Written Evidence Submitted by the Global Disability Innovation Hub

(C190104)

1. About the Global Disability Innovation Hub

The Global Disability Innovation Hub (GDI Hub) is a research and practice centre driving disability innovation for a fairer world. More than a product, service or policy, disability innovation is a way of thinking to address challenges by co-designing solutions and sharing knowledge.

GDI Hub comprises an academic research centre (led by UCL, and Professor Catherine Holloway), and a community interest company (led by Vicki Austin). Moreover, GDI Hub's work is guided by an advisory board, which includes disabled people from three continents that help to steer priorities.

Innovation has a critical role to play in helping society to adapt, respond, and recover from the challenges and threats posed by the COVID-19 pandemic. Disruption and innovation go hand-in-hand, and this has been highlighted by the pace at which innovation evolved during this crisis.

InnovationAction.org is a central innovation hub that sources global solutions to global challenges. It was launched by a consortium of partners brought together by GDI Hub and led by UCL Engineering. Funded by UKAid, the site enables access to designs and development, as well as technical support to local manufacturers around the world.

The response to this inquiry aims to share the lessons learned from the work GDI Hub has been doing in Low- and Middle-income Countries (LMICs) in the inclusive design and assistive technology (AT) sphere and how this was crucial for the quick reaction, and pivoting of activities to support the response to the COVID-19 outbreak.

2. The flexibility and agility of institutions, Government departments and public bodies, and processes to respond appropriately during the crisis including:

- *the availability and responsiveness of funding;*

GDI Hub has leveraged its networks and used the learnings from AT to respond to the unprecedented global challenge of COVID-19. The team pivoted some of its work in response to the pandemic, but this was only possible due to the flexibility of the UK Department for International Development (DFID) AT2030 programme funding, and the close and already established relationships between AT2030 partners across more than 25 countries.

AT2030 is a £20m investment by UK Aid (match-funded by GDI Hub) to test what works in improving access to AT globally. AT – for example hearing aids, wheelchairs, eyeglasses – are used by disabled and older people to overcome accessibility barriers, however 90% of people who need AT do not have access. Through AT2030, GDI Hub and its partners are exploring a) how lean impact models can be combined with distributed manufacturing and b) how advances in technology can be leveraged to develop new supply and delivery chains which are more accessible and resilient. Mapping of these approaches has been conducted by a researcher working in a novel role within GDI Hub – "post -doc researcher and innovation expert".

This person was seconded to the COVID Action project (led by Brink). The unique mix of deep insight into manufacturing and production, combined with innovation knowledge, has meant that the Local Production Local Solutions Call theme (being led by our researcher) has been able to identify key pathways by which PPE production can rapidly be increased across a number of local context across Africa and Asia, while at the same time locking in the flexibility needed to be resilient to future scenarios [2]. This flexible production capacity is directly applicable to improving the ability to adapt to the local context and user-specific requirements that are needed to improve the actual long-term outcomes of AT users. With the further developed understanding and mapping of these requirements globally that this work is developing, designs relevant to multiple parallel localities across the globe can be readily identified and shared.

A number of GDI Hub researchers and partners have also pivoted their work to address the impact of COVID-19 on disabled people. One of the examples is the Collective Heartbeat project where they rapidly developed digital technologies to bring some of the psychological benefits of collective experience to online, virtual experience, with the aim to boost the feelings of social connection. Another is the expansion of the Innovate Now accelerator based in Nairobi, to support COVID related digital interventions.

It is important to note that this fast response was enabled by the already established partnership between DFID and Brink (who lead the Frontier Tech programme for them) and the ideal fit of GDI Hub expertise in empowering local communities to innovate and repair technology. Both the existing partnerships with governments and local communities in LMICs, but also the technical expertise to support directly innovation efforts were crucial.

DFID acted quickly and with intelligence bringing partners together. That being said, if further flexible funding streams had been available, without reducing the resource available to the existing AT2030 programme, more pivots could have happened to provide rapid support to the COVID-19 response.

3. The capturing of data during the crisis that is of the quality and quantity needed to:

- *maximise learnings afterwards;*

Not all segments of society were affected in the same way by the COVID-19 pandemic. The situation has raised explicit challenges for the inclusion of disabled people and, therefore, has affected their participation in daily life. While community mobility, access to education, employment and health care [9] have been felt globally, disabled people might be affected by some of these changes in unexpected ways [10, 11]. Although having a disability most of the time does not put someone directly at higher risk of being infected by COVID-19, many disabled people have additional underlying conditions that make them more susceptible [12]. Many disabled people also rely on frequent in-person interactions with their own social support network for their basic needs, which could increase the risk of contracting the virus [13, 14].

To maximise learnings, GDI Hub has been collecting data on the impact of COVID-19 in the disabled community in relation to:

- ✓ AT use and provision during COVID-19;
- ✓ mobility training for the visually impaired during lockdown;
- ✓ user needs and experience of asynchronous collaboration technologies while working from home;
- ✓ the development and implementation of inclusive innovations and initiatives in Africa in response to the COVID-19 pandemic;
- ✓ inclusive digital technology to amplify social connectedness through collective cultural experience during social isolation.

Additionally, in partnership with DFID and Brink GDI researchers have also been working on mapping local production and local manufacturing capabilities in LMICs to support the global COVID-19 response.

This work has shown that circular economic approaches have come to the forefront in many local contexts. With the compromise of supply chains, supply loops making use of local materials and local available resources are the ones that are most resilient to outside change.

The Innovation Action website provides a platform to connect local companies and organisations to create local flexible manufacturing capacity. It is building a community of experts and connecting innovators with the knowledge and expertise needed. This is of the foremost importance not just for COVID-19, but for resilience in the face of future pandemics and other kinds of crises.

4. Final thoughts and recommendations

Being part of UCL - a multidisciplinary world-leading university – and already operating a large, global programme on an adjacent matter, places GDI Hub in an ideal position to help it to address major challenges presented to communities, national governments and international institutions. In order to best respond to future outbreaks, based on the lessons learned from AT, and on the data collected so far on the COVID-19 pandemic, the GDI Hub recommends:

- ✓ Continuing to ensure contractual flexibility within grants to allow pivoting of topic during global pandemics;
- ✓ The creation of incentivised collaboration of the type initiated under CovidAction, to enable diverse partners to bring their specialism to bare, collectively, against a clear mission
- ✓ Further resourcing and investigation into the benefits of 'reverse innovation' and distributed manufacturing models
- ✓ The establishment of innovation specialist research roles within universities:
  - o able to understand the gaps in the innovation process, and fast-track innovation
  - o working to bridge innovators with manufacturing capacity in local settings.

While COVID-19 has catalysed innovation, it has also revealed deficiencies in our preparedness, and raised the need to address these issues more systemically, and at a global scale.

Within humanitarian settings, or public health crises as the COVID-19 pandemic presented, it became clearer that the world needs a shift towards reverse innovation. This involves the creation of simple affordable products that can be easily manufactured, making the transition from the bench to the bedside at unprecedented pace.

Community resilience in LMICs is not necessarily increased with access to the latest technology. Instead, the innovation ecosystem needs to be redesigned, and the idea of repairability embedded from the inception stages of the product development.

The design and implementation of more inclusive innovation policies can help to achieve more equitable, sustainable and inclusive development. However, this is only possible if the end users are empowered and involved in the design and implementation of such policies and systems.

Increasing community resilience is a core part of making communities more inclusive. More inclusive systems can lead to better resilience in times of pandemic by reducing the chances of exclusion of the most marginalised populations in society.

On a final note, disabled people should always be at the centre and engaged in the development of user-centred technologies, systems, and policies thereby ensuring that all end user needs are met appropriately and in a timely way.

5. Background

The challenges of AT provision are similar to those seen in relation to the COVID-19 pandemic: a lack of affordable, quality products, trained personnel, manufacturing, production and global suppliers. By replicating learnings and working across the GDI Hub's global networks, www.innovationaction.org aims to bridge sectors, industries and borders, and rapidly catapult innovations to the regions that need them.

5.1. Local Manufacturing

Now, more than ever, the need for local production and manufacturing has been highlighted by the disruption of complex and interwoven global supply chains [1, 2]. Across LMICs and globally, innovators are finding novel approaches to shorten supply chains, using local raw materials, and pivot domestic manufacturing to supply local needs [2].

On the one hand, local manufacturing might raise the costs of products (when compared with global supply chains), on the other it can provide security against shortages, export bans and changing needs. For example, having no capacity for PPE manufacturing has left many countries vulnerable and dependent on China in the early stages of the pandemic [3].

Sustainability in Manufacturing through Distributed Manufacturing Systems (DMS), where production is closer to the point of clinical need (or use) can boost economic and development regional growth and, at the same time, help to reduce emissions related to transport and distribution [4]. Furthermore, recent experiences with wheelchair provision have shown how DMS can help produce devices that are better able to address the needs of local users and providers [5]. From the GDI Hub researchers, and local communities' perspective, DMS is a way to solve more quickly the challenges disabled people face. For example, GDI Hub is working with Humanity and Inclusion on piloting 3D printing orthotic devices in remote locations in Northern Uganda and is

supporting the development of networks of PPE production through the COVIDAction project, funded by UKAid, which will later be leveraged for AT production [6].

In the "Product Narrative for Prosthetics", published under AT2030, it was found that in LMICs, there are typically limited options of components available for purchase locally [7]. Instead, prosthetists or health administrators either hold stock of components – but have difficulties in predicting the needs of users who seek care – or place individual orders directly from overseas suppliers after patient assessment, leading to long lead times, inefficient and costly procurements, and logistical challenges. To address this, in Strategic Objective 5, it was found that *local, responsive supply channels are needed to support providers,* and that the desired long term outcome was that of a *competitive, healthy local market of an assortment of affordable prosthetic component options ready to meet the needs of all users.*

5.2. Local Repair

Helping to build community resilience by designing a more inclusive innovation system, where repairability is embedded in the product design is also a challenge that the GDI researchers are delving into.

WHO has found that the lack of ability to locally repair, maintain and replace assistive products contributes to high abandonment rates of AT [8]. Community repair leads to an increase in the product lifespan and decreases abandonment rates. GDI Hub researches have been collecting a number of case studies looking at ways in which the community can repair AT.

5.3 Product Life Cycle

GDI Hub work has shown that the more aspects of the product life cycle that are achieved locally, the more the entire system can thrive and adapt. When problems arise, adaptation is usually slow, and leaves many people and localities in a very fragile state of dependence.

The COVID-19 crisis has highlighted that the businesses that are the most rigid and unable to adapt have been hit the worst. This lack of resilience of local settings could be addressed on two interconnected fronts: resilient supply chains, and flexibility in the local production ecosystems.

6. References

[1]   H. G. Adnan Seric, Saskia Mösle and Michael Windisch. "Managing COVID-19: How the pandemic disrupts global value chains." UNIDO. https://iap.unido.org/articles/managing-covid-19-how-pandemic-disrupts-global-value-chains (accessed.

[2]   B. Oldfrey. "Open Window: Local Production and Local Solutions for #COVIDaction." https://medium.com/covidaction/open-window-local-production-and-local-solutions-for-covidaction-63379e694815 (accessed.

[3]   R. Coates, "Reshoring in the age of coronavirus: beware of the hurdles in leaving China," ed: LSE US Centre, 2020.

[4]   E. Rauch, M. Dallinger, P. Dallasega, and D. T. Matt, "Sustainability in Manufacturing through Distributed Manufacturing Systems (DMS)," *Procedia CIRP,* vol. 29, pp. 544-549, 2015/01/01/ 2015, doi: https://doi.org/10.1016/j.procir.2015.01.069.

[5]   G. Barbareschi, Sibylle Daymond, Jake Honeywill, Dominic Noble, Nancy N Mbugua, Ian Harris, Victoria Austin, & Catherine Holloway, "Value beyond function: Analyzing the perception of wheelchair innovations in Kenya," in *22nd International ACM SIGACCESS Conference on Computers and Accessibility (ASSETS '20)*, New York, NY, USA, 2020.

[6]   B. Oldfrey. "Materials, methods and supply — the challenges of PPE local manufacturing." https://medium.com/covidaction/materials-methods-and-supply-the-challenges-of-ppe-local-manufacturing-204ad5889e5d (accessed.

[7]   F. S. Cynthia Liao, Margaret Savage, Clinton Health Access Initiative, Alison End Fineberg, Barbara Goedde, ATscale, Global Disability Innovation Hub, UCL, Vicki Austin, Catherine Holloway, Ben Oldfrey, "Product Narrative: Prostheses," 2020. [Online]. Available: https://www.at2030.org/static/at2030_core/outputs/Prostheses_Product_Narrative_Final_20200728.pdf

[8]   Director-General, "Improving access to assistive technology," WHO, 2018, vol. A71/21. [Online]. Available: https://apps.who.int/gb/ebwha/pdf_files/WHA71/A71_21-en.pdf

[9]   M. Douglas, S. V. Katikireddi, M. Taulbut, M. McKee, and G. McCartney, "Mitigating the wider health effects of covid-19 pandemic response," *BMJ,* vol. 369, p. m1557, 2020, doi: 10.1136/bmj.m1557.

[10]   C. Mesa Vieira, O. H. Franco, C. Gómez Restrepo, and T. Abel, "COVID-19: The forgotten priorities of the pandemic," *Maturitas,* vol. 136, pp. 38-41, 2020/06/01/ 2020, doi: https://doi.org/10.1016/j.maturitas.2020.04.004.

[11]   V. S. Pineda and J. Corburn, "Disability, Urban Health Equity, and the Coronavirus Pandemic: Promoting Cities for All," (in eng), *J Urban Health,* vol. 97, no. 3, pp. 336-341, 2020, doi: 10.1007/s11524-020-00437-7.

[12]   U. N. DESA. "COVID-19 Outbreak and Persons with Disabilities." https://www.un.org/development/desa/disabilities/covid-19.html (accessed.

[13]   G. Barbareschi, Ben oldfrey, Long Xin, Grace Nyachomba Magomere, Wycliffe Ambeyi Wetende, Carol Wanjira, joyce Olenja, Victoria Austin, & Catherine Holloway, "Bridging the Divide: Exploring the use of digital and physical technology to aid mobility impaired people living in an informal settlement.," in *22nd International ACM SIGACCESS Conference on Computers and Accessibility (ASSETS '20)*, New York, NY, USA, 2020.

[14]   G. Barbareschi *et al.*, "The Social Network: How People with Visual Impairment use Mobile Phones in Kibera, Kenya," presented at the Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems, Honolulu, HI, USA, 2020. [Online]. Available: https://doi.org/10.1145/3313831.3376658.

(August 2020)