

## **Applying market shaping approaches to increase access to assistive technology: Summary of the wheelchair product narrative**

### **Authors**

Margaret Savage<sup>1</sup>, Nikki Tyler<sup>2</sup>, Frederic Seghers<sup>1</sup>, Novia Afdhila<sup>1</sup>, Alison End Fineberg<sup>3</sup>, Richard Frost<sup>4</sup>, Catherine Holloway<sup>4</sup>, Sara Boiten<sup>5</sup>, Michael Allen<sup>6</sup>, Rachit Kejariwal<sup>1</sup>

### **Affiliation**

1. Clinton Health Access Initiative, USA; 2. Center for Innovation and Impact, United States Agency for International Development, USA; 3. ATscale, Switzerland; 4. Global Disability Innovation Hub, United Kingdom; 5. Department for International Development, United Kingdom; 6. United States Agency for International Development, USA.

### **Corresponding author**

Margaret Savage (msavage@clintonhealthaccess.org)

### **Abstract**

To accelerate access to assistive technology (AT), we need to leverage the capabilities and resources of the public, private, and non-profit sectors to harness innovation and break down barriers to access. Market shaping interventions can play a role in enhancing market efficiencies, coordinating and incentivizing the number of stakeholders involved in demand and supply-side activities. Across health sectors, market shaping has demonstrated its potential to enhance national governments' or donors' value-for-money, diversify the supply base, and increase reliability – ultimately increasing product and service delivery access for end users. These market-shaping successes in other health areas have led practitioners to hypothesize that market shaping could also be applied to assistive technology markets. ATscale, the Global Partnership for AT, aims to mobilise global stakeholders to shape markets in line with a unified strategy. To inform this strategy, it is critical to identify specific interventions required to shape markets and overcome barriers. The first product undergoing analysis by ATscale is wheelchairs. The market for appropriate wheelchairs in low-and middle-income countries (LMICs) is highly fragmented and characterized by limited government interest, investment, and a low willingness-to-pay. Moreover, the market is dominated by cheaper, low quality wheelchairs which fail to meet the needs of end-users. Non-profit organizations have attempted to fill the need for context-appropriate wheelchairs, but market uptake is limited. These initial findings led ATscale to believe that market shaping could support increased access to appropriate wheelchairs. This paper outlines what market shaping is, and how it can be applied to assistive technology at large – using the aforementioned wheelchair product narrative as an illustrative case study and presents the proposed market shaping strategy for wheelchairs. ATscale will develop a framework to evaluate short-term interventions identified to achieve a healthy market and increase access. This paper provides an opportunity to obtain

feedback from interested stakeholders on the market shaping strategy for wheelchairs, as well as the product narrative process to be undertaken for other priority AT.

## **Keywords**

Market shaping, wheelchairs, ATscale, access

## **Introduction**

### *Overview of ATscale, the Global Partnership for Assistive Technology*

Globally, while progress has been made in improving many aspects of assistive technology (AT) delivery, the sector has been fragmented and under-resourced. Today, there is increased momentum and interest in bringing together different perspectives and voices to focus on AT. ATscale, the Global Partnership for Assistive Technology, was launched in 2018 to accelerate access to AT, coordinating around a common agenda. As described in its Strategy Overview released in February 2019:

*“ATscale, the Global Partnership for Assistive Technology is a cross-sector partnership for AT that brings new energy and strategic focus to a significant global challenge. Building upon the foundation that leaders within the sector have established, ATscale looks to revolutionise access to AT through a collective effort, supporting the global community to have an impact greater than the sum of its individual parts... A global partnership, such as ATscale, enables partners who work in distinct sectors to collaborate within a unified strategy and facilitates complementary approaches, innovation, and capacity building. This coordinated approach, convening a broad range of leading stakeholders across sectors, will increase access to affordable, appropriate, and high-quality AT products and services, all while supporting a strong enabling environment.” (1)*

This initial strategy was prepared by the ATscale Forming Committee to guide ATscale through the initial phase of its development and early activities, as well as to inform the establishment of its long-term structure and operating model. ATscale’s strategy proposes a twin-track approach that seeks to:

- Develop an enabling environment across all AT, which includes growing political will, advocating for and informing policy reform, mobilising investment, and strengthening systems and service delivery at global, regional, and national levels
- Identify targeted, catalytic interventions to address both supply and demand barriers to access for priority products via the development of detailed market scoping, called product narratives.

Analysis of approaches in other health areas reinforced this twin-track approach.

### *Role of Market Shaping in Increasing Access to AT and Accompanying Service Delivery*

Development outcomes are inextricably linked to the health of the marketplace that delivers products and services to low-income populations. A well-functioning healthcare market, with public and private sector participation, requires manufacturers to produce

high-quality products, distributors to deliver the necessary quantities, providers to deliver them correctly, and patients to be educated and active participants in their own health. However, markets can fall short. Research and development may not see enough demand to develop a new product, manufacturers may not know how much to produce, and distributors may not see enough profit to justify delivery. The reality is that a single breakdown in this complex system can keep life-saving and life-enabling products and services from those most in need (2).

Market shaping is designed to improve a market's outcomes by targeting the root causes of market shortcomings. Actors at both ends—for example, producers on the supply side and purchasers on the demand side—can face high transaction costs, critical knowledge gaps, and/or imbalanced risks that hamper participation in the market, leading to market shortcomings. These include lack of affordability, availability, assured quality, appropriate design, and/or awareness. Market shaping, grounded in health ecosystem-level thinking, reframes issues, boundaries, and constraints to better align incentives across all stakeholders in the market to potentially overcome these shortcomings. Designed to be transformative, market shaping aims to reduce long-term demand and supply imbalances to achieve sustainable health benefits. It requires participation from countries, donors, procurers, distributors, service providers, end users, and beyond (2).

Market shaping has been successfully implemented in a variety of contexts, including global health. For example, with the support of PEPFAR, the United Kingdom's Department for International Development (DFID), the Clinton Health Access Initiative (CHAI), and others, South Africa conducted careful analysis of the market landscape and reached out to suppliers in India and China to increase supplier competition. In doing so, they were able to negotiate better prices, incentivize timely delivery, and improve transparency. In aggregate, the collective efforts of all parties helped cut the cost of antiretrovirals for HIV treatment by more than 50 percent in the initial post-intervention tender and by nearly 30 percent in the second, saving an estimated \$700 million and \$260 million, respectively (2)

The design of successful and sustainable market shaping interventions requires analytics to pinpoint the underlying root causes of the aforementioned shortcomings. For example, unaffordable prices can lead to low product uptake; however, high prices can stem from a variety of causes, including expensive inputs, high supplier margins, high transaction costs, uncertain demand, or a combination of these factors. Only by identifying the relevant root causes of a market shortcoming can a market shaping intervention target the shortcoming effectively. Market shaping interventions typically use three types of levers to reduce market shortcomings:

- Reducing transaction costs: reducing transaction costs seeks to lower structural hurdles to interacting in the market, such as simplifying, smoothing, or rationalizing purchase orders.

- Increasing market information: increasing market information seeks to generate new data, align existing analyses, and/or improve the visibility of existing data to reduce asymmetries of information, such as demand forecasting, pricing information exchange, or market landscape analyses.
- Balancing supplier and buyer risks: balancing supplier and buyer risks seeks to offset financial risks borne by suppliers and shifting them to donors/purchasers in order to make market engagement more attractive, such as advance market commitments, volume guarantees, or guideline inclusion (2).

Market shaping alone does not address the multitude of product or serve uptake challenges in low- and middle-income countries. It is only a powerful nudge toward further market optimization. Thus, market shaping relies heavily on ongoing programmatic interventions to implement and effect change. Not every situation calls for market shaping; it is important to consider all the options. When used appropriately, market shaping can accelerate the market to a more optimal equilibrium in terms of improved health outcomes and sustainability, playing a critical role in delivering life-saving and life-enabling products and services to those most in need. Market shaping successes in other health areas have led practitioners to hypothesize that market shaping could also be applied to assistive technology markets.

## **Wheelchair Product Narrative**

### *Overview*

In support of Objective 2 of ATscale’s Strategy Overview, a wheelchair product narrative, was delivered under the AT2030 Programme, funded by United Kingdom’s aid from the United Kingdom government. The product narrative defines a proposed approach to sustainably increase access, availability, and affordability to high-quality, low-cost AT in LMICs. The goals of this narrative are: 1) highlight the current market landscape; 2) illuminate the barriers to access; 3) set the long-term strategic objectives for a market shaping approach; and 4) identify immediate opportunities for investments. The next sections provide a summarized version of the approach, the market landscape, and market challenges that limit access to wheelchairs.<sup>1</sup> The final section provides the proposed Market Shaping Strategy, including initial activities and long-term outcomes, to create a sustainable, healthy market for wheelchairs in LMICs.

### *Summarized approach*

Desk research, market analysis, key informant interviews, and site visits with relevant partners and governments informed a robust understanding of the market landscape and the viability of the potential interventions. Stakeholders interviewed included representatives from non-governmental organizations (NGOs), service providers,

---

<sup>1</sup> The full results of these sections can be found at [atscale2030.org](https://atscale2030.org) within the wheelchair product narrative.

governments, commercial entities, as well as academic experts, wheelchair users, and partners of the AT2030 programme and ATscale.<sup>2</sup>

### **Summarized Findings: Market Landscape**

*Globally more than 75 million people need an appropriate wheelchair, however 85-95% of those in need do not have access.*

World Health Organization (WHO) estimates that 1% of the population, approximately 75 million people globally, require a wheelchair (3). Four in five people who need a wheelchair live in LMICs (4) with an estimated 65 million people needing a wheelchair. The need for wheelchairs will only continue to grow globally, especially in LMICs, due to aging (5), increasing rates of injuries (6), and the growing burden of NCDs (7).






*Access to an appropriate wheelchair is critical to increasing civic and economic engagement and preventing negative health outcomes*

An appropriate wheelchair is defined as one that meets the user's needs and environmental conditions, provides proper fit and postural support, is safe and durable, is available in the country and can be obtained and maintained, with services sustained, at an affordable cost (4). Proper fitting prevents various secondary health conditions such as: pressure sores and progression of postural deformities or contractures; respiration and digestion complications; and premature death (8). Table 1 outlines different wheelchair types available in the global market.

---

<sup>2</sup> The full list of those interviewed and consulted can be found at [atscale2030.org](https://atscale2030.org) within the wheelchair product narrative

Table 1. Wheelchair Types

Temporary Use	Indoor/urban/ even-surface	Outdoor/rural/ rough-terrain	Dual use/ indoor-outdoor (for Long- term or active use)	Postural support
<ul style="list-style-type: none"> <li>- Depot, transport, orthopaedic or “hospital” chairs,</li> <li>- Does not provide the user with additional fitting, postural support or pressure relief.</li> <li>- Often pushed by attendant or carer.</li> </ul>	<ul style="list-style-type: none"> <li>- Lightweight</li> <li>- Has a fixed/rigid or foldable frame</li> <li>- Transportable</li> <li>- Easy to manoeuvre in small spaces</li> <li>- Adjustable for proper fit, provides pressure relief, and basic postural support needs; postural support devices may be added to fit user needs</li> <li>- Divided into <i>manual</i> and <i>powered wheelchairs</i>.</li> </ul>	<ul style="list-style-type: none"> <li>- Designed to be robust and stable</li> <li>- Easier to propel over uneven ground</li> <li>- Often three wheeled with longer wheelbase</li> <li>- Adjustable for proper fit, provides pressure relief, and basic postural support needs; postural support devices may be added to fit user needs</li> <li>- Divided into <i>manual</i> and <i>powered wheelchairs</i>.</li> </ul>	<ul style="list-style-type: none"> <li>- Have level of compromise for both environments</li> <li>- E.g., robust wheelchair with large castor wheels, but with a short wheelbase</li> <li>- Adjustable for proper fit, provides pressure relief, and basic postural support needs; postural support devices may be added to fit user needs</li> <li>- Divided into <i>manual</i> and <i>powered wheelchairs</i>.</li> </ul>	<ul style="list-style-type: none"> <li>- Designed for users requiring a higher degree of postural support</li> <li>- Highly adjustable</li> <li>- Comes additional postural support systems such as back support, head support and a positioning cushion</li> </ul>
				
<p>LMICs: ~US\$80 HICs: US\$100-800</p>	<p>LMICs: US\$150-300 HICs: US\$2,100-3,500</p>	<p>LMICs: US\$150-300 HICs: rarely found</p>	<p>LMICs: US\$200-300 HICs: rarely found</p>	<p>LMICs: US\$180-350 HICs: US\$2,200-4,000</p>

Note: Wheelchair images provided as reference only (Source: clasphub.org)

*Common guidelines exist to ensure the provision of appropriate wheelchairs in less resourced settings*

The *WHO Guidelines for the Provision of Manual Wheelchairs in Less Resourced Settings* emphasise eight steps for appropriate wheelchair service (known as the **WHO 8-Steps**; see Figure 1) to assist stakeholders in developing an appropriate wheelchair provision service in different country contexts (4). Uptake by country governments has been low due to lack of awareness of the *WHO Guidelines*, a lack of existing service provision systems for wheelchairs or AT, and limited donor support for the dissemination and adoption of the *Guidelines* worldwide.

*The global market for wheelchairs largely focuses on high-income markets and is largely fragmented*

The global market for wheelchairs was estimated between US\$4.0-4.5 billion (9) in 2018 with the United States and Western Europe accounting for about 40% and 20%, respectively. Manual wheelchairs make up about 60% of the sales revenue globally, with sales projected to grow 6% year-on-year. The powered wheelchairs segment is projected to grow faster at 15-20% (10).

The supply landscape is relatively fragmented with the five largest manufacturers controlling less than 50% of the global mobility market. Leading global players are: Invacare (USA), Sunrise Medical (Germany/USA), Ottobock (Germany), and Permobil (Sweden).

Figure 1. Poster on Wheelchair Service Steps



*Global manufacturers mostly enter into LMICs through distributors, but this adds costs*

The production of active wheelchairs for high-income countries (HIC) is highly customized and localized, which limits the product range that could be provided cost-effectively in LMICs. Suppliers, such as Invacare, Sunrise or Permobil, have a limited presence in LMICs

and mostly operate via local distributors. The final price offered to LMIC buyers increases due to high shipping costs, and in some cases, import duties. Small volumes and limited competition among distributors further raises the price.

*There is limited public funding for procurement and provision of wheelchairs in LMICs; where procurement within the public sector exists, it is often fragmented and/or erratic*

Generally, LMIC governments allocate insufficient and/or variable financial resources for the procurement and provision of wheelchairs. Wheelchairs are typically tendered at the country or regional level, generally based solely on cost. Procurement and distribution or provision is often fragmented across different ministries, such as health, social welfare, education, and defence.

*As the primary global manufacturers do not focus on LMICs, NGOs have filled the gap to design, produce and provide wheelchairs that are appropriate for use in low resource settings (LRS)*

Leading global suppliers have limited interest in LMIC markets due to low and erratic funding and demand, a reliance on a distributor network that is often poorly developed in LMICs, and a need to develop products with specific design features for use in LRS. Various NGOs and faith-based organizations (FBOs) fill that gap and deliver low-cost, manual wheelchairs that are specifically designed for LMIC environments.

These organizations typically have full control over the value chain from product design to service provision. In most cases, the NGOs are structured as social enterprises and will contract third-party manufacturers. Income from wheelchair sales is used to support wheelchair access programs. Such a model allows the NGO to raise funds for overhead and operational costs while keeping a minimum margin and therefore reducing the price of the final product. In addition to providing wheelchairs and services to users through their local service partners, they also sell their products to donors, other NGOs, and governments.

*Charitable organizations that donate product dominate funded wheelchair demand in LMICs*

Most wheelchairs in LMICs are donor-funded with delivery models ranging from organization distributing refurbished wheelchairs with limited services to mass distribution campaigns to organizations providing quality appropriate wheelchairs with services that meet WHO Guidelines. Regardless of the model, almost all chairs are delivered at little or no cost to the user.

Free Wheelchair Mission (FWM) and LDS Charities are the largest donors of wheelchairs in LMICs, but volumes are still low compared to need. For example, it is estimated that >80% of the 5,000 wheelchairs delivered annually in Kenya (<5% of need) were delivered via donor-funded programs with FWM and LDS Charities making up >50% (9). Because these organizations deliver larger quantities, it allows them to have full control over the design, manufacturing, transportation, and inventory management of the primary products that



they donate, while also reducing cost per wheelchair provided. To achieve higher volumes and the lowest possible cost, a limited range of products is supplied.

*Local manufacturing to meet LMIC demand has seen varying levels of success*

Enabled by favourable government policies, incentives to manufacture locally, and perception that wheelchairs are a low-tech product, local manufacturers exist in LMICs. The wheelchairs are often designed for local context and can be customized to match users’ needs, though the manufacturing process is labour-intensive, expensive to initiate, and requires materials or parts from abroad, limiting scalability.

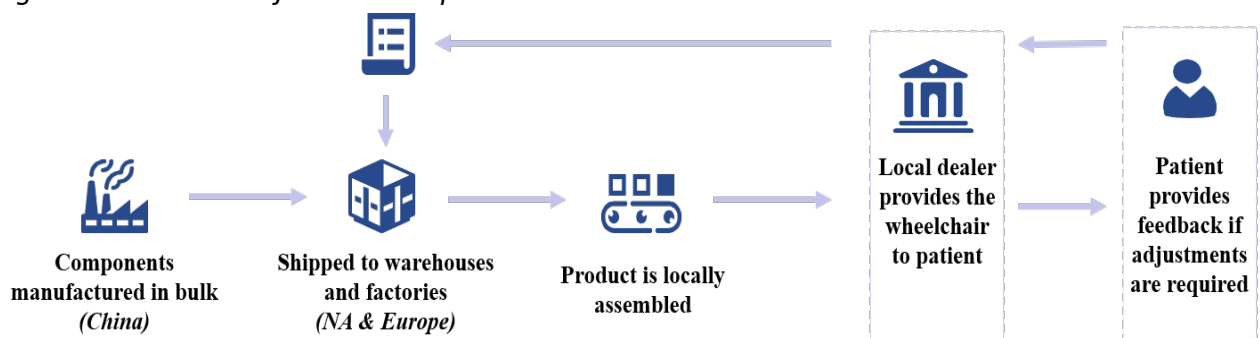
Local manufacturers struggle due to low and erratic demand, resulting in low production capacity planning and utilization and difficulties in sustaining production levels. Additionally, quality in production can be hampered by low investment, training, available equipment, skills, and quality mechanisms.

Key success factors for local manufacturing include: 1) quality and competitive pricing; 2) receiving support from the local government in the form of tender purchases; 3) selling both domestically and through regional exports; and 4) ability to provide a more diverse wheelchair product-offering.

*While not heavily utilized in LMICs, localized assembly of component parts could support a cost-effective supply of appropriate wheelchairs*

Bulk manufacturing of parts with regional assembly is the standard manufacturing model employed in HICs. In this model, wheelchair parts are manufactured at a centralized manufacturing site - usually in China - and then shipped to a warehouse or facility that is specialized to do final assembly of certain models (Figure 2). Given the pressure on profit margins, suppliers optimize warehousing and production costs while maintaining the ability to offer a highly customized final product. One supplier suggested that an assembly approach reduces shipping costs to 25% of the total cost of shipping assembled products. Most assembly of lower-cost wheelchairs happens in China, while more expensive, high-end products are commonly assembled in Europe or North America, closer to the end-user. Some NGOs have developed an approach that involves ‘localized’ assembly of wheelchairs in LMICs.

*Figure 2. Illustrative of wheelchair production in HICs*



*Generic suppliers that serve as contract manufacturers for NGOs and FBOs produce quality wheelchairs that may be able to supply LMICs cost-effectively but lack market visibility or scale*

Wheelchair manufacturing has largely shifted to Asian countries. For example, China's large bicycle industry, together with an extensive and diverse supply chain, indigenous supply of raw materials, high investment in production technology and volume manufacturing infrastructure, makes for an effective production base.

Asian-based companies, used as contract manufacturers by NGOs and FBOs, also manufacture their own brand and have the manufacturing capabilities and excess capacity that could be used to serve LMIC markets, but lack understanding on what products are needed for these markets, who are potential buyers, and potential market size.

*Product standards and specifications for wheelchairs in LRS have been developed or are in development, though use in guiding purchasing and design has been limited*

The *WHO Guidelines* include guidance on minimum product quality standards for products based on ISO 7176, the international standards for wheelchairs that evaluate the product's safety, durability, performance, and product dimensions. However, ISO 7176 does not test for factors typical for LRS, such as rough terrain, or environmental conditions, such as high humidity, exposure to water and sand, and high temperatures.

To improve reliability and usability of wheelchairs in LRS and guide product design, the International Society of Wheelchair Professionals developed the *Design Considerations for Wheelchairs Used in Adverse Conditions (11)*. It complements the *WHO Guidelines* by providing detailed information in designing wheelchairs for adverse environment and common pitfalls. ISWP developed protocols and equipment to test casters, rolling resistance and corrosion for adverse conditions, labelling it the ISO-Plus, but no specific pass/fail thresholds have been determined thus far.

At the moment, most LMICs include limited specifications in their tenders, often even restricting the request to a single word, such as "wheelchairs". As a result, these countries may buy products that are inappropriate for their settings or are of limited quality. The WHO, under the GATE Initiative, is developing Assistive Product Specifications (APS) for all assistive products listed in the Priority Assistive Products List (12), including wheelchairs.

*A lack of clarity on the ideal products required to serve the highest proportion of the population, as defined by a preferred product profile (PPP), contributes to a fragmented market space.*

PPPs for different types of wheelchairs that would be appropriate for use in LRS can rationalize demand and increase market transparency. A PPP that contains preferred criteria and specifications for a product that is appropriate for LMICs can, when backed by funders, provide strategic guidance for development and purchasing. While the *WHO Guidelines* give providers and program managers a framework for product selection, there is no mechanism

to evaluate products against its criteria. The APS will help buyers with procurement but doesn't include guidance on the desired price points and specific performance standards for LRS.

*To address the challenges of a fragmented market landscape, USAID funded the development of a global distribution hub of context appropriate wheelchairs*

Consolidating Logistics for Assistive Technology Supply and Provision (CLASP) is a USAID-funded global consolidation or distribution hub launched in 2014 offering access to a variety of products. It was designed to address challenges faced by service providers in LMICs. Advantages of CLASP as a procurement mechanism included: increased access to a variety of products; increased market visibility of available appropriate, quality products; reduced lead-time; and acting as a pooling mechanism for small/fragmented ordering. Challenges include: limited feedback loop from users; limited working capital; limited space and additional overhead from contracting third-party logistics company for warehouse management; and a limited buyer base.

### **Summarized Findings: Market Challenges**

LMIC markets for wheelchairs are nascent, with a need to focus on demand creation. Table 2 summarizes the demand and supply dynamics that challenge the development of a wheelchair market.

*Table 2. Challenges in Wheelchair Market*

<b>Demand</b>	
<b>Awareness</b>	There exists a lack of awareness around the need for and importance of appropriate wheelchairs among end-users, service providers and policymakers.
<b>Political Will:</b>	Government involvement is low. Donor funding that fills this gap and supports 'free' product inhibits the development of a public market.
<b>Provision</b>	Due to a lack of awareness, prioritization and investment in this sector, the capacity for service provision in line with the WHO Guidelines is limited
<b>Financing</b>	There is a lack of financing - both public and private - for the purchase of appropriate wheelchairs. Financing often supports the cheapest product available
<b>Preferred Product Profile</b>	Limited consensus on a range of preferred product classes and no commonly accepted objective standards on what is a quality, appropriate wheelchair has contributed to a proliferation of products.
<b>Supply</b>	
<b>Appropriate design</b>	Limited feedback loop from end-users to inform product design and innovation.
<b>Production economics</b>	Manufacturing economics for current appropriate products are unfavourable with small volumes and wide range of SKUs lead to inefficient manufacturing schedules and increased production costs.

<b>Competitive landscape</b>	Leading global manufacturers have limited interest in entering LMIC markets, while Governments have a preference for locally manufactured products.
<b>Cost-efficient supply chain</b>	Limited use of cost-effective supply mechanisms, such as local assembly, combined with high import taxes increase price to final payer.
<b>Enablers</b>	
<b>Quality</b>	Limited quality assurance mechanisms at the demand and supply side. Buying is not driven by quality standards
<b>Procurement</b>	Fragmented funding drives fragmented procurement and limits the ability to aggregate demand, effective forecasting and incentivize volume- and value-based procurement. It contributes to a lack of visibility and data on actual demand.
<b>Market visibility</b>	There is limited to no data for suppliers on unmet need and funded demand for appropriate wheelchairs in LMICs and for buyers on available and quality suppliers and pricing.

### Proposed Market Shaping Strategy for Wheelchairs

To overcome these market challenges, a multi-pronged approach that is informed by a long-term vision towards a sustainable market for appropriate wheelchairs and their provision in LMICs is required. This section describes the proposed strategic objectives and long-term target outcomes to achieve this. For each strategic objective, an initial set of activities is proposed that would deliver the outputs required to support the target outcomes. Many of the activities are interconnected.

Table 3. Strategic objective 1

<b>Strategic Objective 1:</b> Build and stimulate demand through the integration of wheelchair services, including procurement & provision, into healthcare systems	
<b>Barrier addressed</b>	Low and erratic demand in LMICs with limited government engagement and funding.
<b>Rationale</b>	<ul style="list-style-type: none"> <li>• There is limited awareness within government on the need for and return on investment for appropriate wheelchairs.</li> <li>• Integrating the provision of wheelchair services into the health sector could drive regular purchases from government, leveraging existing infrastructure and capacity for service provision, product distribution and procurement.</li> <li>• Health systems are well suited to support user identification, service delivery and procurement in particular for remote settings in LMICs.</li> <li>• Buying appropriate wheelchairs and pressure relief cushions can be cost-saving overall to the health system by offsetting negative health outcomes.</li> </ul>
<b>Proposed Activities</b>	<b>Support the integration of wheelchair provision into the health system at country-level:</b> In a sub-set of identified countries [framework for country selection TBD], increase provision through integration, expanding and further developing proven models for delivery. This includes: 1) mapping the provision landscape and need, where appropriate; 2) developing a roadmap or strategy to integrate wheelchair services into the national health system; 3) developing or expanding personnel and capacity for service provision,

	including follow-up and maintenance. Document learnings to inform the global toolkit.
	<b>Develop advocacy and implementation toolkit to be used by decision-makers to integrate wheelchair provision into the health system:</b> Develop and disseminate tools to support the implementation and advocacy at government level, including: 1) tools to model the need; 2) investment case for integration of wheelchairs, including financial and societal ROI; 3) a road map template including policy, guideline development, procurement guidelines and operational management guidance that can support countries with the integration of services; and 4) a sample budget impact model for scale-up.
<b>Target Outputs</b>	<ul style="list-style-type: none"> <li>• Unmet need better understood and quantified</li> <li>• Improved awareness of the need for, and value of, appropriate wheelchairs</li> <li>• Demand generated (sustainably and predictably) in a number of countries</li> <li>• Model for integration tested and evaluated for scaling to meet need that: <ul style="list-style-type: none"> <li>○ Improves ownership and coordination</li> <li>○ Provides quality-assured product through services</li> </ul> </li> </ul>
<b>Long-term Outcome</b>	Predictable, sustainable and sufficient demand for appropriate, quality wheelchairs which leads to positive outcomes for wheelchair users

Table 4. Strategic objective 2

<b>Strategic Objective 2:</b> Pool resources to catalyse increases in funded demand and to limit fragmentation in the market	
<b>Barrier addressed</b>	Fragmented market driven by a lack of coordination of among buyers of wheelchairs for LRS and a limited focus on deploying the available resources to effectively support the development of a public-sector market
<b>Rationale</b>	<ul style="list-style-type: none"> <li>• Across various LMICs, donors operate parallel delivery systems that often lack coordination with the government;</li> <li>• Successes in other health areas show that viable LMIC markets can be developed through partnering with governments, and with targeted support from donors</li> <li>• Opportunities exist to expand domestic expenditure and catalyse government participation for both product procurement and service delivery, potentially using innovative financing mechanism (e.g. results-based financing &amp; co-financing).</li> <li>• Pooling the available resources - both donor and government - allows for the channelling of resources to a single payer, thereby strengthening purchasing power, increasing market visibility to suppliers and predictability in funded demand.</li> </ul>
<b>Proposed Activities</b>	<b>Test model(s) to pool resources from key donors:</b> Facilitate and test innovative models with select donor(s) to leverage available resources. This may include, match funding, subsidy, product purchasing support, etc.
	<b>Leverage donor funds (e.g. from FBOs) to activate government purchasing and unlock additional resources:</b> Work with donors and government to commit resources (in line with innovative funding model, such as match

	funding) towards wheelchair purchasing or provision, supporting integration into government-owned supply chain.
<b>Target Outputs</b>	<ul style="list-style-type: none"> <li>• Government payer activated</li> <li>• Purchaser landscape consolidated and buyer power strengthened</li> <li>• Increased funding predictability</li> <li>• Increased market visibility</li> <li>• Key donors commit to taking proven innovative funding approach to scale</li> </ul>
<b>Long-term Outcome</b>	Donor funding is effectively deployed to catalyse funded public demand and strengthen systems for the provision for appropriate wheelchairs

Table 5. Strategic objective 3

<b>Strategic Objective 3:</b> Strengthen procurement via adoption of specifications and standards, improved tendering and increased market information	
<b>Barrier addressed</b>	<ul style="list-style-type: none"> <li>• Proliferation of low-quality products that do not meet end-user needs</li> <li>• Inability to support value-based negotiations</li> <li>• Opaque market environment with limited information available to suppliers and buyers</li> </ul>
<b>Rationale</b>	<ul style="list-style-type: none"> <li>• Aligning on product specifications and/or a PPP that establishes product quality standards, specifications and target pricing can increase transparency for purchasers, such as government programs, and suppliers. Thus, making procurement easier for governments, potentially supporting value-based price negotiations, centralized contracting or donor co-financing.</li> <li>• A procurement or distribution hub that rationalizes supply and negotiates directly with suppliers may serve as a step toward centralized contracting.</li> </ul>
<b>Proposed Activities</b>	<p><b>Develop PPP to be adopted into countries' procurement:</b></p> <p>a. Establish baseline set of standards and specifications for products in LRS;</p> <p>b. Develop key strategic document that communicates PPP requirements for products that fulfil priority needs. The PPP includes desired specifications and requirements, including on environmental conditions, quality and cost;</p> <p>c. Develop standards in line with PPP that would be applied to support quality testing and implement testing body with easy to access testing canters. Promote the adoption of new wheelchair standards by ISO;</p> <p>d. Advocacy with donors/funders (donors, UNICEF SD, governments, NGOs, FBOs, etc.) should be targeted to emphasize buying only products meeting the minimum requirements and specifications as outlined in the PPP.</p>
	<p><b>Increase market visibility:</b> Develop a market intelligence platform that tracks supply and buyer landscape, including data from UNICEF, CLASP, ATscale and AT2030 initiatives, and other field practitioners and NGOs.</p>
	<p><b>Strengthen procurement and distribution mechanisms to ensure the ability to meet market needs:</b></p> <p>a. Work to increase market information, including upcoming tenders and volumes, available to procurement mechanisms, such as UNICEF SD, CLASP and others;</p>

	<p>b. Include products meeting PPP specifications (and future products meeting PPPs) within UNICEF SD catalogue; increase country knowledge on product availability;</p> <p>c. Assess and further develop distribution hub models, such as CLASP, by increasing its independence, diversifying its funding base, reducing product acquisition cost and supporting capacity to increase scale, product range, reach and responsiveness.</p>
<b>Target Outputs</b>	<ul style="list-style-type: none"> <li>• Increased visibility of quality suppliers in the market with products that meet PPPs</li> <li>• Demand rationalized as the requirements of buyers is standardized</li> <li>• Buyers have adopted standardized product specifications and standards (in line with PPP) and implemented procurement principles to adopt quality, appropriate product</li> </ul>
<b>Long-term Outcome</b>	Transparent flow of information on demand and supply enables the market to grow in a cost-effective manner.

Table 6. Strategic objective 4

<b>Strategic Objective 4: Identify and support cost-effective supply systems</b>	
<b>Barrier addressed</b>	<ul style="list-style-type: none"> <li>• Unfavourable manufacturing economics and high shipping costs significantly increase the cost to LMIC payers.</li> <li>• Governments may prefer 'local products', therefore limiting international supply and uptake of international distribution mechanisms (e.g. CLASP).</li> </ul>
<b>Rationale</b>	<ul style="list-style-type: none"> <li>• Proven models of affordable, quality, localized supply exist.</li> <li>• Manufacturers of quality, low-cost wheelchairs or wheelchair components exist that could meet LMIC market needs.</li> <li>• Increasing the use of globally recognized minimum quality standards may help filter out lower quality manufacturing in support of new mechanisms for cost-effective supply.</li> </ul>
<b>Proposed Activities</b>	<b>Improve understanding of the economics of local manufacturing versus local assembly:</b> Conduct detailed analysis on the economics of local assembly versus local production in specific countries to support government decision makers and private sector business development units.
	<b>Test models for localized cost-effective supply systems:</b> Work with (local) suppliers already operating in LMICs and/or with large global suppliers to test approaches for the supply of products that meet quality and price goals. This may include – for example – facilitating a joint venture, supporting licensing agreements between social enterprises and contract manufacturers or supporting the development of a (regional) distribution network.
<b>Target Outputs</b>	<ul style="list-style-type: none"> <li>• Governments have the tools and information required to make informed investment and procurement decisions regarding localized production</li> <li>• Proven model for a responsive and cost-effective supply of appropriate wheelchairs in country</li> </ul>
<b>Long-term Outcome</b>	A healthy supplier base of quality, appropriate products for LMICs that are delivered at optimal prices that can efficiently service market needs.

## Conclusion and next steps

This product narrative was developed to support identification of activities that will increase and sustain access to appropriate, affordable wheelchairs. ATscale is currently in the process of developing a prioritization process to inform which of the market shaping activities proposed above will be incorporated into the Partnership's overall investment and implementation plan. While that is underway, some of these proposed activities will be undertaken in the immediate term by the United Kingdom's aid-funded AT2030 programme in line with its aim to test what works to increase access to affordable AT. Additionally, ATscale welcomes feedback on the articulated approach and seeks collaboration with partners interested in aligning their activities with the proposed market shaping strategy.

## References

1. ATscale. Strategy Overview. 2019. Available from: [https://atscale2030.org/s/ATscale\\_Strategy-Overview\\_February-2019.pdf](https://atscale2030.org/s/ATscale_Strategy-Overview_February-2019.pdf)
2. Market Shaping Primer [Internet]. U.S. Agency for International Development. USAID; 2019 [cited 2019Sep26]. Available from: <https://www.usaid.gov/cii/market-shaping-primer>
3. Assistive technology [Internet]. World Health Organization. World Health Organization; [cited 2019Sep26]. Available from: <https://www.who.int/news-room/fact-sheets/detail/assistive-technology>.
4. Guidelines on the provision of manual wheelchairs in less-resourced settings [Internet]. World Health Organization. World Health Organization; 2016 [cited 2019Sep26]. Available from: <https://www.who.int/disabilities/publications/technology/wheelchairguidelines/en/>
5. Facts about ageing [Internet]. World Health Organization. World Health Organization; 2015 [cited 2019Sep26]. Available from: <http://www.who.int/ageing/about/facts/en/>
6. Haagsma JA, Graetz N, Bolliger I, et al. The global burden of injury: incidence, mortality, disability-adjusted life years and time trends from the Global Burden of Disease study 2013. *Injury Prevention* 2016;22:3-18.
7. Whiting DR, et al. 'IDF Diabetes Atlas: Global Estimates of the Prevalence of Diabetes for 2011 and 2030', *Diabetes Research and Clinical Practice* 2011;94;3:311–21.
8. Toro ML, Eke C, Pearlman J. 'The Impact of the World Health Organization 8-Steps in Wheelchair Service Provision in Wheelchair Users in a Less Resourced Setting: A Cohort Study in Indonesia', *BMC Health Services Research* 2016;16.
9. CHAI. Internal Analysis, n.d.
10. Sable K. Manual Wheelchair Market by Category (Adult and Pediatric), Design & Function (Basic Wheelchair, Sports Wheelchair, Bariatric Wheelchair, Standing



Wheelchair and Others), and End User (Homecare, Institution, and Others): Global Opportunity Analysis and Industry Forecast, 2018 - 2025 [Internet]. Allied Market Research. Allied Market Research; 2019 [cited 2019Sep26]. Available from: <https://www.alliedmarketresearch.com/manual-wheelchair-market>

11. International Society for Wheelchair Professionals. Design Considerations for Wheelchairs Used in Adverse Conditions. University of Pittsburgh, 2017. Available from: [https://www.wheelchairnet.org/ISWP/Resources/DesignConsiderations\\_WheelchairsAC\\_12142017.pdf](https://www.wheelchairnet.org/ISWP/Resources/DesignConsiderations_WheelchairsAC_12142017.pdf)
12. World Health Organization. Priority Assistive Products List (APL). Geneva: WHO, 2016. Available from: [https://www.who.int/phi/implementation/assistive\\_technology/low\\_res\\_english.pdf](https://www.who.int/phi/implementation/assistive_technology/low_res_english.pdf)