How to Cite:

Kumar, R., & Sinha, K. (2021). Benefits of assistive technology and policy implications. *International Journal of Economic Perspectives*, *15*(1), 320–330. Retrieved from https://ijeponline.org/index.php/journal/article/view/58

Benefits of Assistive Technology and Policy Implications

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Abstract---According to the World Bank, 15% of the worldwide population, experiences some type of disability, with the incidence of impairment being greater in developing nations. A fifth of the world's population, estimated to be between 110 and 190 million people, has major impairments. In India, the ratio of assistive innovation technologies to innovative technology adaptation is relatively low. Adaptation of ATs has been a term in technology education and research in recent years. This technology connects and involves a variety of technologies, with a focus on assistive innovation technologies. This results in assistance for those who use assistive innovative technology to tackle their problems. People with physically weaker impairment benefit greatly from assistive innovative technologies. It is not only for persons with disabilities but also for the elderly. The benefits of ATs at the national innovation and grassroots level, as well as crucial information about ATs, are explored in this research article.

Keywords---assistive technology, benefits, health, innovation technologies, socioeconomic.

Introduction

Indian manufacturers are happy with Prime Minister Narendra Modi's mantra of "Vocal for Local and Local for Global." This is an appropriate moment to draw attention to Indian innovations on Assistive Technology (AT). As indicated by the World Bank, one billion groups, or 15% of the world's population, experience the side effects of a type of disability, also, equality is high in developing nations. One-fifth of total appraisals worldwide, between 110 million and 190 million, experience massive disabilities. For decades, Persons with Disabilities (PWDs) in

Corresponding author: Kumar, R.
Submitted: 27 October 2021, Revised: 09 November 2021, Accepted: 18 December 2021

India have relied on imported products to help ease their distress and improve their lives (James et al., 2019). Non-availability of affordable assistive devices and technology gaps in service delivery, discriminatory bias, and social stigma are major barriers to full social and economic inclusion of the disabled. Many physical environments and learning opportunities have been inaccessible to them due to a lack of suitable and affordable equipment (Vaz et al., 2020).

But with the support and assistance of various government scientific establishments, several start-ups in India have stepped into the development of AT products to serve domestic consumers in the last decade. In 2009, the Department of Scientific and Industrial Research issued a notification that allowed scientists working in several government-funded research institutions to promote technology start-ups and have equity in start-ups for research institutions. This policy initiative led to the rise of several technology start-ups in research institutes (Gupta & Etzkowitz, 2021).

These 17 start-ups have developed AT products under the "Department of Biotechnology (DBT)" with funding and support from "Biotechnology Industry Research Assistance Council (BIRAC)[1]." Some of these start-ups are also selling their products abroad. Areas such as vision and hearing loss, speech issues, autism, learning disabilities, prostheses, crutches, and post-operative rehabilitation of breast cancer patients are covered. The prospect of the development of AT in India has been interesting for a long time. This was largely confined to academia, with dozens of students working on such technologies for their undergraduate engineering projects. The major change seen in recent times, development has become more commercially oriented, as reflected in dedicated accelerators for start-ups, incubators, and assistive technologies. If this enthusiasm is harnessed properly, India has the potential to become a world leader in ATs (Pant et al., 2018; Uppal et al., 2021).

This research paper is separated into six sections. The first section examines the benefits of ATs, local for vocal and what is the assistive technology that is benefiting from ATs. The second section focuses on crucial information about assistive technologies, such as who benefits from them in terms of health and wellness, as well as worldwide assistive technology requirements (Bächle et al., 2018; Dolata, 2009; Tumelero et al., 2019; Putra et al., 2020). The third section focuses on individualized innovation in assistive devices, such as the wheelchair market and its strategy, as well as impediments to promising new solutions. The fourth section discusses contemporary inventions in assistive technology, such as Flexmo Crutches Mimic Human Foot, as well as future trends in Indian ATs. The fifth section delves into the autism screening and therapy platform, as well as associated advancements and advantages. The sixth section consists of policy recommendations and suggestions for PWDs and elderly people (Borg & Östergren, 2015; Bus et al., 2016; Plos et al., 2012).

[1] See more details, Biotechnology Industry Research Assistance Council (BIRAC)

Assistive technology (AT) key facts

AT empowers individuals to lead healthy and luxurious lives and to participate in instruction, work market, and public activities. AT formal affluence and support organization, reduce the need for significant distance care and nurturing work. People without AT are often disadvantaged, displaced, and protected destitute, expanding the effects of disease and disability on the individual, their family, and people. Today, just 1 in 10 people approach assistive technology due to significant costs and lack of care, access, a prepared workforce, strategy, and subsidies (Lestari et al., 2019).

- AT is a broad term that takes in the systems and services identified with the delivery of AT products.
- Subordinate objects maintain or further develop the functioning and independence of a person, accordingly furthering their prosperity.
- Portable hearing aids, wheelchairs, specialized gadgets, glasses, prostheses, pills, and memory aids are all examples of ATs.
- All around the world, need for excess auxiliary items.
- With worldwide maturing populations and expansions in non-transferable diseases, several billion individuals will need at least 1 AT item by 2030, and more established individuals will need at least 2 AT.
- Today only 1 in 10 people in need reach ATs items

Who can profit from AT?

People who need AT the most include:

- People with disabilities (PWDs)
- Elderly and disabled, old people
- People with non-transferable diseases like diabetes and heart stroke
- People with psychological wellness conditions, including dementia and autism
- People with steady functional weakening

Health, wellness and socioeconomic benefits

AT can certainly affect the well-being and prosperity of an individual and their family, as are broad financial benefits, for instance:

- Legitimate use of portable amplifiers by small children further develops language abilities, without which the hearing impaired person would have limited freedom in schooling and occupation
- Manual wheelchairs increase schooling and vocational admission while reducing the cost of medical services by reducing the risk of stress injuries and contractures.
- ATs can empower older people to stay at home and postpone or stop the need for long-distance precaution.
- Supportive shoes for diabetes reduce the incidence of foot ulcers, prevent dislocation of the lower appendages, and reduce the associated load on the health infrastructure (McSweeney & Gowran, 2019).

The global need for ATs are not met

Around the world, many people who require AT do not approach it. Examples of a worldwide neglected need for ATs include (de Witte et al., 2018):

- 200 million people with low vision who do not use assistance for low vision.
- 75 million persons require wheelchairs and only 5% to 15% of people who approach wheelchairs.
- Altogether 466 million people experience bad luck in hearing. Portable hearing aid manufacturing presently happens less than 10% of the worldwide prerequisite.
- The extreme shortage of labor force in AT: More than 75% of low-wage countries do not have prosthetics and orthotics training programs. The nations with the most significant prevalence of disability-related conditions have the lowest list of talented medical care workers in the AT system (no more than 2 specialists for every 10,000 population).
- The absence of reasonableness in low-pay nations is a significant motivation behind why individuals in need don't have AT items (WHO, 2020)

Customized wheelchair Ibex

Established in February 2014, Indent Designs Private Limited (IDPL) was incubated at the Society for Innovation and Entrepreneurship (SINE) at the Indian Institute of Technology-Bombay. It operates in the electric mobility space. It has an inclusive design philosophy, products, and services through frugal innovations. In 2017, it explored opportunities in the personal mobility space for the disabled and created an electric mobility vehicle suited to Indian road conditions. There are many manual and powered wheelchairs available in the market. These are designed for navigating smooth surfaces (Camara et al., 2020).

Market access and strategy

He has sold 18 wheelchairs in seven cities. AT products are always guaranteed to be the biggest buyers and influencers for government departments to make them successful. It is part of a strategy to reach out to NGOs, distributors, and end customers for better market access (Austin et al., 2021).

Barriers to promising new technology reaching to users

The awareness of end-users and influencers about the existence of an innovative product is the major access barrier. Mentorship can reduce the existing disconnect between innovation centers and workplace or end-use (Smith et al., 2018).

- Correct form of government assistance
- Red Tape
- Shortage of funds at the opportune time

Perspectives on Indian AT scenario development, and potential

The current AT scenario in India is not impressive. The needs are largely unmet. Research and innovation in this area have gained momentum in the last few years. However, much of it is wrong and malicious. They are yet to see indigenous products commercialized and used on the ground. It's hard to predict how we'll be held five years later. However, if multidisciplinary teams including engineers, doctors, and end-users work with greater engagement, I don't see why can't turn a new leaf (Raina & Sinha, 2019).

Flexmo crutches mimic human foot

They started Flexmotiv in August 2017 when started testing the design of crutches made with the help of our professors and doctors from AIIMS, New Delhi. In the first half of 2018, IIT's incubation centers joined Foundation for Innovation and Technology Transfer (FITT) and intensive research and development (R&D) work began. It aims to transform the way mobility aid capitalization is understood and improve the quality of life of users through well- designed products and delivery mechanisms (Bharucha et al., 2009; Cincotti et al., 2008; Nijboer, 2015). The product Flexmo crutches mimic the human foot and can grip surfaces better, whether it is wet, sandy, muddy, or rocky. A person can walk confidently without the fear of slipping and falling[2]. Benefits Users can walk anywhere, anytime using our crutches. Like traditional crutches, the inability to use them on an uneven surface inhibits that freedom. These dig into the sand on the beach, making walking difficult, and thus any crutch user would need another person to hold them. Our design makes it easy to walk on sand or any other terrain (Kelly et al., 2018).

Platform for autism screening and therapy[3]

The problem of the statement following the prevailing limits in the special needs healthcare market guarantees the development of auto-progressive, data-driven, technology-based solutions (Sudhakaran et al., 2019).

- Lack of early detection and intervention: The Indian Academy of Paediatrics (IAP) officially recommends screening all children for autism between the ages of 18-24 months using standardized autism screening tools.
- In addition to the prevailing lack of awareness of autism, most children are diagnosed with a delay of one or two years, and due to limited clinicians and infrastructure.
- With 50,000 babies born daily in India, it is not humanly possible to screen such a large number of children.
- Expensive Health Services: The diagnostic and treatment services currently available are concentrated in a few cities. It is a burden on the parents emotionally and financially and it can be treated.
- The cost of treatment for a family ranges from Rs 30,000-50,000 per month. It is very expensive which poor people cannot afford.
- Shortage of specialists: There are limited mental health practitioners available for diagnosis and therapy in India, struggling to serve the growing population of children with autism.
- The extent of the problem in India there are more than 15 million people with autism in India and 270,000 new cases are being added every year.

[2] Arvind Suresh Ambalapuzha Co-founder, Flexomotiv Technologies Pvt. Ltd., New Delhi.

[3] Manu Kohli, CEO, SM Learning Skills Academy for Special Needs Pvt. Ltd. (Cognizable), Gurgaon. He is an engineering and management professional focused on developing affordable, accessible, and data-driven detection and therapy solutions for Autism Spectrum Disorder. My wife Swati Kohli and I are the founders of Cognizable, a technology platform powered by artificial intelligence (AI) that provides innovative early detection and therapy services for children with Autism Spectrum Disorder (ASD).

Autism screening

Following a structured video script provided by us, any clinical specialist or non-specialist can record a 5-10 minute long video using a mobile phone with concerned children aged 1.5 years, in which their guided game-based interactions are shown. Once this video is submitted to our mobile app, it gets uploaded to our cloud platform and automatically analyzed by our unique artificial intelligence (AI) model to help a user with Autism with minimal waiting time does. Provide screening results by predicting a child's risk (Rudra et al., 2017).

Autism therapy

Digital Therapy Platform is available on a mobile app (iOS and Android), empowering users for relevant integrated assessment and treatment planning at 10-20 percent of market value. It can be used by physicians, schools, parents, and any non-specialist who is part of an autistic child's routine support system to take advantage of customized therapy plans that are automatically play-based. Full of teaching methods and training videos (Koo & Thomas, 2019).

Benefits

Cognizable's digital screening and therapy services promote inclusivity in society by enabling timely and high IQ development, skill acquisition in multiple areas such as social, academic, speech, and language skills in autistic children. It encourages self-reliance among such children (Shefer et al., 2019).

Policy Suggestions and Recommendations

How can start-ups collaborate with NGOs? NGOs are the major players in this sector. Distribution of equipment is also done largely through NGOs as part of government initiatives. Suggestions for increasing the reach of AT products. Start-ups need to immerse themselves in the lives of persons with disabilities and in the activities of NGOs working with such people so that they can identify and understand the right problems to solve. Starting from the user's point of view is the key to coming up with really path-breaking solutions. There is a need to increase awareness of the availability as well as the need among healthcare providers and end-users. There is an acute shortage of well-trained medical and paramedical staff in all streams of rehabilitation, which must be addressed, as it is vital for scaling up any program (de Witte et al., 2018).

Rehabilitation services should be integrated into mainstream healthcare and decentralized so that they are located where they are most needed. There is also an urgent need to improve the disability statistics (Gupta et al., 2011; Lansley et al., 2004; Olusanya & Newton, 2007). The available data is unreliable and without it, we are walking on a blind and uncertain scale. We need robust data to shape policy, make informed decisions, and assess need gaps, outcomes, and impact. Most success stories are based on the idea of being in the right place at the right time.

That place for startups in India and now is the time. The present government is committed to ensuring that all policy is geared towards fostering a culture of innovation and supporting entrepreneurship across the spectrum. Start-ups now have the responsibility to make the vision of "Start-Up India, and Stand-Up India" a reality (Nagayya & Rao, 2017).

The reason behind the relatively limited number of AT innovators. This is a non-mainstream sector. Most of the engineers are unaware of this domain. End users are largely from the bottom of the economic pyramid, and are, therefore, not high on anyone's priority list. To draw attention to this area, engineering institutions should actively expose and sensitize students in socially relevant research areas. Barriers to creating sustainable demand and market access our approach to disability is one of safety and not empowerment, which in itself is a major constraint. Since most of the tools are provided free of cost, no matter how low the start-ups price their products, they will always have to compete with the 'free' ones. Even after that, they need to disseminate AT through NGOs or government agencies (Sujatha et al., 2021).

Many countries do not have a public AT strategy or program. In many countries, AT public sector access is deprived or non-existent. For example, in many European countries, it is generally required that the state give only one hearing device to more established individuals, even though the vast majority with old age or young age-related hearing impairments require two hearing assistances to function. The ATs item industry is presently restricted and focused, basically serving big-time salary markets. State funding is lacking, establishing cross-country systems, convention frameworks, client-centered innovative work, realization frameworks, principles of quality and well-being, and appropriate itemization plans. Services in high-income nations are frequently free and not included. People are forced to move to many arrangements in diverse areas, which is excessive and loads on users in the form of parental data and health and health expenditure plans (Barber et al., 2020).

In many low- and middle-income countries, there is no national service delivery support for AT items. Those who can buy them can buy AT items directly from the drugstore, private clinic, and workshops. People from the more unfortunate parts of society must trust on unruly causes or great services that are routinely focused on delivering used goods of substandard quality or in huge quantities. These are often not suitable for customers, and required equipment for repair and follow-up. A comparable situation is common in crisis response programs (Sandberg et al., 2019).

Skilled health personnel are fundamental for an appropriate solution, user training, and follow-up of assistive innovation technologies items. Without these critical steps, supporting innovations are often of no use or unusable, and they can cause real harm. Suggestions for AT products most of the country's manufacturers in this field need to abandon the 19th-century mindset. A mix of quality building, advocacy, promotion, philanthropy, and sales through distribution channels and tailored government schemes and missions such as 'Vocal for Local' can help increase the reach of AT products (Sujatha et al., 2021).

In a small country like Italy, there are 33 centers dedicated to ATs. China hosts a ten-story building on ATs products, indicating its economy of scale in the region. The social models of the Nordic countries and the scientific concepts of Italy, Germany, and the United Kingdom relating to AT have the potential to be replicated in India to increase the demand for such products. There should not be any specific policy for AT start-ups as a separate ecosystem for them is simply not possible. India's policies are good (Azari & Pick, 2005; Munyoro et al., 2021; Archana et al., 2016). Access to those who need AT ought to improve, but not only through philanthropic means. For example, mobile vans can be deployed at the municipal or panchayat level to collect data and needs of the disabled in their area and the vans can deliver AT products to them on the next trip. Why should PwDs and their family members keep chasing government agencies or NGOs for their AT needs? The government of India should provide AT in every hospital (Muyinda, 2020). People can easily access the product and use it for a better life. The government should provide financial assistance to start-ups to promote "Vocal for Local and Make in India."

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