

THE NEED FOR THE DEVELOPMENT OF SPECIAL PRODUCTS FOR THE PEOPLE WITH DISABILITIES IN MALAYSIA

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Abstract. According to the latest statistics, Malaysia has a total of 4.7 million people with disabilities of which only 570,000 people are registered with the Department of Social Welfare, Malaysia. The government's commitment in protecting the welfare and destiny of this group can be seen through various long-term and short-term policies and programs to ensure that this group enjoys life as normal people. For the Malaysian community, one of the ways of contribution that can be given to this group is through the development of special products that they need. Therefore, this paper will explore the need for special product innovation for the people with disabilities and the key features that need to be considered in order for it to meet the needs of customers and the market. The information presented in this paper is obtained entirely through literature review, direct observation as well as summaries from past research findings. As a result of the information collected, this research found that there are some significant weaknesses in existing products such as not being able to meet anthropometry, still lagging behind in terms of design, as well as modified from ready-made products to be a special product. This difficulty cannot be tolerated and some suggestions to further improve the quality of this special product have been proposed. Among others, by setting up design centres in public universities as well as developing and producing special products for this group. To achieve this noble goal, several design features have been proposed including adopting universal design, producing functional and stylish products, products that have an attractive visual appearance without neglecting the aspects of ergonomics, sales price and technology. This paper concludes that Malaysia has the ability to develop and manufacture special products for the people with disabilities because it has a large number of professional experts. In addition, it can reduce the country's dependence on products and equipment imported from abroad, also able to meet the needs of these people who dream of a more orderly, perfect and safe life with a conducive environment in the future.

Keywords: *people with disabilities, product design, special product innovation, special products for the disabled, Department of Social Welfare Malaysia.*

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1. Introduction

According to the World Health Organization (WHO, 2020), there are more than 1 billion people in the world living with various disabilities with 80% being from developing countries. This figure represents 15% of the global population, with 190 million (3.8%) people aged 15 and over. By 2021, this figure will jump to 1.3 billion or represent 17% of the world's population (Schifter, 2021).

A living conditions study conducted in Southern Africa stated that disability and poverty have posed a threat to the population in several countries - Namibia, Zimbabwe, Malawi, Zambia - based on relevant factors and findings such as: sample size, demographics, education and literacy, highest grade achieved, involvement in schooling, employment situations, access to a variety of information, disability status, and service gaps for life. Therefore, critical assistance from government agencies must be implemented immediately to resolve the issues and problems faced by the disabled, in addition to the poverty factor of national income has also been taken into account (Arne, 2011).

In Malaysia, the actual number of people with disabilities cannot be ascertained due to problems in obtaining complete statistics. However, based on the latest statistics by the Department of Statistics Malaysia (Mahidin, 2018), the registered person with disabilities (PWD) at the Department of Social Welfare, Malaysia in 2017 were 453,258 persons. PWD in physical category recorded the highest number which was 35.2%, followed by learning disability category (34.8%) and visually impaired category (8.9%). Speech category recorded the lowest registration of 0.5% (Figure 1). The latest report shows that out of the 4.7 million lists of people with disabilities in the National Registration Department, only 570,000 of them are registered with the Malaysian Social Welfare Department which represent 20% of the total actual population (Mulup, 2020).

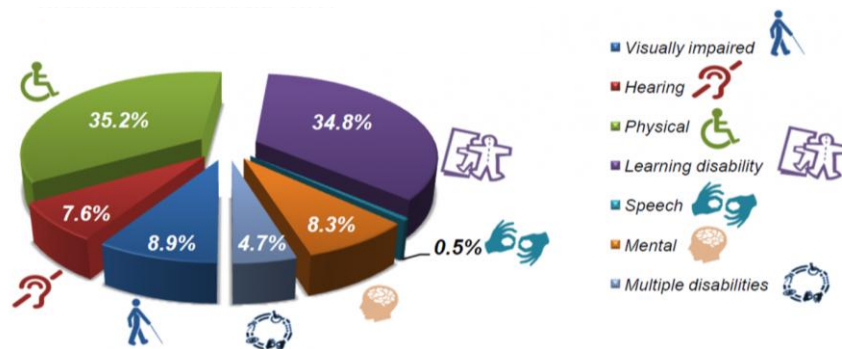


Figure 1. Percentage of registration of PWD by category of disabilities in Malaysia 2017

Despite the low number of registrations, the Malaysian government's commitment in defending the welfare and fate of this group can no longer be disputed. The Malaysian government has always cared about the fate of this group by introducing various policies and programs to ensure that they are not excluded and enjoyed life as a normal people. In fact, the government has continuously drawn up short-term and long-term plans to meet the needs of this group. One of the contributions that can be offered by the Malaysian community is by designing, developing and producing special products as needed. This special product will be able to change the perception of people who often think a good design and a new invention is suitable for normal people only.

The development of this special product could meet the needs of this group who dream of a more orderly, perfect and safe life with a better and comfortable environment. It is in line with the Policy of Persons with Disabilities of the Department of Social Welfare Malaysia which gives recognition and acceptance of the principle that persons with disabilities have equal rights and opportunities for full participation in society. This policy also outlines that people with disabilities have rights, opportunities and access

equitably under national law, thereby eliminating discrimination against a person on the grounds of his or her disability (Mahidin, 2018).

With the production of this special product soon, it could reduce the country's dependence on products and equipment that are fully imported from abroad which are very expensive and rarely to find it here. Special products for the people with disabilities made locally can be standardized, improved and modernized so that it can meet the modern needs and tastes of the people with disabilities in Malaysia. According to Lakshmanan (2019), with more than one billion people with disabilities in the world, companies need to figure out how to develop products and services that can help the daily lives routine of this group. Companies need to think inclusively by developing special product designs that can solve problems and work for this group.

Based on the above discussion this paper is proposed. Besides, this topic has not been fully discussed by researchers in this field. As such, the author considers this paper to have novel element of its own.

2. Objective

The main objectives of this paper presented are to:

- 1) provide current information related to people with disabilities, especially in Malaysia;
- 2) discuss the disadvantages of special products for the people with disabilities in the current market from a design perspective;
- 3) explain the need for special product innovation for the people with disabilities to future generations; and,
- 4) suggest the main features that need to be considered to develop special products for the people with disabilities to meet the needs of customers and the market.

3. Source of information

The information presented in this paper is through the following main sources:

- 1) Literature review - the latest information is obtained through reference sources such as books, journals, articles as well as through search engines related to the topics discussed,
- 2) Direct observation conducted by researchers on special products for the people with disabilities available in the market used in Malaysia,
- 3) Summary of findings from some previously conducted research,

4. What is a special product for the disabled?

A product is termed as a [tangible] goods, [intangible] services etc. produced by a factory, or offered by an institution etc. (Kamus Dewan Bahasa dan Pustaka Edisi Keempat, 2017). The emphasis of this paper, is on tangible (physical) products. The term disabled refers to “a person with a long -term physical, mental, intellectual or sensory disability who when faced with various obstacles may not be able to participate fully and effectively in society” (Mahidin, 2018). Based on the terms given, then this paper will focus on a tangible item that is specifically developed for people with long-term physical disabilities. Among the special products that can be developed include daily and routine needs like beds, chairs, baths, and toilet equipment; mobile equipment like wheelchairs

and scooters; posture and carriage items like trolleys and stroke support systems; pediatric equipment like postural aids; and small items like specially-designed toothbrushes, paintbrushes, stationaries, and cutleries.

Winter (2007) explains that most wheelchair designs available in developing countries need to have the characteristics of the chance to better the lives of others. As many as 20 million people across developing countries need practical wheelchairs, of which under 1% of needs are recorded in Africa. Each wheelchair design must have several important factors such as operating environments, social stigmas against the disabled, manufacturing constraints, and scientific and engineering applications in technical solutions. In addition, studies on long-term projects on related topics - hardware design, manufacturing optimization, biomechanics modeling, and business plan development - are also emphasized.

5. Disadvantages of special products for the people with disabilities in Malaysia

Undoubtedly, there are various special products for the disabled that are widely used around the world, including Malaysia. However, through literature review and observations conducted by researchers found that most of the existing products are still lagging behind in terms of design. Most consumers, on the other hand, do not emphasize the design aspect adequately if the purchased product can be functional and offered at a competitive price (Ibrahim *et al.*, 2019). There are products that are modified from existing products by combining certain parts to make a special product for the disabled. Take a simple example, a wheelchair, where the product was originally from a bicycle frame that was then modified in its function with a combination of other parts that eventually formed a wheelchair for the people with disabilities (Figure 2). Most of these refurbished products are available in poor countries where the high cost of the product is a major barrier for them to buy it.



Figure 2. Examples of products modified from ready-made products

Although in Malaysia the situation is better and different than what is stated, but there are services to modify vehicles for the use of the disabled. For example, the services offered by Mohd Ariff Abdullah from Alor Setar Kedah, Malaysia in modifying vehicles

for the use of the people with disabilities (Figure 3). He, who is also a patient with spinal cord injury and partial paralysis, took the initiative to offer this service to help those who are like him. The workshop, which opened in 2006, offers vehicle repair services for the people with disabilities including cars, motorcycles and wheelchairs. It has the cooperation from the Road Transport Department (JPJ) which provides guidelines to make modifications to vehicles (Muharam, 2020).



Figure 3. Example of vehicle modification services for the use of the disabled

Although today there are many special product options in the market with various designs, colours and prices, but it is seen not to meet the anthropometry (size and comfort) and true ergonomics of the people with disabilities in Malaysia. There are some imported products and equipment that need to be modified with the size and body size of consumers in Malaysia (Ibrahim, 2010). Furthermore, every person with a disability has disabilities that vary from one another and of course required various measures. This situation can expose users to the risk of joint, bone, muscle pain and discomfort. However, lately, ergonomic factors are often given major attention by the community in Malaysia, especially those involving the disabled, the elderly and pregnant women.



Figure 4. Sahala ablution station

As an example of an innovation product for taking ablution named Sahala (Figure 4). This special product allows the people with disabilities to perform ablution while sitting in either a wheelchair or a static chair, and does not need to go to the place to

perform ablution as is customary. This Sahala ablution station has been installed in 20 mosques around the Klang Valley, Penang and Kedah, Malaysia (Mohd, 2019).

Today we can see individuals, NGOs, companies, organizations and agencies under the Malaysian government racing to provide special facilities and products specifically for the people with disabilities and the elderly. Among the facilities that already provided including special seating in public transport, toilets, special parking, ramps on buildings and public transport, as well as special lifts (Figure 5). The provision of such facilities is an appropriate action to enable the people with disabilities to move from one destination to another in order to continue and develop themselves to a better level.

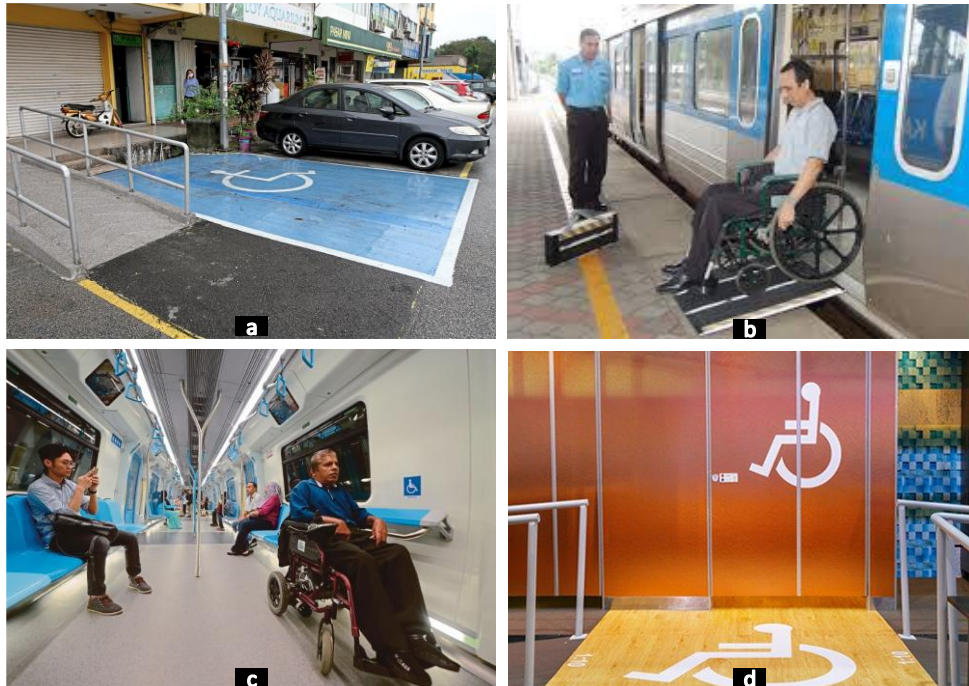


Figure 5. Among the facilities provided for the people with disabilities in Malaysia; a) special parking, b) ramps, c) special seats in public transport, and d) special toilets.

6. Proposals to improve the quality of special products for the people with disabilities in Malaysia

Establish a special product design centre for the disabled

One of the ways to show continued support and commitment to the people with disabilities in Malaysia is by proposing the establishment of a design centre to develop and produce special products for this group. This noble intention has long been proposed by two public universities in Malaysia, namely Universiti Teknologi MARA (UiTM) which proposed the establishment of such centre twenty years ago (Ibrahim, 2002). and most recently by Universiti Sultan Zainal Abidin (UniSZA) (Ibrahim, Ahmad, et al., 2019). For UiTM at that time, their backing was through the success of producing special products for the people with disabilities through collaboration with several associations of people with disabilities in Malaysia (Figure 6). The proposal for the establishment of this centre was presented at the International Forum on Disabilities (Osaka Forum 2002) in Osaka Japan and has received excellent feedback from participants of other countries.



Figure 6. Example of UiTM's joint venture project with Cheras Rehabilitation Centre, Kuala Lumpur, Malaysia



Figure 7. Example of a special project for tetraphochomelia children by UniSZA

Meanwhile, for UniSZA, the success of the Department of Industrial Design which has produced special products for children with tetraphochomelia is the starting point for the university to express its desire to establish a design center specifically for the disabled. According to Mohd et al. (2020), this project carried out for two years (2016-2017) is a long-term strategic plan of this department in developing and producing products specifically for the physically handicapped (Figure 7).

Referring to both the proposals from UiTM and UniSZA, the philosophy and rationale of the proposed centre is based on the view that persons with disabilities have the right to participate in the life of an open society. Therefore, it is the intention of the proposed centre to create the necessary products that are highly suitable for people with disabilities so that they have a better quality of life. The centre will provide products and equipment specially designed for people with disabilities by providing advice and assistance in designing, developing and manufacturing as well as improving the quality of the existing products. It is hoped that the products designed and produced by this centre

will improve the quality of life and provide opportunities to present and future generations with disabilities.

Proposal to produce special products for the disabled

Given that Malaysia has a large number of professional experts in fields related to the design and production of products such as designers, architects and engineers, they are encouraged to work together to realize this noble aspiration. The involvement of other professionals such as doctors, ergonomists, scientists and experts in fields that are directly related to the development of new products is also needed to solidify this dream.

If we take the example of products related to physical disabilities, the products and equipment that will be designed and manufactured in the future will not be limited to large-sized products for daily use such as beds, tables, chairs and bathroom appliances only. In fact it can be extended to small utensils used daily and frequently by them such as crockery, cutlery, writing utensils, drawing etc. In addition, equipment to assist movement such as trolleys, wheelchairs and scooters as well as equipment related to posture and pediatrics should be given priority. In addition to being fully used by the disabled, these products and equipment can also be utilized by other groups such as the elderly or those with non-permanent disabilities as a result of accidents, war or natural disasters.

Handicap International explains that an accessible environment should have the characteristics of free and safe movement, function and access for all, regardless of age, gender or circumstances. It includes the accessibility of the built environment in residential areas, private buildings, and public spaces; geographical accessibility based on the right of space to move their transport from one place to another according to needs and abilities; and have access to easy -to -understand information and communication. The legal framework in Cambodia has been finalized in a manual based on disabled international standards that includes employment law, planning policies, and technical advice (Martes, 2016).

As expected by Ibrahim, Ahmad, et al. (2019) who wants to see one day Malaysia able to produce its own products and equipment specifically for the disabled. The products and equipment that will be produced in the future will give major consideration to function, ergonomics, safety aspects as well as quality and have a high aesthetic value. Apart from reducing the country's dependence on products and equipment imported from abroad, the production of local products and equipment will also provide a more perfect life for the people with disabilities in the future.

In order to develop and manufacture a product, the main basis that needs to be considered is design. From Feldstein (2017) point of view, product that need to be designed in the future must be better than what we have now. From the point of view of product design for the disabled, the design must be innovative in addition to latest materials used, technology and production processes. Apart from that, among the design features that need to be taken into account so that the special products released later meet the needs of customers and marketability to the people with disabilities will be discussed in depth in the next section.

GPE (2018) stated that improvements on inclusiveness need to be focused into disabled education. There are a total of 51 countries that have implemented these matters through the programs introduced by the GPE. Directly, it can help organizations involved in improving issues related to disability analyses to achieve the second strategy of GPE 2020, besides helping to meet the transformative vision of 2030. This means, disabled

children will not only have the right and quality of education, but they will also be able to engage in social activities realistically and happily.

7. Suggested design features of special products for the people with disabilities in the future

Practicing the principles of universal design

Undoubtedly, universal design and manufacturing of special products for the people with disabilities have not yet been developed in Malaysia. According to Ibrahim, Ahmad, et al. (2019) although there were 159,547 people with physical disabilities in Malaysia in 2017, the design and manufacture of special products is inadequate when evaluated in terms of function, ergonomics, safety, quality and aesthetic value based on universal design. Therefore, he advised the manufacturing companies to adopt universal design principles in developing the special products for people with disabilities, especially in Malaysia.

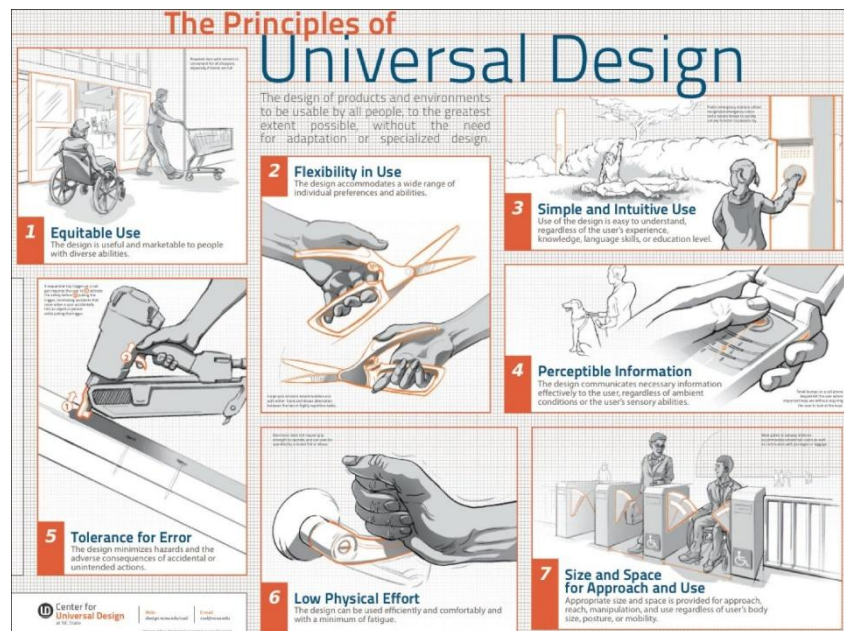


Figure 8. The principles of universal design
(Source: Center for Universal Design, NC State, 2011)

There are seven universal design principles published by the Centre for Universal Design, (Figure 8 above) that are frequently referred industrial designers around the world. According to Kennedy & Jain (2019), universal design encompasses everyone, regardless of age, gender, or disability. It is the essence of innovation. To realize this, companies are advised to take employees from the people with disabilities to be in their product development team. This is because employees with disabilities have in-depth knowledge and experience of the special product features required by users with disabilities.

In summary, the principle of universal design is the basis for industrial designers who want to develop universal design products. This principle can serve as a guide to various design disciplines including environment, product, and communication, and it can be adapted in any design style or trend (Zheng, 2021).

Functional and Stylish

According to Palmer (2018), when we buy a new product in the market, we expect it to work fully as needed. In addition to functionality, we will also choose products that are stylish and good-looking. Therefore, it is better if products that have similar value, work well and stylish are also developed for people with disabilities.

Browse the "Access+Ability" Exhibition, at Cooper Hewitt, Smithsonian Design Museum (September 2018) which showcases 70 special products for the disabled, ranging from aerodynamic wheelchairs to vibration-activated shirts to allow the deaf to experience sound (Figure 9). The exhibition has successfully combined two important aspects in product development for the disabled, functional and stylish. Moreover, it also reflects how designers create products for those with disabilities, making them not only more functional and practical, but stylish (Palmer, 2018).

Brenna (2017) explains that most wheelchairs produced in developing countries have innovative features. Like the example of an innovative wheelchair solution called SafariSeat, it is capable of being used in off-road conditions, in addition to having hand-powered redesign features that can be used for all-terrain. Therefore, such special features need to have some criteria such as easy-to-use mechanism, low-cost manufacturing, manufacturing that requires recyclable materials, and easy to maintain and repair when damaged.



Figure 9. Access+Ability exhibition

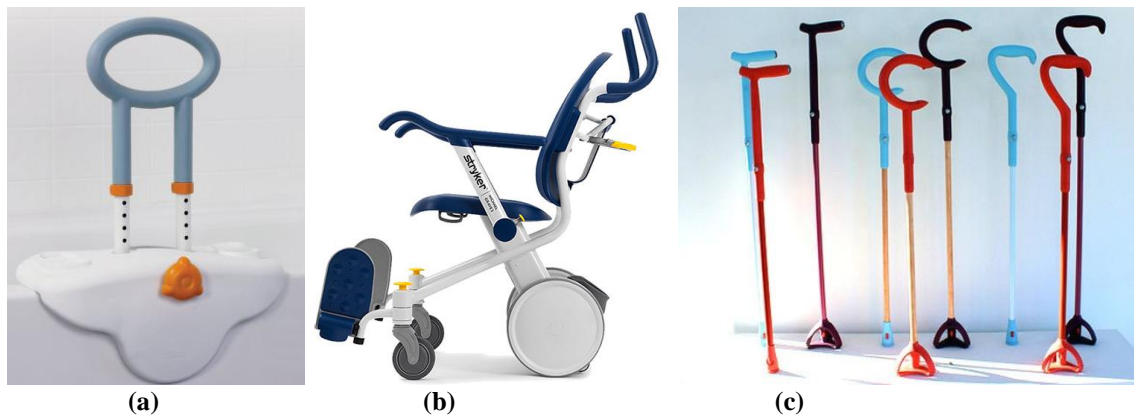


Figure 10. Some special products for the people with disabilities by Michael Graves Design that successfully combine function and stylish: a) bathtub grab bar, b) wheelchair, c) walking canes

Attractive visual appearance

In addition to functional and stylish, special products for the people with disabilities also need to consider the visual appearance, which is, the shape and appearance of a product seen from the outside (Marzuki, 2013). Therefore, the product that will be released later must have a charming shape and appearance. Anup Jain, General Manager, Whirlpool India brand marketing stated that an attractive (beautiful) visual appearance can impress customers. This is because, the first thing that customers consider when buying a product is not the technology, but the design and colour of the product (Joshi, 2006). Consumer surveys show that most consumers do a cosmetic evaluation first on the product and then on the technology of the product. For this reason, the world's giant product manufacturers often focus on innovation on the design of the products they produce in order to attract consumers (Joshi, 2006). This is supported by Patel (2011) who stated that there are four main features of a product that can be marketed and two of them are related to a simple and concise design and unique design that is innovative and different from existing products on the market.



Figure 11. The E-Wheelchair produced by the company Whill is an example of a product that has an attractive visual appearance. (Source: Alrasub.com)

Ergonomics

According to Irene (2018), there are six negative effects on health if we ignore the ergonomic aspects namely musculoskeletal disorders, back injuries, headaches & migraines, stiff neck, trigger finger and ganglion cysts. Therefore, special products for the people with disabilities should emphasize ergonomic features such as physical comfort and easy to use with very minimal fatigue. In addition, aspects related to the body size, posture or movement of a user must also be fully taken into account.

Special products for the people with disabilities next-generation versions that are ergonomically characterized involve “design for effective use,” taking into account the physical and psychological capabilities and limitations of the user (Boff, 2006; Salvendy, 2012). Compatibility between the consumer and the product or referred to as “human compatibility” (Karwowski, 2005), analysis related to the physical properties of the consumer, the activity being carried out as well as the suitability of the product during the activity should be carried out. Special emphasis should be on the size, shape, weight, configuration of the product as well as the suitability of the product during the activity (operation).

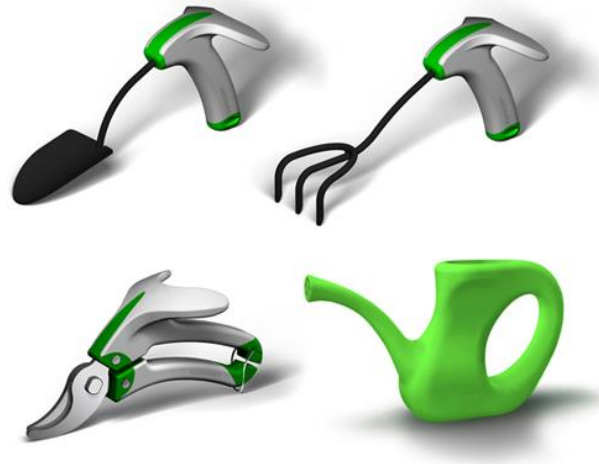


Figure 12. Examples of specially designed gardening tools taking into account the ergonomics of the hand grip (Source: <http://en.verdurable.fr/gardening-tools/>)

Selling price

Pricing a new product is one of the most important components of a marketing strategy. Price is one of the determining factors when the decision to buy or not is made. Therefore, special products for the people with disabilities who want to be featured later must be offered at a reasonable and competitive price. Such prices need to be considered because they are based on the current socio-economic position of this group. According to the latest report released by The World Bank (Basaninyenzi, 2021) on 19th March 2021, people with disabilities are more likely to experience poor socio-economic outcomes such as lower employment levels, and higher poverty rates. This is supported by a report by The International Labour Organization (ILO), which states that in some countries the unemployment rate of people with disabilities is up to 80% (Greenberg, 2012). The Covid-19 pandemic that is currently sweeping the world further complicates the situation. Affordable and competitive price offers allow more people with disabilities to have the opportunity to own the products they need. Intelligence Node (2016), demonstrate that competitive pricing is a game that needs to be played. Competitive pricing requires in-depth knowledge of the market and target customers. This is supported by Infiniti Research (2018) who states that by using a competitive pricing strategy, traders can continuously monitor the price changes played out by their competitors. Such measures allow traders to deal with price changes by competitors and at the same time be able to control the price war. Traders need to have business acumen as well as use the right technology to face this competitive pricing strategy.

High technology

Today we can see that companies and organizations around the world are racing to experiment with innovative solutions to produce high-tech products that are directly related to innovation. The main goal of innovation is to maximize the company's profits by creating new products and modifying existing products while high-tech products are product innovations that can be classified into a new-tech products and advanced-tech

products. High-tech products are capable of finding new solutions, generating significant changes in existing markets or opening up new markets.



Figure 13. VenusArm - bionic prosthetics

Special products for the next generation with disabilities that apply the latest technology or feasible technology when a product is designed should be implemented. This is to ensure that the products that will be produced are in line with the latest techniques, technologies and standards or in the future. Among the best examples of products released for the people with disabilities is VenusArm - ventured by young people and supported by UNICEF and Generation Unlimited (Morina, 2021). This product features the sophistication of assistive technology in speeding up the process and saving production costs. This bionic prosthetics product with a revolutionary design and innovative features uses full 3D printing (Figure 13). Among the advantages of this product, it can be installed by the buyer without any previous experience in just one hour. Moreover, its cost which is 30 times cheaper than other bionic arms on the market makes it affordable for everyone.

8. Conclusions

There are a total of 4.7 million people with disabilities in Malaysia who need help to continue and develop themselves to a better level. To realize this aspiration, all parties, especially the government, the private sector and the community must work together to achieve that goal. One of the contributions that the Malaysian community can give is by designing and producing the products and equipment they need. It is hoped that this contribution can meet the needs of this group who dream of a more orderly and perfect life in the future. This dream is in line with the Policy of Persons with Disabilities of the Department of Social Welfare Malaysia which recognizes and accepts the principle that people with disabilities have equal rights and opportunities in society.

Given that Malaysia has a large number of professional experts in fields related to product design and production, they are advised to work together to realize this noble aspiration. The involvement of professionals and experts in fields directly related to the development of new products is also needed to solidify this dream. It is hoped that one day our country will be able to produce its own products without having to rely on products imported from abroad, thus giving new light to the people with disabilities in Malaysia in the coming days.

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