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# Assistive technology service delivery in South Africa:

## conceptualising a systems approach


## Authors

Surona Visagie[i]
Elsje Scheffler[i]
Nikola Seymour[ii]
Gubela Mji[i]


Current evidence indicates that assistive technology services are inequitable, fragmented, and dependent on qualified individuals working in professional silos.


Assistive technology (AT) services and products are essential to many persons with impairments, as they enable participation in life roles and community integration. In South Africa, AT services are mainly provided through the healthcare system, which means that with the implementation of National Health Insurance, the National Department of Health will be responsible for providing AT services to the people of this country. Current evidence indicates that these services are inequitable, fragmented, and dependent on qualified individuals working in professional silos. The aim of this chapter is to review AT service provision in South Africa using a systems-approach lens and to provide recommendations for future AT services that build on current best practice strategies and international best practice guidelines.

A systems approach to AT service delivery can facilitate seamless, equitable provision across time and place. This chapter describes the extent to which users are placed at the core of AT services and explores the degree to which AT services are guided by dedicated policy. Current practice is described for people, products, provision, personnel, policy, procurement, partnerships, promotion, pace, and place. The chapter also identifies social, historical, economic, and geographical influencers; responses to emergent behaviours; and strategies for sustainable, resilient, and cost-effective service delivery.

National Health Insurance may be the catalyst needed to harness South Africa's unique opportunities, strengths and challenges to develop equitable, person-centred AT services. Under guidance of the National Department of Health, overarching, integrated, intersectoral policy must be established for accessible, equitable, person-centred AT services. Product development and manufacturing must be stimulated. Furthermore, a new-look provider corps and training programmes must be developed.



i Centre for Disability and Rehabilitation Studies, Stellenbosch University
ii Occupational therapist in private practice

## Introduction

Assistive technology (AT) services and assistive products (AP) enhance function, participation in life roles, and community integration of persons with impaired body function and/or structure, such as persons with disabilities, the elderly, and persons with chronic conditions like HIV and AIDS. Without appropriate AP they cannot access opportunities on an equitable basis as required by the Sustainable Development Goals[1] and the South African National Development Plan (NDP).[2-6] The Framework and Strategy for Disability and Rehabilitation Services in South Africa[7] supports the NDP and provides a practical guide for rehabilitation service delivery in the country, including the provision of AP, with a view to facilitating social and economic inclusion of persons with disabilities.

Currently, both healthcare and AT service provision in South Africa are delivered through a two-tiered health system (public and private), which is set to change with implementation of the National Health Insurance (NHI) Bill.[8] NHI "aims to achieve sustainable and affordable universal access to quality healthcare services" through "serving as a single purchaser and single payer of healthcare services in order to ensure equitable and fair distribution and use of healthcare services … by pooling of funds and strategic purchasing of healthcare services, medicines, health goods and health related products from accredited and contracted healthcare service providers".[8]

On implementation of NHI, the National Department of Health (NDoH) will remain a key provider of AT services to South Africans across their lifespan. However, the Department's readiness for this role raises concerns given that the NDoH currently provides healthcare services to 80% of the population but only meets between 25% and 65% of the total AP need.[9-11] In addition to financial constraints, there is great variation in AT provision among different provinces, between levels of healthcare, and across geographical areas, with rural settings experiencing the greatest challenges.[10,12-14] Barriers in procurement and delivery systems, inadequate integration of AT services, fragmented services, inadequate AP knowledge among service providers,[12-16] and insufficient numbers of service providers,[12-19] all hamper AT services in South Africa.

To explore AT services on the eve of NHI, using a systems perspective, could assist in identifying strategies and solutions to address the many challenges impacting on AT service delivery.

## Systems and systems thinking

Systems can be open or closed. In closed systems, such as the physiological systems in the body, specific cells and organs work together with little environmental interaction. Open systems, such as healthcare systems, are entrenched in their environments and are simultaneously dependent on and responsive to them. They are designed to interact with and respond to the environment, with porous boundaries that allow an exchange of information. Open systems are fluid, with practices, objectives and outcomes that can change over time.[20]

Systems thinking is dynamic, collaborative, and transcends disciplinary, organisational, departmental, and societal boundaries. A zoom-out approach is used that appreciates the bigger picture, and patterns are observed over time. Relationships, their context, and the impact of interventions must be understood. Interventions have complex up- and downstream effects that form part of the collective whole. "Every intervention, from the simplest to the most complex, has an effect on the overall system, and the overall system has an effect on every intervention".[21] To effect change, interventions can be implemented at different points or levels within the system. All interventions are monitored and assessed, and findings are fed back into the system to facilitate continuous improvement.[20,21]

## Assistive technology and assistive technology systems

Terminology in the AT field is often used interchangeably and defined in different ways. This chapter uses the 2018 World Health Organization (WHO) definitions for AT and AP as presented by Smith et al. (Box 1).[22]

## Box 1: Definitions of AT and AP

**Assistive technology (AT):** "...application of organized knowledge and skills related to assistive products, including systems and services".[22]

**Assistive products (AP):** "...any external product[s] (including devices, equipment, instruments or software), especially produced or generally available, the primary purpose of which is to maintain or improve an individual's functioning and independence, and thereby promote their well-being. AP are also used to prevent impairments and secondary health conditions".[22]

Source: Smith et al., 2018.[22]

### Conceptual framework

The "10 'P's for systems thinking in AT"[20] will be used as a conceptual framework to explore AT services in South Africa. The framework (Figure 1) has AT users (people) at the centre; the four main strategic drivers of AT as identified by the WHO Global Cooperation on Assistive Technology (GATE)[23] in the middle circle (Policy, Products, Personnel and Provision); and five contextual elements in the outer circle (Procurement, Place, Pace, Promotion and Partnership).

## Figure 1: Conceptual framework – the 10 'P's of systems thinking in AT


Source: MacLachlan and Scherer, 2018.[20]

### People (users)

Existing and potential AP users are the reason for AT services, and as such they are central to AT systems. Users should drive AT systems from policy through to individual AP selection. Users are unique, and are distinguished from each other by their specific impairment, context, culture and social roles, and each must be empowered through a person-centred process to identify appropriate AP. The AT system should remain responsive and adaptable to different life stages and changing requirements over the lifespan.[20,24,25] Failure to deliver person-centred services can be linked to dissatisfaction with and non-use of AP.[25]

Emerging person-centred service provision in South Africa seems to depend on individual service providers rather than standard practice requirements.[12,14,26] Still entrenched in the medical model, many AP users do not yet perceive AT services as a right, and are passive recipients who feel obliged to be grateful for and satisfied with what they receive.[8,12]

### Policy

Using systems thinking, an overarching AT national policy should link with policies across all sectors to facilitate participation, function, and well-being. Most existing AT policies are found in high-income countries (HICs) and are based on global-North research and thus not directly applicable to low- and middle-income countries (LMICs) such as South Africa.[27] However, international AT guideline documents[28-32] developed by the United Nations and WHO specifically consider LMIC contexts, so despite their global approach, these documents could guide countries to develop national policy.

Although South Africa has no overarching AT policy, national guidelines on the provision of assistive devices in the public health sector circa 2006[33] are fairly comprehensive and largely aligned with key elements of international AP service steps and guidelines. However, the national guideline lacks an intersectoral, person-centred approach. Furthermore, based on the limited evidence available, awareness and implementation of these guidelines are poor. These guidelines were also not included in undergraduate curricula of healthcare professionals, who are currently the key AP service providers in South Africa.[5]

One of eight goals in the NDoH[7] strategic plan for rehabilitation includes improving access to appropriate assistive devices/technology and accessories, with revision of the 2006 guidelines by March 2017, and implementation of the revised guidelines by March 2020. No revised documents have been published yet.

### Products

In systems thinking, product range and variety are needs-based, aligned with supply-and-demand data, and costs. Product specification and standards should reflect the physical and functional needs of users relative to their environment and culture,[20] and offer adequate technical and adjustment options to configure the product to optimise fit, function, and personalisation.[26,34] Products should be affordable, and cost-effectively maintained.

South African providers and consumers often do not recognise the value and quality of locally manufactured products, preferring imported products over local ones. Thus where government tender specifications do not support local production, local suppliers often choose imported products. However, imported products are developed in HICs, so cost is usually high and design features may be unsuited to environmental and/or cultural requirements such as language.[26,35] Local product manufacturing capacity is limited, but innovative development is present, such as in the wheelchair industry. Appropriate local technology and leading designs will address a wide range of individual functional, posture support, and environmental needs at affordable costs in line with ethical service-provision guidelines.[36]

Despite stringent international standards for most products, including local standards for mobility devices, these standards are not enforced by the local product regulatory body with regard to import, local manufacture, and trade of products. As a result, low-quality, cheap products are widely available in South Africa and often widely distributed by vendors and well-meaning donors without input from trained personnel or partnering with existing AT services. These challenges lead to inappropriate provision that follows a one-size-fits-all approach, frequent breakdowns, and poor maintenance and repair of products.[37]

### Personnel (service providers)

In a systems approach, countries plan AT services around availability of professionals, supplemented with alternate models such as capacity building, task shifting, skills mix, and remote support via e-methods.[3,20,38]

In South Africa, AT services are mainly provided through highly trained professionals operating in narrow professional domains.[5,16,26] Professional scope of practice and boundaries, together with service roles, stringently define and regulate service delivery, inadvertently limiting access and an integrated approach, to the detriment of the user.[16] The proposed Health Professions Council AT position statement will further perpetuate the current status and is counterproductive to the task-shifting model proposed by the WHO and current healthcare reform. Healthcare reform and task shifting promote the widespread inclusion of mid- and grassroots-level workers at primary care level. Their responsibility includes the provision of certain categories of AP.

Service providers remain a homogeneous group consisting mainly of white females, or males in the case of orthotics and prosthetics, the majority of whom practice privately in the more urbanised provinces of Gauteng, the Western Cape and KwaZulu-Natal.[17-19] In addition to a shortage of providers, especially in rural areas and among the poor, cultural and language barriers may prevent user-centred

services from reaching many members of South Africa`s diverse population.[17-19,26,35] Service providers often also have limited AP knowledge and are ill-equipped to provide appropriate AP within their scope of practice due to limitations in their undergraduate training, little exposure and experience, and insufficient confidence in their skills.[5,12,26]

AT and AP are rapidly evolving through constant innovation and technology. Smart phones and other 'mainstream' products are increasingly replacing more specialised equipment like electronic communication devices.[6,26] To ensure appropriate provision, providers and provider education must stay abreast of these developments and the diversity of AP.[6,26] However, apart from wheelchair service training, few AP training options are available in South Africa, other than marketing training by manufacturers/ suppliers.

### Provision

A systems approach advocates for a variety of products to be provided in a sustainable manner close to the user,[20,38] such as through one-stop community-level services with referral to specialist centres where needed.[4]

To improve access, AP provision in South Africa should have been decentralised to district level, supported by more central specialised service points.[7] However, in practice, AT services remain inequitable and often inaccessible, with services mainly available at centralised service points,[12,14,15] and with dysfunctional and fragmented referral pathways.[15] Fragmented, siloed provision results in users having to access multiple professionals and/or services.[5,16] Training, follow-up, adjustments, repairs, maintenance, and replacements are often not provided or not responsive to users' ongoing needs,[10,15,39] with resultant suboptimal use, safety issues, and product dissatisfaction and abandonment.[25,39]

Resource allocation and AP availability in South Africa are often guided by the knowledge and passion of individual service providers and advocacy groups,[12] with certain products more frequently provided than others, despite user needs.[9,10] Mobility devices (walking devices and wheelchairs) are most frequently provided,[9,10] followed by visual aids.[10] Teaching on mobility devices is also most frequently included at undergraduate level.[5] Commonly needed incontinence, self-care, and environmental-control devices are least often provided, and teaching on these products is also seldom included in undergraduate curricula.[5,9]

### Procurement

Effective procurement secures timeous purchase of AP to meet the needs of the population, based on detailed impairment data for specific settings such as districts.[20]

AT will be included in NHI and procured according to a formulary, which will probably operate much like the current tender system in public health care. Currently, AP procurement in the NDoH is guided by multiple national and provincial tender documents. Tenders facilitate access to a wide range of commonly needed AP to meet common physical, lifestyle, and environmental requirements. Tenders specify product function and design features. Although product quality and durability standards should be specified, they are currently only specified in national mobility device tenders. Companies are awarded tenders based on manufacturing capacity, governance, and compliance with product standards. Prices, delivery time frames, warrantees and guarantees are specified. Where there are no tenders, or an existing tender does not include the required product, public procurement mechanisms make provision for the purchase of these products. Poor use of AP tenders and procurement processes reflects insufficient knowledge and understanding among users, providers, and supply chain management.

The biggest challenges to AP provision in South Africa are probably financial constraints and the absence of ring-fenced budgets.[12-15,26] Finances impact on the availability of products, and lead to long waiting times. Waiting times in excess of two years have been reported, with products no longer fitting or being appropriate as physical measurements, needs, environments, and life roles change.[12,14,15]

In certain instances, in order to be able to assist more users, providers supply basic and cheaper products rather than products that are more expensive but environmentally and/ or functionally more appropriate and/or adjustable.[12,14,15,26,40] However, this 'one-size-fits-all' approach impairs use, function, and satisfaction and can lead to complications and abandonment of the product.[14]

### Place

Place refers to physical setting and societal infrastructure.[20] The interconnectedness of psychosocial, socio-political, and cultural factors must be considered in the design of universally accessible AT service provision and take historical factors into consideration. These services must focus first on the user and the context, rather than the impairment and the product.[20] For example, within the diversity of South Africa, cultural and language differences must be considered in augmentative and alternative communication systems.[26,35] Varied environments and/or life roles may also require that a user have two products of the same type but with different characteristics that suit the differing environmental requirements.[39]

AT service in South Africa is closely linked to healthcare reform and the quest for equitable healthcare access. However, although access has improved for the general population, it is still limited for marginalised and/or vulnerable groups, many of whom need AP. Furthermore, AT provision is poorly integrated in health services,[12,13,15,41] and varies widely across the country and settings.[10,12,14] Inaccessible public transport,[42,43] further hampered by the vastness of the country, poorly maintained road systems,

and low population density in rural areas,[43] challenge service delivery even when decentralised.

### Pace

According to the theory-of-change approach, pace refers to the rate of systems change, with course of action determined by desired outcome.[20] Due to the absence of national, integrated policy driving change, very little reform has occurred to improve equitable access to AT services. Pace has been mostly reactive, focused on disability, and apart from reform in the National Department of Education (NDoE), reform has remained mostly in the health sector, rather than constituting an integrated targeted multilevel approach. As alluded to above, pace of AT service reform has lagged at primary care level, particularly in rural and remote areas. Reforming the pace of service provision to a heterogeneous group more representative of the cultural and language groups in South Africa has been slow.[17-19]

### Promotion

In a systems approach, stigma and negative attitudes towards disability and APs are addressed and a positive image of AT is portrayed,[20] with AT widely promoted in a broad intersectoral strategy. In South Africa, with limited and fragmented AP provision within health care and absence of intersectoral promotion, there is limited awareness of AT and the role it can play to mitigate impairments.[38] Myths, stigma, and negative beliefs further limit interest in and uptake of AP.[12]

### Partnership

In a systems approach, collaboration is proactively and strategically developed, as opposed to no partnership or short-term reactive partnerships.[20] Disabled people's organisations (DPOs), non-governmental organisations (NGOs), and donors play an important supplementary role in AP provision in South Africa; however, their efforts are not synchronised with those of the NDoH. Similarly, there is little integration and coordination of AT services between major service providers such as the NDoH and NDoE.[12] Although the importance of collaboration between professional and non-professional role players is recognised, collaboration often remains challenging.[26]

## Remodelling AT services in South Africa

Looking through a systems lens, the slow pace of AT service reform in the public health sector has perpetuated fragmentation, poor access, and inequity. Decentralisation of AT services has not had the desired impact of equitable access, and other models of delivery should be investigated. The theory-of-change method or a similar strategy could facilitate more user-centred, efficient, and effective AT service delivery by simultaneously targeting and addressing the 'P's[38] that will have the biggest up- and downstream impact. Equitable access could also be extended by linking with the existing extensive reach of the NDoE[44] and the Department of Social Services at primary care level. Remote specialist outreach and support through information technology strategies may also improve access.

A comprehensive, integrated, national AT service-delivery strategy collaboratively developed by AT users and their families, professionals, government sectors, NGOs, DPOs, donors, regulatory bodies, suppliers, manufacturers, and universities should guide AT policy, integrated inclusive practice, and service development. Policy and AT services must be driven by demand, supply, and funding needs, be based on equity principles, and have clear user-centred implementation milestones. Policy should also provide clear guidelines on the demand and supply of AP during pandemics, such as the current coronavirus pandemic, and human and natural disasters.

National registries should be developed of persons with impairments (e.g. hearing or vision loss, amputation, spinal cord injury, and cerebral palsy) that commonly require APs. This will enhance national census data on activity limitations. Increased life expectancy,[45] and the growing burden of non-communicable[46] and communicable diseases[47] in South Africa, drive the AP needs of older people and those with chronic conditions. These users require AP to maintain functional ability and quality of life through ameliorating memory, vision, hearing, and mobility impairments.

Response indicators to monitor and evaluate implementation frameworks must be based on AT use, functional outcomes, and satisfaction of users. Incentives and steps to address poor implementation must be included and enforced.[20,22]

Collaborative, strategic partnerships and communication channels between the NDoH and other existing AT service providers such as the NDoE, NGOs, DPOs, and donors, should be formalised and nurtured to ensure accessible, comprehensive, seamless service delivery to all, not just users with a specific diagnosis or belonging to a specific group.

The current limited range of AP should be strategically expanded, using the WHO Priority Assistive Products List[23] as a guideline, together with a needs analysis. Local manufacturing and innovative product design should be facilitated and developed by stakeholders utilising local skill, innovation, and resources, together with national funding that supports the research and development of local AP. The snapshots of good practice in product design and manufacturing presented at the GATE GREAT summit in 2018 could guide decisions on best practice. In addition to formal, large-scale product development, persons with disabilities, their families and local communities must be supported to make simple, basic AP such as grab rails, ramps, reachers, plate-guards, etc. themselves, using basic tools and materials.[22]

The small number of professionals necessitates a move away from restrictive regulations and siloed service delivery, such as narrow scope of practice, service boundaries, and product provision certification,[3,27,38] towards embracing of a broader generalist approach supported by specialisation. Task shifting, staffing models, skills mix, and continuing education options in AT must be mapped simultaneously, included in national and provincial health and AT policy documents, and supported by the NDoH, training facilities and providers. This implies training and awareness raising of service managers to understand and facilitate intersectoral responsive service delivery. Professional, mid-level, technical and community workers, including those who do not traditionally provide AT services, should be trained in basic AT services according to a core set of basic competencies for priority APs.[48] Teaching and learning should be competency based, with clear teaching strategies, skills to be achieved, and milestones. Curricula should be standardised. Basic training can be augmented by specialist training for provision of services to persons with more complex needs and to support personnel with basic AT training through e-strategies. The role of each level of provider must be clearly described, and minimum numbers of providers must be determined at each service level.[3]

Existing well-established and well-functioning AT services, local good-practice strategies, and training packages must be identified, evaluated, and both scaled out and up if feasible for larger areas of the country.[4,38]

Budgets for AT service delivery must be based on projected population needs, ring-fenced for exclusive use, and be inclusive of a range of products. Budgets should make provision for replacement, servicing and repairs, including spare parts, as well as for any backlogs that might exist.[12,39]

More national tenders should be developed, in addition to the existing well-designed, comprehensive tenders on mobility, communication, and hearing, using the WHO guide for public procurement of assistive products, accessories, spare parts and related services.[34] Successful national implementation and use of tenders will rely on education and information sharing among users, members of the public, service providers, and supply-chain management.

Finally, it is imperative that strategies should be studied while they are being implemented as part of monitoring and evaluation, and that findings should be used to strengthen policy and practice.[3,22]

## Conclusion

The pending NHI may be the catalyst needed to use a systems approach and harness our opportunities, strengths, and challenges to “craft a uniquely South African response”[49] for person-centred AT service delivery in all parts of the country, from city centres and urban communities to deep rural settlements and farms.

## Recommendations

The development of integrated, intersectoral policy for accessible, equitable, person-centred AT services is recommended. This must be monitored and evaluated through assessing user outcomes, under guidance of the NDoH. Important focus areas based on the 10 `P` conceptual framework include:

- Stimulation of local product design and manufacture.
- Specified ring-fenced budgets.
- A heterogeneous appropriately trained provider corps that can provide a range of products at community or district level.
- Communication and collaboration between different stakeholder groups.
- Identification and upscaling of clinical good practice models.
- A collaborative research and dissemination agenda implemented alongside recommendations.

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