulness) in society.

In relation to its institutionalisation within EU policy, RI has been adopted within a ‘business-as-usual’ perspective rather than one more concerned with eliciting social progress through transformational change (Owen, von Schomberg, and Macnaghten 2021). Then and now, related research and policy have tended to focus on complex, high-risk or controversial technology development (Stahl et al. 2021). Empirically, certain aspects have been neglected, notably RI in relation to more mundane innovations (Nordmann 2018; Ploeg et al. 2021) particularly in the context of business and ‘transformational’ and ‘inclusive’ entrepreneurship involving marginalised groups of entrepreneurs (rather than in the university laboratory). ‘Transformational entrepreneurship’ (TE) is a relatively new concept describing entrepreneurial activities with potential to generate systemic transformations in socio-economic development, such as reduced social inequalities (Maas and Jones 2019; Ratten and Jones 2019). There are possible synergies between TE and RI principles promoting positive social change; for instance, in terms of responding to the needs of under-served or excluded groups like disabled consumers (Coogan and Cluley 2016).

Decision makers have struggled to maintain the ambition prevalent in early representations of RI or to identify how RI might be made actionable in practice. There is a lack of specificity regarding how to operationalise core aspects of the approach; for example, relating to which participants should be included in governance processes and how this could be achieved effectively. Beyond this is the implication that ‘relevant’

stakeholders need to be invited to organised deliberative exercises as the preferred approach to increase inclusiveness. Recent critiques of RI however point to the absence of genuinely inclusive ‘bottom up’ approaches to democratic deliberation (Genus and Iskandarova 2018; Genus and Stirling 2018). Bearing these criticisms in mind, a fundamental point is that RI has become – or risks becoming – an ‘empty signifier’ (Owen, von Schomberg, and Macnaghten 2021).

The significance of this paper is two-fold. First, we investigate new ventures set up by UK-based disabled entrepreneurs as a site for RI – something that has not been done explicitly in previous studies. It is argued here that innovation undertaken by marginalised groups, such as disabled people, can help to meet the specific needs of those who are often excluded, neglected or under-served as customers and contribute to a more equitable distribution of resources, thus constituting a form of RI. Second, we take an approach to innovation which goes beyond the usual focus on complex technology found in previous studies of RI to explore innovations that seek not only to improve material day-to-day practice but also to challenge and transform dominant social structures and attitudes that disadvantage disabled people in mainstream society.

The paper adopts a perspective of RI which emphasises: (a) TE inhering in relations which challenge existing societal structures (c.f. Albertson et al. 2021); (b) processes and activities by which RI might be practiced by and with transformational entrepreneurs; and (c) the potential for productive dialogue between RI and TE literatures. The findings of the paper are cast in terms of these foregoing concerns, with a contribution to policy concerning the need for policy-makers to recognise the transformative potential of RI. This, we suggest, may be facilitated by policies which foster ‘inclusive’ and ‘transformational’ entrepreneurship to build the capacity of marginalised groups, such as disabled people and those with long-term impairments and health conditions<sup>1</sup>, to generate low-tech innovations of great benefit to their communities while also developing relationships with mainstream actors that can help move such innovations through development, testing and diffusion.

The paper commences with a review of literature on RI in the context of entrepreneurship, identifying several knowledge gaps. We then set out our theoretical framework, drawing on insights from RI, entrepreneurship and TE studies, elaborate on our methodological approach, and present the results. We conclude with a discussion and suggestions for future research.

## **Prior research: responsible innovation and entrepreneurship**

The existing conception of RI has been criticised on a number of grounds, suggesting both gaps in current knowledge and opportunities for building bridges between RI literature concerned with the governance of ‘big science’ in society and RI as examined from a TE perspective. First, entrepreneurship attracts little attention in the RI literature, though there is some work on RI from within the entrepreneurship and small business field, in which RI has been defined more in relation to the environmental and societal benefits of new products and services than principles of governance and inclusion (c.f. Halme and Korpela 2014). Some contributions explore how responsible entrepreneurs influence a range of stakeholders (Vallaster et al. 2019). Others question what resources small firms need to develop RIs (Halme and Korpela 2014). Increasingly, studies investigate

the implementation of RI by entrepreneurs and for-profit firms (Auer and Jarmai 2018; Brand and Blok 2019; Lukovics et al. 2023; Thapa and Iakovleva 2023) or social enterprises (Caldwell, Harris, and Renko 2012; 2016; Lubberink et al. 2019), including the tensions that might arise in balancing the goals of RI and profit maximisation. The relations and potential synergies between RI and TE activities more specifically, however, remain under-theorised.

Second, the literature on RI pays little attention to entrepreneurship relevant to the needs of marginalised groups in society, including disabled people, while there continues to be an emphasis on technological as opposed to social innovations (Bolz 2020; Bolz and de Bruin 2019; Kerr, Hill, and Till 2017; Lubberink et al. 2019). Considering technological innovations that seek to give more autonomy to vulnerable groups in society – whilst often well meaning – scholars have warned against the tendency to ‘focus on “fixing” individuals, rather than the structures that generate their vulnerability’ (Kerr, Hill, and Till 2017, 3). There is a dearth of empirical studies on the potential of promoting ‘inclusive’ entrepreneurship involving marginalised groups of entrepreneurs who not only respond to the under-served needs of socially excluded groups but also seek to introduce transformational ‘social’ (as opposed to technological) innovations.

Third, the centrality of inclusiveness in RI meant that ‘responsibility’ has become politicised in terms of capabilities to decide collectively on the kinds of innovations that are socially acceptable and desirable so that ‘one can only be responsible if one is *inclusively responsible*’ (Eizagirre, Rodríguez, and Ibarra 2017). Yet, this can generate particular tensions in the context of business competitiveness and growth (Eizagirre, Rodríguez, and Ibarra 2017); for instance, when social entrepreneurs must balance both social and market logics in order to sustain their business (Lubberink et al. 2019). Whether and how ‘inclusiveness’ that resembles RI can be realised in the context of TE is yet to be explored.

To address some of these criticisms and knowledge gaps, we ask: How do ‘bottom up’ innovations by disabled entrepreneurs respond to otherwise overlooked societal needs to transform for the better the lives of disabled people? In what ways does such ‘transformational’ entrepreneurship contribute to ‘responsible innovation’? What are the impacts of these innovations and, more specifically, whose needs do they serve? We integrate thinking from RI and entrepreneurship literature as well as drawing on new empirical material to answer these questions. In doing so, the paper builds an understanding of TE as a route to RI, conducive to building linkages between grassroots actors and others generating innovation which responds to the needs of disadvantaged social groups.

### **Theoretical framework: responsible innovation as transformational entrepreneurship**

The preceding review draws attention to entrepreneurship which has the potential to transform for the better the lives of marginalised groups in society and, more widely, transform social structures that place them at a disadvantage. ‘Transformational entrepreneurship’ (TE) is a nascent concept describing entrepreneurial activities that seek to bring about a systemic transformation or change in socio-economic development (Maas and Jones 2019); for example, by introducing novel business practices to reduce inequality in the marketplace (Ratten and Jones 2019). We adopt this notion of TE as

activities that address and transform systemic inequalities in society rather than an earlier use of the term by Schoar (2010) who distinguishes ‘transformational entrepreneur’ (that is, someone who grows a business and creates jobs) from ‘subsistence entrepreneur’ (whose core aim is to generate income for themselves). A transformation in socio-economic development is not dependent on growth or job creation, although these processes can have transformational and positive impacts.

Entrepreneurship or new venture creation involves various practices that bring about innovative products and services in response to societal needs and wants. Innovations by entrepreneurial actors generally may or may not emerge in a ‘responsible’ way corresponding to RI principles of anticipation, reflexivity, inclusive deliberation, and responsiveness (Owen, Bessant, and Heintz 2013; von Schomberg 2013), however, TE by marginalised groups of entrepreneurs more specifically resembles innovations developed through genuinely inclusive ‘bottom up’ approaches to deliberations (Genus and Iskandarova 2018; Genus and Stirling 2018) in which ‘ethical concerns outweigh economic concerns’ (Lubberink et al. 2017, 4).

This section conceptualises the relationships between RI dimensions and TE, focusing on one marginalised group – disabled entrepreneurs. Both RI and TE concepts unite in seeking to address grand or global challenges, such as climate change or social inequality, through innovations that generate positive social change (Ludwig et al. 2022; Ratten and Jones 2019). However, a critique of RI studies’ attention to solving global societal problems highlights a lack of more inclusive negotiations of ‘contested responses’ to such issues and the tendency to respond with solutions proposed by dominant actors (Ludwig et al. 2022). TE practice, in contrast, illustrates how solutions to such grand challenges can be developed from the ground up and collectively by diverse and often marginalised entrepreneurial actors; for example, by reaching out to and negotiating with mainstream organisations across industries to transform exclusionary practices and reduce social inequalities (Kašperová 2021). RI and TE are not synonymous. TE may best be conceived of as one possible route through which RI can be realised, however, there is no simple linear and one-directional causal relationship between them. RI and TE are bound in a mutually reinforcing and iterative relationship.

Promoting ‘inclusive entrepreneurship’ where *all* regardless of background are given opportunity to start and run a business (OECD 2023) can help diversify and democratise innovation processes to generate outcomes aligned with RI dimensions, including innovations that address grand challenges such as social structural inequalities. TE by disabled entrepreneurs, for instance, can manifest in a number of specific outcomes – as markedly transformed organisational practices, products that enhance personal powers of disabled individuals, or as changed societal attitudes. Theoretically, these outcomes are the product of TE, conducive to the generation of ‘right’ impacts (von Schomberg 2013) on the lives of disabled people.

Fundamentally, the grassroots processes governing the setting up of new ventures from the ground up involve what transformational entrepreneurs ordinarily do, often in response to crises or traumatic events. The lived experience of disability and marginalisation, for example, can be an important source of innovative ideas for products that meet the under-served needs of disabled people marginalised in the marketplace, or challenge inappropriate mainstream practices causing marginalisation. Disability can further drive the motivation and commitment needed to bring innovations to the marketplace

(Kašperová, Kitching, and Blackburn 2018) and, vitally, legitimise innovations in the eyes of relevant stakeholders who judge the ‘rightness’ of innovations by an individual’s expertise and authenticity as a ‘disabled entrepreneur’ (Kašperová 2021). Support for inclusive entrepreneurship *itself* can be a means of democratising the governance of innovation by promoting a range of niche and distributed entrepreneurial activities involving marginalised groups (often excluded from entrepreneurship and innovation processes) who must interact with relevant stakeholders to develop their ideas into viable businesses.

The aforementioned governing processes of new venture creation are understood as dimensions of responsibility since various market actors, particularly customers, have the power to support a new venture or reject ideas judged as inappropriate. Moreover, while the RI dimensions and the associated behaviours can be antecedent to the emerging TE projects, they may be more usefully perceived as routine practices integral to many entrepreneurial journeys characterized by uncertainty, improvisation and trial-and-error (Cha and Bae 2010) as opposed to organised deliberative exercises described in RI studies. Entrepreneurs often do not have formal business plans or resources to support their innovation processes (Berends et al. 2014; Richbell, Watts, and Wardle 2006), constraining their ability to formally anticipate the likely impacts of innovation. Yet, they must, at least implicitly, reflect on their assumptions and the potential outcomes of innovation as well as engage with and respond to the voices of relevant stakeholders, to develop into a viable and legitimate business that can withstand uncertainties and survive in the marketplace.

In relation to ‘anticipation’, we conceive of TE *by* disabled people *for* disabled people’s benefit, as stemming from an awareness that an established mainstream practice is unfair or excludes disabled people from participating; for example, a future vision of how personal powers of disabled individuals may be enhanced with novel products, or of an alternative worldview of disabled people’s place in wider society. The vision or the anticipated impact often evolves as entrepreneurs interact with various relevant stakeholders, such as support providers or potential customers, in developing their innovations.

‘Reflexivity’ draws attention to ways in which able-bodied people’s taken-for-granted views of disability, and how disabled people should be served, are challenged and changed. The onset of disability can be a critical event that stimulates such reflexivity in transformational entrepreneurs. Recognising previously unknown barriers can lead one to reevaluate their values, commitments and assumptions about the world, motivating TE. Hence, reflexivity as a dimension of RI that promotes critical scrutiny often involves self-reflection on prior assumptions and values as well as significant transformation of personal concerns and commitments, followed by a desire to address the existing problems. Surfacing sometimes unacknowledged attitudes towards disability through TE activities can potentially shed light on and transform disabling social practices, assumptions or values of individuals who may have been socialised to think and behave in certain ways; for example, having low expectations of disabled people. Such reflection is vital for systemic transformations of unequal social structures and disabling attitudes.

In the framework, ‘inclusive deliberation’ is a routine process which occurs among a range of stakeholders, including disabled entrepreneurs, their potential or existing customers, employees, suppliers and various organisations the entrepreneurs interact with. An entrepreneur may discuss the purposes of their innovation with support providers, or may consider how to adapt and diversify a product in response to customer



feedback. Indeed, testing by disabled users is often integral to developing a viable prototype. These interactions can generate ideas for new practices and solutions that benefit disabled people; for instance, by providing sites in which received views about disabled people might be challenged.

Finally, in relation to ‘responsiveness’, engaging in a collective dialogue with relevant actors, including customers, employees and others, about the direction of innovation may be done less formally but still constitute a form of governance. TE activities typically involve reaching out to organisations that recognise the need to become more accountable or have specific legal duties (for example, to comply with the Equality Act) with a view to transform them for better. The entrepreneurs may introduce novel products or services, or even diversify, in response to the specific needs of disabled customers which would otherwise be neglected by mainstream businesses. The innovations that seek to benefit disabled people – a highly heterogeneous group in terms of impairment or health condition type, onset, severity, longevity and visibility – may be quite niche, serving a small group with specific impairment type, but may also emerge as a collective response to a disabling world. The new product or service may empower disabled people to be treated with more dignity and greater respect in society.

Within this framework, the innovations concerned are likely to be incremental but non-trivial to would-be users for whom the impacts and outcomes could be significantly beneficial; they could be physical artefacts, services or cultural products such as a book. Engagement of social groups occurs ‘upstream’ in the innovation processes but this looks quite close to the market compared with science laboratory-focused studies of RI of the past. In conceptualising who the product or service is for, the framework distinguishes between the end user and the target customer/market, recognising that the customer can be ‘mainstream’ (for example, hotels or employers) or ‘disabled’ (or sub-groups thereof), though in either case the end users or beneficiaries are disabled people.

## Methodology

To help us explain a previously under-theorised phenomenon of RI in the context of TE by disabled people, we adopted a critical realist-informed methodological approach. Critical realism is a philosophy of science that encourages researchers to move beyond empirical observation to theorise the underlying causal powers, conditions and mechanisms that make phenomena, such as RI, possible objects of study (Danermark et al. 2002). Whilst we utilise new empirical material – drawing on cases of disabled entrepreneurs in the UK – our starting point was to review extant theories of RI to understand the key concepts and relevant debates in relation to business and entrepreneurship. We recognised and theorised synergies between RI and TE while also interrogating the empirical material to identify demi-regularities in the data across cases (Danermark et al. 2002). We employed abductive and retroductive inference to ‘confront theory with data’ (Hoddy 2019), generating new concepts at the higher level of abstraction. We subsequently developed the theoretical framework, informed partially by the empirical material *and* existing theory, to explain the different ways in which TE activities by disabled entrepreneurs generate the ‘right’ impacts on the lives of disabled people, and the wider society, contributing to RI.



## **Data collection**

The paper draws on qualitative data from semi-structured interviews with 12 entrepreneurs in the UK, forming part of a larger study of 43 disabled entrepreneurs conducted between 2013 and 2015 (Kašperová 2018). Our selection of cases was theory informed; we chose to focus on the 12 cases illustrative of TE which addresses social inequalities faced by disabled people, rather than seeking to provide a representative picture of the kinds of entrepreneurship and innovation undertaken by disabled entrepreneurs. Whilst innovation was not the main focus of the larger study, coming up with innovative ideas for novel products or services that would respond to the needs of under-served customers and fill gaps in the market was an important theme that emerged on close examination of the data. The interviews, lasting approximately 90 min, were conducted mostly face-to-face and were audio-recorded and transcribed verbatim. The entrepreneurs were identified and approached using a variety of methods. Most were recruited with the help of gatekeeper disability organisations with interest in supporting entrepreneurship among disabled people. Snowball sampling was employed in some cases where participant entrepreneurs connected the researcher with others in their business network.

Additionally, our focus on the 12 selected cases was purposeful as we sought to showcase specific disability-related product or service innovations that: (1) address previously unmet needs of a niche group of disabled customers; or (2) seek to transform problematic attitudes and practices of mainstream organisations, and society at large, for the benefit of disabled customers or users. The sample comprises a diverse group in terms of entrepreneurs' personal and business characteristics (Table 1). The participants differ with regards to their experience of disability, the impairment or health condition severity, type – including primarily those with physical and/or sensory impairments – and the age of onset of impairment or health condition. The sample businesses comprise established micro- or small-sized enterprises trading for more than two years at the time of the interview. They operate in a variety of sectors but all 12 offer what can be described as specific disability-related product or service innovations targeted either at mainstream or niche disability markets, or both.

## **Data analysis**

We used abductive inference, moving back and forth between theory and new data, to redescribe and recontextualise our knowledge of RI and TE. The data was analysed in stages. First, building on the larger study conducted by the first author, our analysis commenced with some presuppositions based on prior observations. The entrepreneurial projects of disabled people are often motivated by the lived experience of disability and the identification of gaps in the provision of products/services within the mainstream society that excludes disabled customers. Consequently, specific disability-related innovations targeting disabled customers or beneficiaries are common among these entrepreneurs. Some disability-related innovations, however, are targeted at mainstream customers with the objective of challenging and changing established practices or attitudes that disadvantage disabled people at large.

Second, we read and re-read each interview transcript and conducted a within-case analysis to identify whether and how the already established concepts – primarily the

**Table 1.** Personal and business characteristics of participant entrepreneurs.

Pseudonym	Impairment or health condition type	Sector	Year business started
Daniel	Physical impairment	Arts and education	2010
Duncan	Physical impairment	Retail	2009
Gabriel	Chronic health condition, physical impairment, hearing impairment	Manufacturing and retail	2006
Jack	Physical impairment	Management consultancy and publishing activities	2006
Liam	Long-term health condition, physical impairment	Manufacturing	2007
Max	Long-term health condition, physical impairment	Manufacturing and retail	1998
Paul	Physical impairment	Manufacturing and retail	2007
Rhea	Chronic health condition, physical impairment	Management consultancy	2010
Steve	Long-term health condition, physical impairment	Education and publishing activities	2013
Stella	Long-term health condition, physical impairment	Employment activities	2011
Teresa	Visual impairment	Social work activities	2002
William	Chronic health condition, physical impairment	Management consultancy	1990

core principles of RI – apply in the context of entrepreneurial activities by disabled people. Although the practices of anticipation, inclusive deliberation, responsiveness and reflexivity were in evidence, they were not necessarily intentional in terms of creating innovations that are ‘responsible’. We sought to unpack the ways in which RI principles are realised through TE, highlighting a myriad of activities that entrepreneurs ordinarily undertake throughout the entrepreneurial journey which may differ from the ‘top down’ deliberative exercises described in RI studies.

Third, a cross-case analysis involving comparisons of cases allowed us to recognise emergent similarities, differences and demi-regularities in the data. Subsequently, a new typology of innovations initiated by disabled entrepreneurs was identified, with three specific benefits or ‘outcomes’ for disabled customers or end users. Our analysis involved re-reading of the original 43 cases and an in-depth discussion and comparison of the 12 selected cases, which resulted in the identification of the three disability-related innovation outcomes. ‘Manual’ coding of the original transcripts, highlighting instances illustrative of RI dimensions was undertaken for the 12 cases, identifying various actions and interactions of disabled entrepreneurs and relevant actors.

## Results

We have argued so far that RI principles can be realised from the ground up through ‘inclusive’ and ‘transformational’ entrepreneurship involving marginalised groups of entrepreneurs interacting with relevant actors, which is quite different to ‘top down’ deliberative exercises described in RI studies. TE examples presented in this section seem to differ from RI in one respect – while the RI framework seeks to prevent potential harms of innovation, the identified TE practices often address existing harms through innovations expected to generate ‘better’ outcomes. This does not guarantee that TE will be undertaken in a ‘responsible’ way akin to RI principles and produce the ‘right’ impacts. Yet, the very concern with *correcting* harms of the past highlights the reflexivity and anticipation inherent in TE practice. The showcased examples demonstrate that the

‘transformations’ are never realised through the actions of individual entrepreneurs alone but through collective deliberations of multiple stakeholders.

Exploring ‘bottom up’ innovations by disabled entrepreneurs who address the under-served needs of disabled people can enrich our understanding of RI. The innovation inherent in TE practices differs from the predominant understanding of RI and its focus on tackling ‘grand challenges’ through radical technological advances. In what follows, we show how the four inter-related dimensions of RI – that is, anticipation, reflexivity, inclusive deliberation and responsiveness – have been realised, intentionally or inadvertently, by UK-based disabled entrepreneurs. Our findings illustrate that RI can involve more mundane changes to day-to-day practices, often developed from the ground up and incrementally by entrepreneurial actors who simply strive to meet their own needs and those of others in their communities. A myriad of such small-scale innovations, however, has the potential to change social structural relations as well as material circumstances that exclude disabled people from mainstream markets and the wider society.

Disabled entrepreneurs in the UK were found to initiate three specific innovation types to positively change the lives of their intended beneficiaries, by: (1) transforming inaccessible practices within mainstream organisations; (2) enhancing personal powers of disabled people; and (3) changing mainstream societal attitudes towards disability (Table 2). In discussing these three ‘outcomes’, we demonstrate the application of RI principles in the context of TE and argue that RI might helpfully be conceived as a myriad of niche and distributed entrepreneurial activities. In relation to the *anticipation* principle of RI, for example, we find that participant entrepreneurs engaged in some early-stage deliberation of the expected impact of their innovation. In all cases, we identified initial expectations of some positive social change that would improve the marginalised position of disabled people in society, based primarily on entrepreneurs’ personal experience of disability. Below, we elaborate on these findings.

### ***Transforming inaccessible practices within mainstream organisations***

Participant entrepreneurs often pursued TE with an aim to challenge and transform established practices within mainstream organisations perceived as inaccessible to disabled people. The lack of access in the material environment – for example, public transport and buildings but also private spaces such as cinemas and other venues – continues to be a key barrier, particularly for people with physical impairments and mobility difficulties (Disability Unit 2021). Despite requirements under the Equality Act 2010 which legally protects people from discrimination in the workplace and in wider society, disabled people often face difficulties in accessing a range of products, services and opportunities across sectors.

Take the case of William – the owner of an accessibility consultancy focusing on hotel industry. William had set up his business when he became disabled in adulthood, resulting in mobility difficulties which meant that he also became a wheelchair user. Previously, William had had a long-standing career in hotels, however, he only became properly aware of the lack of accessibility within the sector when he himself acquired a physical impairment. Combining his prior knowledge of the sector with the newly acquired embodied experience and knowledge of disability sparked the idea of offering

**Table 2.** Transformational entrepreneurship cases of responsible innovations by disabled entrepreneurs.

Innovation outcome	Pseudonym	Product/service offering	Target market/customer	End user/beneficiary
<i>Transforming inaccessible practices</i>	Liam	Mobility aid for wheelchair users	Mainstream and disability-related (organisations e.g. airlines, individuals)	Wheelchair users
	Rhea	Digital accessibility consultancy	Mainstream (organisations e.g. broadcasters)	Disabled website users
	Stella	Inclusive recruitment service	Mainstream and disability-related/(organisations – employers, individuals)	Disabled job candidates
	Teresa	Rehabilitation for people with sensory impairments	Mainstream (organisations – social service providers)	People with visual and hearing impairments
	William	Physical accessibility consultancy	Mainstream (organisations – hotels)	Disabled hotel guests
<i>Enhancing personal powers</i>	Duncan	Specialist wheelchair clothing	Disability-related (individuals)	Wheelchair users
	Gabriel	Aqua running for injured or disabled people	Mainstream and disability-related (organisations e.g. sports clubs, individuals)	Injured athletes and disabled people
	Max Paul	Wheelchair gloves Mobility aid for hand grip	Disability-related (individuals) Disability-related (individuals)	Wheelchair users People with a weak hand grip function
<i>Changing social attitudes</i>	Daniel	Disability art and technology workshops	Mainstream (individuals, organisations – schools)	Disabled people
	Jack	Disability motivational public speaker and writer	Mainstream (organisations e.g. corporates)	Disabled people
	Steve	A theatre play and children's book about disability	Mainstream (organisations e.g. schools, individuals)	Disabled people

accessibility advice to hotels (his customers) which would make staying in them easier for disabled people (users of hotel services).

The main motivation [for business start-up] was seeing how badly hotels looked after people with disability. And so, I put my hotel background with my disability and decided to do something about it. My disability hasn't disabled me, it's actually enabled me to set up [the business]. ... I now campaign on a hotel disability issues. ... We do access audits. We do training. [William]

Rhea, similarly, runs a business that aims to transform inaccessible practices in the private sector. Her digital accessibility consultancy works with large corporates to improve access to various online services, such as television streaming and online shopping. Prior to setting up her business, Rhea worked in the corporate sector in the space of digital content where she experienced many complaints particularly from customers with sensory impairments. This professional experience together with personal insight of disability – having developed arthritis in adolescence – prompted Rhea to start a business specialising in digital access.

I worked at [organisation] for about eight or nine years in new media and, while I was there, I became very interested in usability. I was producing content websites and I was getting a lot of feedback from users, and some of those were disabled users who were quite frustrated about not being able to use the website as fully as they thought they should be able to. So, I just got quite interested in that. [Rhea]

These two cases show how TE by disabled people addressing the lack of accessibility within mainstream organisations can help *respond* to the specific needs of marginalised groups of disabled users through collective *reflexivity* involving a dialogue and campaigning with relevant stakeholders, including existing and potential customers, as a form of *deliberation*, upholding the key principles of RI.

Accessibility is not just about physical or digital access. Inaccessibility in a wider sense involves practices that exclude people from participating in society or from obtaining and using resources. Stella, who runs a recruitment business specialising in connecting inclusive employers and disabled candidates, is a good example of a transformational entrepreneur seeking to improve access to employment opportunities. Like William and Rhea, combining her prior background in human resource management with a newly acquired personal experience of disability has motivated Stella to create a social enterprise focusing on inclusive recruitment. As shown below, her efforts to include different voices in developing her business aligns with the *inclusive deliberation* principle of RI. The inclusion of diverse voices has in fact enabled Stella to conceive of the idea for her business and, using various discussion platforms, to consult potential beneficiaries and develop the idea into a viable and legitimate enterprise, illustrating how RI and TE can be mutually enhancing.

When I talked to employers about employing disabled people, most would say ‘Well why would I want to employ a disabled person?’ But some would say ‘Actually we understand the business case for employing disabled people, but we can’t find them.’ And then I became disabled, so I got in touch with lots of forums for disabled people and asked the question ‘Why is it that employers can’t find us?’ ... So, [it was] just seeing that there were some employers who were desperate to find disabled candidates and disabled people with loads of skills that those employers wanted but the two groups just weren’t finding each other [that motivated business start-up].  
[Stella]

These cases show that the onset of disability is an important event generative of *reflexivity*. The disruptive effects of an acquired impairment or health condition often forces one to reflect on their own values and assumptions and to *see* how the previously taken-for-granted world designed with able-bodied people in mind constrains those who are embodied differently, motivating TE that generates ‘better’ outcomes. There is evidence in these cases of including relevant stakeholders in discussions to further enhance reflexivity on the potential impact of innovation. Moreover, combining this newly acquired ‘embodied’ and ‘discursive’ knowledge with prior work experience is a crucial condition that makes these examples of TE possible.

Table 2 offers an overview of innovations by the case study entrepreneurs, the ‘outcomes’ of their TE, their target market/customer as well as the intended end user or beneficiary. One can distinguish ‘customers’ from the ‘end users’ of services in these cases since many innovations are targeted at mainstream organisational customers to help them serve better *their* disabled customers or beneficiaries – as in the case of the recruitment service targeting employers (customer) to facilitate recruitment of disabled candidates (beneficiary).

### ***Enhancing personal powers of disabled people***

Disability can be a powerful source of ideas for innovative products or services precisely because it disrupts, and often constrains, routine day-to-day activities previously taken for granted. For those who acquired impairment or health condition in adulthood, business creation was often motivated initially in *response* to personal needs. We found that the entrepreneurial projects of our case study entrepreneurs typically sought to enhance their personal powers to carry out various activities, particularly where there is a gap in mainstream markets for more tailored products or services. A growing demand from people with similar needs subsequently resulted in the development of a fully-fledged business, demonstrating the *responsiveness* principle of RI in the context of TE. Take the case of Paul, for example, who invented a specialist mobility aid for hand gripping support, initially for his own use only, following an accident which left him with partial paralysis.

I was trying to find something which helped me to overcome the weak grip on my hands and there was nothing out there at all. ... I couldn't build my arm strength because I couldn't hold any weights in my hands, because my hands were too weak. And I wanted to do sports and for that I needed to hold things and do things with my arm, my body strength. And that was just really frustrating not having a product available. ... It was my invention to develop [mobility aid] ... Initially, it was just for me, and a few people said 'You know, they're really good. Can I have a pair?' So, we made a few more and then that kept happening. ... and the business was very slowly growing and it became a limited company. [Paul]

In Duncan's case, similarly, the experience of paralysis caused by an injury in adulthood was a key event that inspired business creation. When he became a wheelchair user, Duncan struggled to find appropriate clothing and subsequently started a distribution business specialising in clothing for wheelchair users. The lived experience of disability, he explains, can be an important source of 'practical knowledge' valued by disabled customers who face similar challenges. It can help entrepreneurs gain legitimacy in disability markets.

For the new products [wheelchair clothing], it was mostly spinal cord injury [customers]. I just found that that was, it was my area of knowledge. It was sort of my group and so, you know, I was getting people there. [Duncan]

Another example is the wheelchair gloves business set up by Max, a leatherworker who acquired Multiple Sclerosis in adulthood. Max conceived of the idea for his business when he hurt his hands using wheelchair for the first time. In the following quotation, he illustrates the *inclusiveness* of his deliberations in the innovation process by involving wheelchair user community in developing the first prototype.

I went down to town and anybody who passed in a wheelchair, that were actually wheeling it themselves, not being pushed, I said 'Look, do you wanna help me out to do some research?' and I went out and bought two specialist glove-making sewing machines. In the end, it was 13, 14 [wheelchair users] including myself. We did nothing but test wheelchair gloves. [Max]

These examples of innovation have origins in everyday experiences of disabled people and their designs and development are shaped through entrepreneurs' interactions with groups of users or beneficiaries and others. The nature of *deliberation* typically

looks rather mundane, involving usual market practices such as research and prototype development, but this does represent an organic process through which feedback from relevant users is generated on the need for and purposes served by the innovation as well as its material content.

### ***Changing mainstream societal attitudes towards disability***

Innovative products and services offered by disabled entrepreneurs are sometimes developed to change mainstream societal attitudes towards disability or to shape the thinking of specific groups, such as children. The examples presented in this section illustrate that the *anticipated* impact of innovation tends to centre, directly or indirectly, on efforts to challenge and change stereotypical views of disability. Take the case of Steve, a creative writer who, among other things, published a children's book about disability. The inspiration for the book emerged when Steve saw a theatre play tackling the subject of discrimination through a satire. His subsequent collaboration with the actor in the play helped him develop his idea for the book. Both the *inclusivity* and *reflexivity* of this TE project are well demonstrated in the following quotations.

And so this actor, I spent a long time talking to him about this very thing [the impact of disability]. And he questioned me about what it's like to have a disability. ... And when I saw [him] acting, I just thought 'What an amazing way of actually telling a story'. [Steve]

The product that we provide, whether that is a script, a workshop, or a performance, has been conceived and developed with, by, people who have not just an artistic experience and qualification, but also, more than that, they've had either a personal experience of the issues involved and have looked at them and analysed what they are and what the message is we want to get across in a creative, accessible way. [Steve]

A further example is the case of Daniel, an artist who additionally offers technology workshops to schools. Daniel's art deals with the subject of disability, seeking to challenge mainstream audiences to reflect on the issue. Moreover, although his school workshops are not directly disability-focused, Daniel explains, they are crucial in exposing children to disabled role models from an early age.

It's to get them [children] to learn technology, to understand the idea of an artist, that artists are kind of real people, but also about, hopefully, kind of role model studies. It's kind of [about] meeting a disabled person; he is not a Paralympian, he is not somebody who's got a tartan blanket over the knees. ... Hopefully it's inspiring for them. It's certainly inspiring for me. ... They [workshops] are very popular. [Daniel]

This illustrates how the *anticipation* principle of RI can go beyond entrepreneur's deliberation over the expected impact of the innovation itself (for example, disability arts) to highlight less direct but crucial role of social representation of 'innovators' – in this case, disabled people represented in the fields of entrepreneurship, arts and technology – and the potential impact in transforming disability stereotypes.

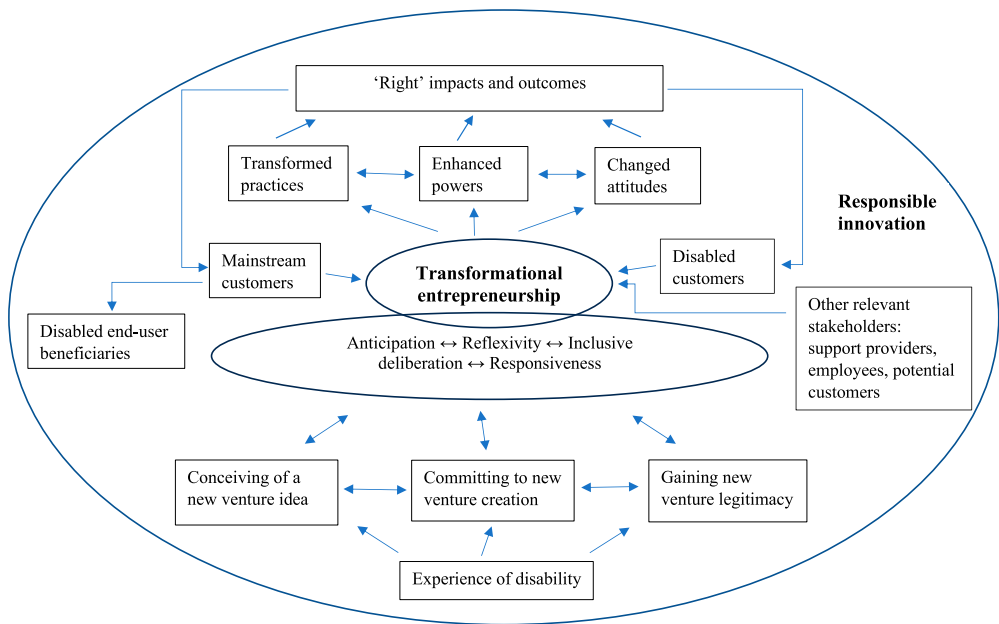
Finally, innovations by transformational entrepreneurs can change mainstream attitudes towards disability without initial deliberation to do so. Jack, whose business is motivational public speaking, is a good example. Drawing on his personal experience of disability, he had written a book and works with corporate sector clients to help



improve employee engagement. Inspired by his experience of developing a successful career as a disabled athlete, Jack had developed a model to help others achieve their goals. Using the power of storytelling, he illustrates how this model works in practice by sharing his story of overcoming adversity when he acquired a chronic health condition in childhood.

While the three innovation outcomes outlined above are inter-related – for example, transforming inaccessible practices can also change social attitudes to disability and enhance personal powers of disabled individuals – they are ontologically distinct. Each emerges and transforms ‘properties’ at different levels or strata of reality. Realist ontology helps us distinguish ‘personal emergent properties’ from ‘structural’ and ‘cultural’ ones (Archer 2000). Hence, improved social attitudes to disability (cultural emergent property), while important, may not necessarily result in the enhancement of individuals’ personal powers to carry out tasks (personal property). A novel product that counters the constraining material effects of impairment or health condition on activity, such as walking, may be needed. Similarly, improving accessibility within mainstream organisations that exclude disabled people (social structural property) can enhance the powers of disabled individuals to participate on a more equal footing, yet individuals may still be constrained by their particular impairment or health condition at the physiological or psychological level.

Our findings show that the four dimensions of RI can be realised from the ground up through TE by disabled entrepreneurs, generating ‘right’ impacts and outcomes for disabled people and the wider society. Figure 1 offers a visualisation of our new theoretical framework building on prior research and the empirical material to explicate the emergence of TE as a route to RI.



**Figure 1.** Relations between responsible innovation and transformational entrepreneurship by disabled entrepreneurs – a theoretical framework.

## Conclusions and discussion

This paper set out to explore how the key principles of responsible innovation (RI) might be realised in the context of business, responding to a call in this emerging field of research to investigate the possibility that RI could be institutionalised within the competitive market economy. Our specific focus was on ‘transformational entrepreneurship’ (TE) activities of disabled people whose innovations respond to otherwise overlooked societal needs to transform for the better the lives of disabled people. Drawing on qualitative data from interviews with UK-based disabled entrepreneurs, our analysis showed the relevance of TE to RI, identifying what types of innovations are realised, the conditions for their emergence, and what and whose needs they serve. Fundamentally, RI is made (Randles et al. 2016) as TE generates three specific types of outcomes: (1) transforming inaccessible practices of mainstream organisations; (2) enhancing personal powers of disabled people; and (3) changing mainstream societal attitudes towards disability.

Our findings address the knowledge gaps identified earlier. There is a particular concern in the RI literature with addressing ‘grand challenges’ facing society and for these to be the object of governmentally-sanctioned public engagement exercises to which some citizens or stakeholders might be invited (de Saille 2015). The formal status and impact of such deliberations on state policy-making is variable (Conrad et al. 2011; Wynne 2007). The cases presented above tell a different story. Firstly, while connected by the lived experience of disability, they illustrate the particular and varied circumstances of disabled people which might motivate them to innovate. Once one delves into the grand challenges, therefore, one may identify a nest of more mundane, peculiar needs affecting distinct sub-communities of disabled people, all requiring responsive innovations. Disability is an important source of innovative ideas for products/services that respond to those needs. It is also a powerful motivator that drives entrepreneurs’ commitment to business creation (Kašperová, Kitching, and Blackburn 2018) and helps them gain legitimacy with relevant stakeholders (Kašperová 2021), making the realisation of RI possible.

Secondly, in our cases, the entrepreneurial actors addressing these various needs are not ‘invited’ to do so (by the state) but have the capacity to generate new products/services for the direct benefit of disabled people. Although RI is not a stated aim of these entrepreneurs, they do engage in practices that align with RI dimensions, as found in other studies of entrepreneurial actors (Lubberink et al. 2019; Thapa and Iakovleva 2023). Our cases articulate specific unmet needs of particular groups of disabled people which are addressed by innovative products/services conceived of by entrepreneurs from within those communities. Yet, the targeted customers are not necessarily disabled people only; customers can include schools, social service providers, airlines, hotels and other organisations engaging with disabled people as *their* customers or employees.

Thirdly, the findings challenge foundational conceptions connected with dimensions of RI (identified by e.g. Owen, Macnaghten, and Stilgoe 2012; 2013; Stilgoe, Owen, and Macnaghten 2013; von Schomberg 2012). For example, in the anticipatory dimension of RI, technology assessment is implicated with anticipating possible harms attending the development and then use of complex innovations through processes of collective

envisioning and deliberation about desired futures and how to meet grand challenges. This study sheds new light on questions typically of concern to RI researchers, such as: How are ‘needs’ recognised? How are future impacts assessed *ex ante*? In our cases, the onset of impairment or health condition and the lived experience of disability combined with various configurations of knowledge contribute to an emerging sense of need and thence to the establishment of a new venture offering a product/service to address that need. The prevalence of some overarching, prevailing or indisputable societal value to which entrepreneurial activity is directed does not strongly characterise what drives the entrepreneurs in our cases. Instead, personal experience of unfair treatment, or inability to access a service, seems to be closer to the mark. The entrepreneurs in our study often address the needs that may not necessarily be recognised by mainstream competitors.

Fourth, the inclusive deliberation dimension of RI tends to be discussed in the literature in terms of its contribution to the assessment of desired or expected impacts or outcomes of new technologies, with the aim being to prevent possible harms caused by innovations. Arguably, this may be accomplished through collective deliberation about the desired futures, seen as an effective form of governance of large-scale science and technology. In our study, entrepreneurship is dominated by small-scale innovations, so the anticipatory and deliberative dimensions of RI are less likely to be realised through the institutionally-driven efforts found in ‘big science’ projects. Instead, such small-scale innovations tend to address a myriad of ‘existing harms’ in society, like the exclusion of disabled people from the labour market or physical spaces, by involving relevant actors, in a less formal manner, to develop innovative ideas into viable products/services.

Entrepreneurs and small business owners rarely develop formal business plans to guide their management or innovation processes (Berends et al. 2014; Richbell, Watts, and Wardle 2006). Limited resources at start-up often constrain their capacity to fully anticipate the likely impacts of their innovations. Nevertheless, the principle of inclusive deliberation is an inherent part of *successful* entrepreneurial projects where early engagement with the intended beneficiaries and other stakeholders – for example, to test prototypes with potential customers – is desirable to create products/services that are more responsive to customers’ needs, and therefore legitimate, and to overcome uncertainties associated with disruptive innovations (Bolz 2020). This highlights that RI and TE practices can be mutually reinforcing, though as with wider debates about RI, the question remains concerning how and which stakeholders are engaged in TE and how such inclusion influences decisions, for instance, on product design.

We present a perspective of RI in which scale needs to be seen rather differently. Instead of a concern to scale up innovations which meet previously unsatisfied needs in experimental, localised settings, an alternative approach could conceive of the grand challenge (say, of achieving equality for disabled people) as decomposable. The ‘wicked problem’ (Rittel and Webber 1973) then is, partly, the subject of remedial, ongoing attention by myriad actors, such as disabled entrepreneurs, although central actors might be supportive of niche or local innovations and the replication of promising initiatives whilst being sensitive to sectoral contexts and user needs. Reflexivity here has been addressed as the self-reflection of local entrepreneurs rather than on the part of lab scientists or state actors featured in foundational contributions. Nevertheless, the

conception of *de facto*, distributed entrepreneurial RI (c.f. Randles et al. 2016) suggests how to challenge and transform prevailing social structures through linkage among disparate actors.

Our primary contribution is to illustrate processes of RI understood as a phenomenon practised by people who are often marginalised in the mainstream society. We have shown that disabled people and those with long-term health conditions do not need to wait to be invited to state-sponsored public engagement exercises that embody RI practice. Instead, they engage in RI, intentionally or inadvertently, to address their marginalised position in society. This differs somewhat from a largely future-oriented conception of RI and the anticipation of potential impacts (Stilgoe, Owen, and Macnaghten 2013), emphasising that innovators can be ‘responsible’ by seeking to mitigate existing harms or problems (Lubberink et al. 2017).

Our second contribution is to add to the emerging knowledge of RI in a business context (Bolz and de Bruin 2019; Long and Blok 2018; Lubberink et al. 2017; 2018; 2019). RI need not involve development of complex or sophisticated technology; it may be realised through transformational entrepreneurship (Maas and Jones 2019; Ratten and Jones 2019) activities undertaken by new actors motivated by personal experiences of marginalisation in the marketplace who offer novel products/services that bring about systemic change, such as reduced socio-economic inequalities or positive attitudes towards disability. While such social innovations are often neglected in RI studies, we highlight here the importance of paying attention to the socio-economic context and how it relates to RI (Lubberink et al. 2017).

The findings are of significance to policy. We draw attention to the need for policymakers to recognise the transformative potential of relatively modest innovations which serve the needs of marginalised though numerically substantial groups of people. Such innovations are capable of contributing to long-standing and widely shared aspirations regarding, in this case, greater inclusion and better care of disabled people and the realisation of their potential. The implication is that policy need not be as preoccupied with supporting high-growth companies and / or high-tech innovation as is currently the case. Policy-making interventions might be directed to more effective promotion and support of ‘inclusive’ innovation and entrepreneurship by and for disabled people. This includes programmes of support for mainstream organisations which may be the immediate beneficiaries of such activities but via which more equitable access to services may be provided to disabled users (c.f. Owalla et al. 2021).

The cases presented in the paper speak to the importance of network building among disabled entrepreneurs, various communities of disabled people and/or mainstream organisations. Policies might be deployed to support the capacity of disabled people aspiring to start a business to build relationships with those from other actor categories, thereby to support idea generation, product or service development and testing. Such programmes might be effectively conceived and delivered locally, perhaps by local authorities and enterprise/innovation agencies. Importantly, support agencies must recognise the embodied and practical knowledge and experience of disabled people as potential entrepreneurs, capable of innovation which may be transformative of society.

There are some limitations affecting the generalisability of our conclusions. We presented evidence in the form of vignettes from a small number of cases. These have relied on the testimony of the participants which are subject to post-hoc rationalisation and

selectivity. Following on from this, we suggest several strands for future research to build our understanding of the contribution of TE to RI. First, a deeper investigation of particular cases to understand better the contexts and conditions under which disabled entrepreneurs exercise their power to create a new venture and to realise innovations responsive to under-served communities of disabled people. Second, more comprehensive cataloguing of the extent and processes of TE, and the conditions that enable or constrain it. Such research would likely require a large-scale survey, probably at national or regional level. Fundamentally, future work should seek to further articulate how principles of RI might be infused with the identity and capacities of disabled entrepreneurs and what this means for the establishment of new ventures and the realisation of innovations responsive to the needs of disabled people.

## Note

1. Disabled people are defined here as people with long-term impairments and health conditions that affect their day-to-day activities. We use ‘disabled people’ as an umbrella term throughout the article for stylistic purposes while recognising that disabled people are a heterogeneous group and many people with impairments or health conditions do not self-identify as disabled.

## Disclosure statement

No potential conflict of interest was reported by the authors.

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