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Reliable Web-Based Forum: A Solution to Bridge Accessibility Information Gap among Donors, Vendors and Consumers of Assistive Technologies in Tanzania.

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Abstract:

The internet and related technologies have the potential to make significant improvements in the lives of persons with disabilities (PWD) through empowerment, access to information and integration in society by extending the scope of activities available to them. It is also the most reliable channel to link donors, vendors and consumers of assistive technologies (AT) based on the fact that it has a wider reach, and can easily be shared among users through search engines and its accessibility through different platforms such as computers and telephones. This study, therefore, took advantage of the current situation of the Internet and its multimedia front-end as well as the World Wide Web to develop and came up with a reliable web-based system that could provide a consistent linkage between AT consumers, donors and vendors for ease AT accessibility at affordable cost in Tanzania.

Keywords — **Web-Based System, Donors, Vendors, Consumers, Assistive Technologies, Tanzania**

I. INTRODUCTION

In many countries, access to AT in the public sector appears to be poor or non-existent, resulting in additional costs that place a burden on the PWD and their families, whereas in other settings, AT is accessed through the health or welfare system, where services are always fragmented and standalone [1]. Furthermore, PWD is required to attend many visits, which are costly, dispersed, and add hardship on carers, as well as health and welfare expenditures [1], [2], [3]. Currently, there are limitations in the AT business, including extremely specialized requirements, largely serving higher income settings, a lack of state support, weak procurement and service delivery systems, and the existence of middlemen [1], [4], [2].

More than 9% of Tanzania's population aged 7 or older has some form of functional limitation [5]. The disability movement is well-established, with various PWD organizations and The Tanzania Federation of Disabled People's Organization (SHIVYAWATA); their umbrella organization, frequently participating in discussions with the government on issues affecting the lives of PWD, such as accessibility and availability of AT [4], [3]. According to [3], families with disabled members can only access the necessary services in a limited variety of sites that are quite expensive for them to travel to. It is recommended to create a localization plan for PWD services such as a portal

that would provide information about rehabilitation and AT accessibility [4], [3].

All of these restrictions indicate that the AT information accessibility and AT availability Framework has not been sufficiently developed to improve the efficiency, accessibility, and acquisition of devices in a continuous flow [6], [7]. This inhibits the ability to provide services as soon as possible, especially during times of crisis. The study addressed this gap by creating a reliable web-based forum that might aid in the availability of AT information and AT accessibility among AT donors, vendors, and consumers.

The developed web-based forum could bridge the information gap by guaranteeing that AT donors, vendors, and end-users get trustworthy and valid information on AT access, as well as allowing donors and sellers to post a list of AT devices needed. On the other hand, consumers may be able to place their needs and specifications for the AT they require, as well as ask questions about disability and AT. The forum might ensure that both AT suppliers and consumers receive reliable information throughout their conversations.

A. *Other Related Works*

Several websites provide AT accessibility information, such as the AT Innovators Map (AT2030), which is led by the Global Disability Innovation Hub (GDI Hub) and financed by UK Aid [8], [9]. The centre gives global information on where to get AT services in each country, though not all locations in each country are included. The Global Assistive Technology Information Network (EASTIN) is a global search for AT in the world that gives information services on AT and other support for PWD [10], [6]. One of its limitations is that the information gathered is solely of worldwide importance, whereas national databases provide comprehensive and detailed information to individuals in their home country [11].

However, some African AT service delivery models include the Jairos Jiri Association, a platform that operates in South Mashonaland, Bulawayo, and Zimbabwe to provide disability services such as AT and rehabilitation services for people with physical, mental, visual, hearing, and other disabilities [12]. The website is simply an electronic reproduction of the organization's brochure.

The government of Tanzania has worked with non-governmental organizations to improve the availability and accessibility of rehabilitation services and AT, and there are websites such as Rehabilitation Center Tanzania, which is located in Usariver Arusha [13], Anglican Alliance Project [14], and Anglicanaid Project, which is a community-based Inclusive Development Organization (CBIDO). Furthermore, there is the Disability in Tanzania information platform, which is managed by the Information Centre on Disability (ICD) in Dar es Salaam [15]. This online resource is focused on gathering information about disability in Tanzania.

The websites of the Usa River Rehabilitation Center Tanzania (URRC), CBIDO, and ICD do not facilitate collaboration and information interchange and are frequently not updated on time. There is also a lack of a well-coordinated system of data collecting, analysis, and distribution that harmonizes AT users and suppliers. As a result, there is a need to create a web-based system that would provide constant connectivity between AT consumers, donors, and vendors.

B. *The Conceptual Framework*

Donors, vendors, and AT consumers could use the web forum to reduce the dependence on location, and instead of relying on geographical or location-based services, the web forum would allow them to more easily engage in the system and place their contents. The Web-based forum could provide donors, vendors, and consumers with faster access to information. To overcome the barrier to the availability and accessibility of AT among PWD, both suppliers (donors and vendors) and consumers must have continual and unrestricted access to information [7]. See Fig. 1.**Error! Reference source not found.**

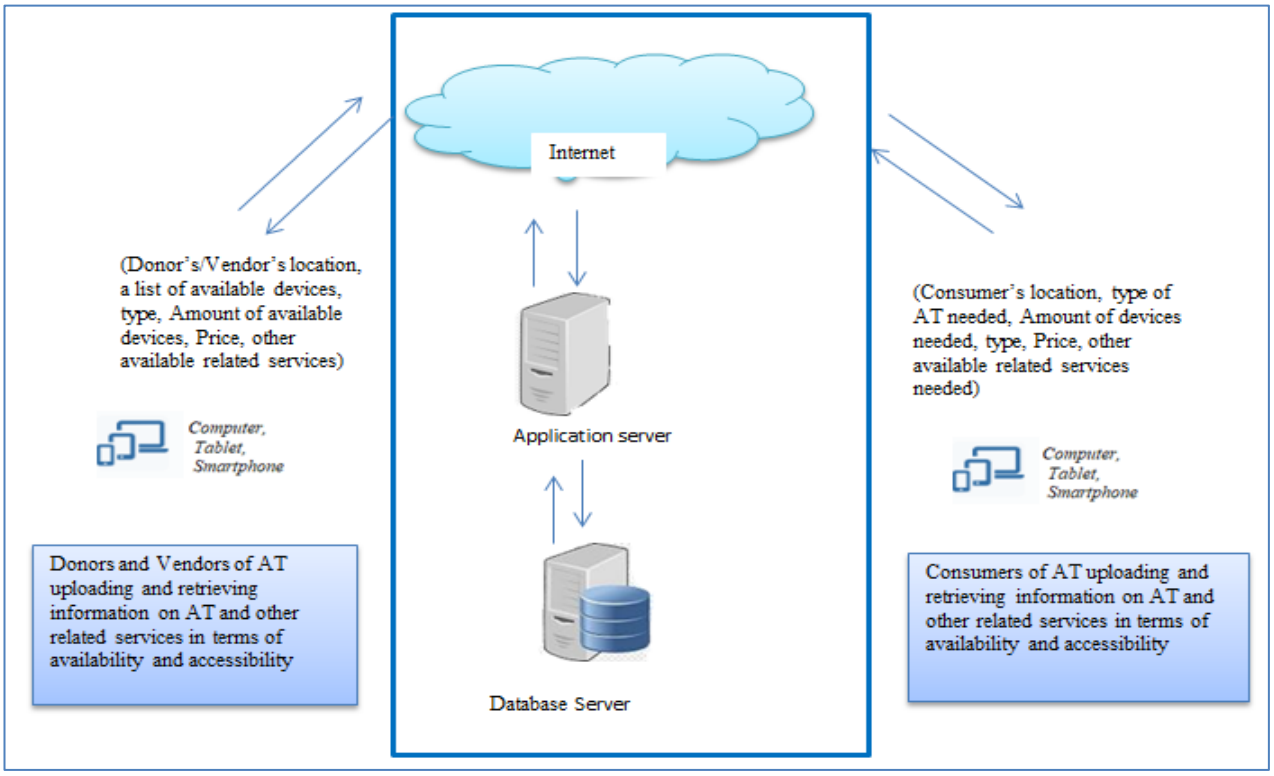

Fig. 1: Conceptual framework of the research
Source: research data, (2022)

II. METHODOLOGY

A. Design

The researcher was interested in "what," "how," and "why," hence deployed a qualitative methodology for the investigation. When fewer individuals are needed to understand human perceptions, behaviours, and attitudes, the method works well and provides the researcher with more process control [16].

B. Study area

The study was carried out at the Dar es Salaam City Council. The site was chosen because of the abundance of vendors and donation centres.

C. Participants

The responders were picked based on their understanding of AT issues. As a result, they were seen as having a treasure of knowledge [17]. Purposive sampling was used to select 207 respondents, including 5 AT donors, 2 AT vendors, and 200 consumers, from a total of 116 males and 91 women. PWD centres and institutions that help PWD, families with PWD members, and anybody who interacts with PWD in any manner are all considered AT consumers. Thus, among the 200 AT consumers visited by the researcher were five PWD service centres.

D. Materials

A systematic questionnaire was used to collect qualitative data on AT accessibility information and requirements for the construction of a web-based forum for easy availability and accessibility of AT among donors, vendors, and AT consumers. The questions were coded to Microsoft Form, an online method for improving mobile data gathering that entailed signing in to Microsoft, creating the form, sharing the form, and seeing the results. The form link was disseminated across AT vendors, consumers, and donors' mobile devices.

The interview was used to collect information verbally, and qualified information was gathered during the survey through observation, in which a researcher visited the real environment of real users and observed the process of acquiring AT for donors, vendors, and consumers of AT in the

selected areas. The approach allowed for the discovery of how the AT was purchased, sold, and donated, which was also useful in building the web-based forum.

E. Data Analysis

Survey data was coded to Microsoft Forms for online mobile data collection and later offline processing. Analytics were embedded into the forms to evaluate replies, which were then sent to Excel for further analysis or rating. The qualitative interview results, on the other hand, were grouped according to the study questions and then presented in a clear and instructive manner using charts and tables.

F. System Design

The evolutionary prototype model system development life cycle (SDLC) model was used in a reliable web-based forum for donors vendors and consumers of AT. The model was selected because a reliable web-based forum needs more user engagement and interaction. It could help to visualize components of the reliable web-based forum during implementation since users could be able to provide better and more comprehensive feedback and specification.

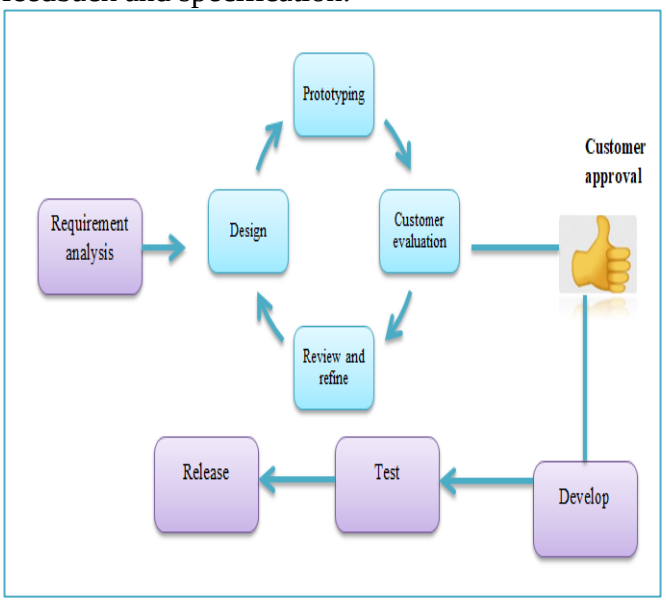

Fig. 2: Prototype SDLC model

Source: research data, (2022)

The evolution prototype model enforces a developer to focus on creating the actual software than concentrating on documentation [18]. It also enabled the release of a reliable web-based forum in advance before all features were fully implemented. Furthermore, user participation in the product even before implementation offered a better understanding of the software that was developed, allowed users to evaluate during development and try it out before implementation, reduce time and cost because of early defects detection, availability of faster user feedback that led to better solutions, easily identification of missing and confusing functionality. Hence the final product could be more likely to satisfy the users' desire for appearance, feel and performance [18]. The stages involved are portrayed in Fig. 2.

G. System Development

Word press was employed in this study to create a web-based forum for AT donors, vendors, and consumers. It is a PHP and MySQL-based open-source online website construction tool. This program has tailored solutions for users, allowing it to capture crucial benefits such as improved customer production and output [19].

Instead of building pages one by one, a system with basic components, guidelines, and best practices was built using the *'design system approach'* [20]. The system was then referred to, and as many pages as possible were created. The benefits of implementing the design are that everything, including the pages developed based on the system, is consistent because the same components stated in the system are used [20]. Furthermore, the design system approach helps to generate pages faster, and even if they are built early, they have some possibilities to simply alter. To apply the design system method, many tools such as an idea, elementor, coda, and drop box paper are employed [21].

The instrument used in this study for the design approach was elementor. It is a live front-end editor with script optimization and bespoke features that allows you to create complex layouts and gorgeous pages with multiple font options and enhanced backgrounds without jumping between editors [21]. WordPress includes all of these capabilities. Fig. 3 depicts an elementor plugin

design dashboard used in the design system approach of a web-based forum for donors, vendors, and AT consumers in Tanzania.

Some of the benefits of utilizing open source software (OSS) include low cost because no license charge is necessary, flexibility, which allows it to be updated to better suit a business or project, reliability, good quality, and the ability to add or remove any given function [22]. OSS can be either system software or application software, such as content management software such as WordPress. The majority of this software has active online communities that provide active assistance for users

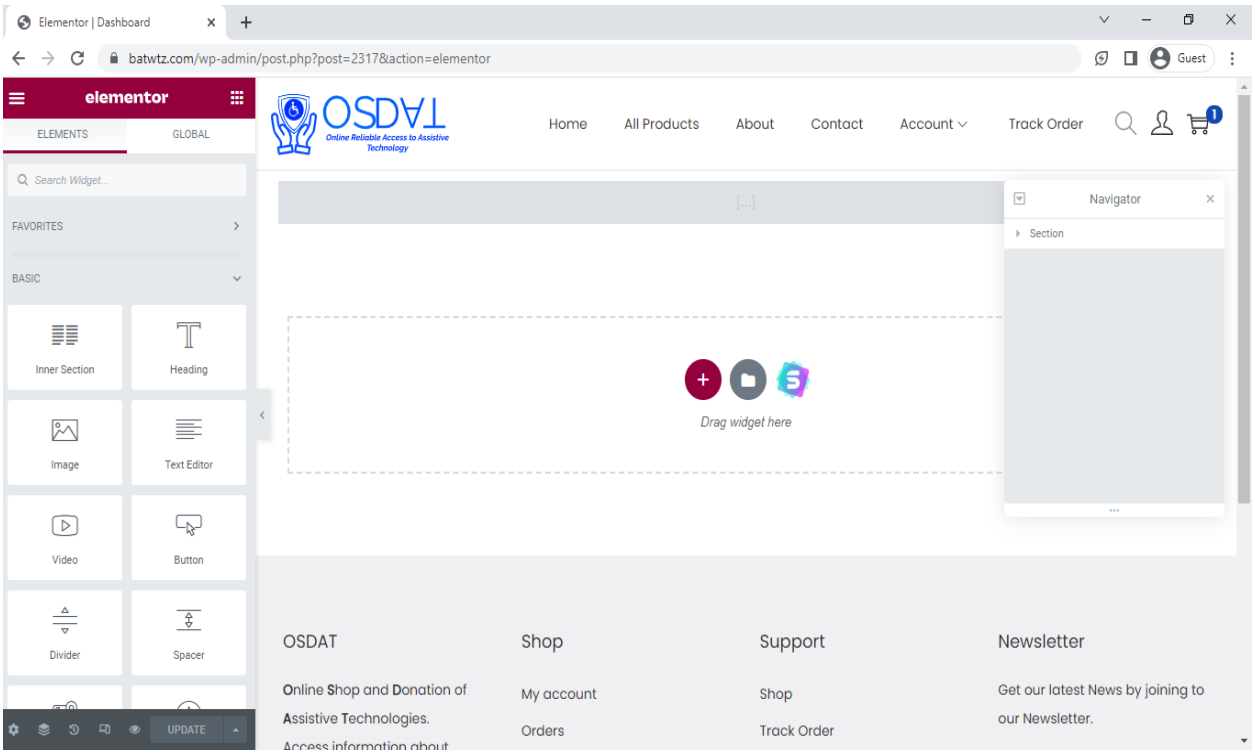

Fig. 3: Elementor; design system approach dashboard for a reliable web-based forum
Source: Field research data, (2023)

1) ***Assumptions:*** The following assumptions were considered during the study:

a. All Donors, vendors and consumers of AT know how to read and write
b. All Donors, vendors and consumers of AT have or could afford to have a smartphone, computer or tablet
c. All Donors, vendors and consumers of AT could have internet access
d. All Donors, vendors and consumers of AT know using smartphones and website

2) ***Technology Used:***

a. WordPress website creation tool based on PHP and MySQL
b. HTML and interface were used to format the interface
c. Script language; javascript language was used

3) ***Other Requirements for Operating Environment:***

a. Internet connection
b. A web browser: Mozilla Firefox, internet explorer, opera, etc.
c. Operating system: Windows, Linux, Ubuntu, Mac OS and Android
d. XAMP server

e. Java JDK

*4) **System Actors:***

The reliable web-based forum comprises several actors and their roles. They are important and direct users of the system since they represent various groups of stakeholders of the reliable web-based forum including:

a. Administrator
b. Donors of AT
c. Vendors of AT
d. Consumers of AT
e. Visitors

The actors and their associated activities are shown in Fig. 4.

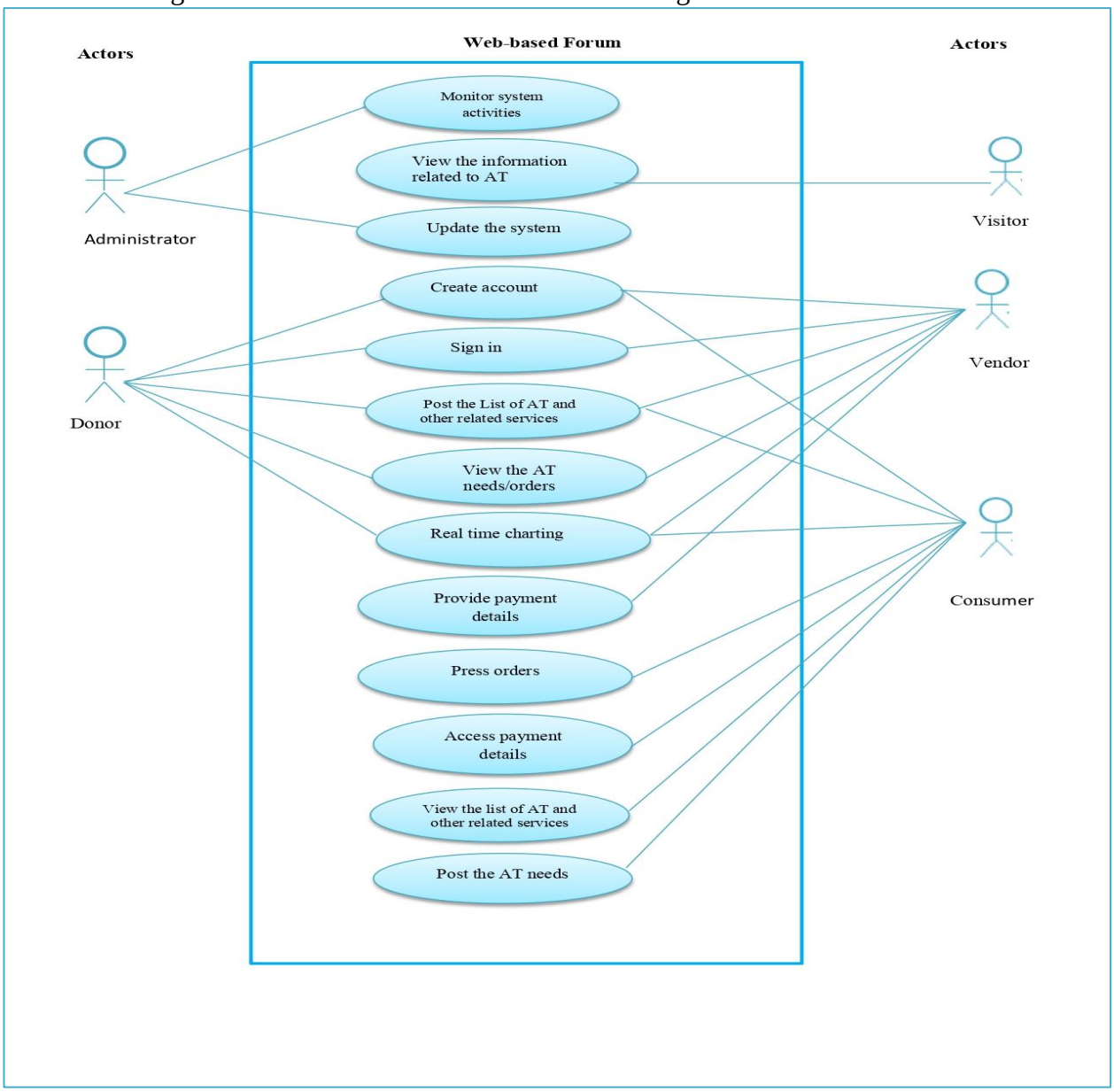

Fig. 4: Use a case diagram showing the actor and activities involved

Source: Field research data, (2023)

III. RESULTS

A. Respondents Characteristics

The survey had 207 respondents in total, including 200 (97%) AT users, five (2%) AT

donors, and two (1%) AT vendors. There were 116 (56%) men and 91 (44%) women who participated.

When asked how long they had been involved with AT, 59% of respondents said they had used it for at least ten years, while 60% and 100%, respectively, said they had been AT donors and vendors for at least ten years. 95% of respondents had an internet connection, 78% used smartphones, and 82.8% had regular access to the internet, according to data on devices and internet access.

WhatsApp, email, and Facebook were the three most popular web applications used by 73%, 68%, and 48%, respectively. Google was most frequently noted (73%) as a way used by consumers to search for AT information, with 90.5% of consumers finding the most information on product locations, as well as other data including price (70%) and AT type (59.5%). Data on information system knowledge also reveals that whereas 27% did not know, 73% did. The topic was presented to respondents to see whether they could relate the ideas of the system they were already familiar with and to rouse them so they could offer ideas that would help in the development of a reliable web forum.

B. Kind of Information System Needed

Ninety-nine per cent of respondents said they would like access to an information system that would let them post AT adverts, obtain AT information, and place orders. Every web-based system that is created begins with the needs of the users, so respondents suggested the specifications for creating a reliable web-based forum, as illustrated in Fig. 5

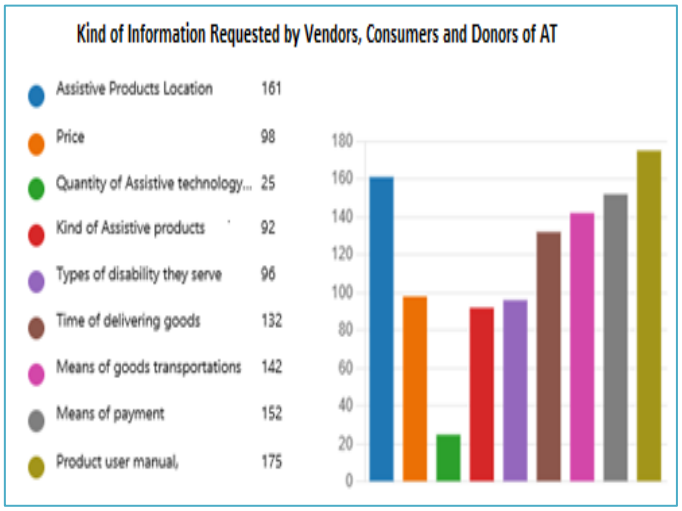

Fig. 5: Requirements for A reliable web-based forum
Source: Field research data, (2023)

Fig. 5 shows a total of nine requirements requested by AT consumers, vendors, and donors, including (87.5%)product user manual, (80.5%)AT product location, (76%)means of payment, (71%)means of goods transportations, (66%)time of delivering goods, (49%)price, (48%)types of disability, (46%)kind of AT product, and (12.5%)quantity of AT. When all of this information is gathered in one place, the entire process of acquiring AT might be simplified.

C. The Developed Reliable Web-Based Forum for Donors Vendors and Consumers of AT in Tanzania

The developed web-based forum is safe and simple to use. Before publishing an advertisement, applying for donated AT, or placing an order, users must first register by clicking the 'account' button and viewing the login/registration page. The home page includes all of the most significant connections and information. It is a location from which you can easily go to other pages. Refer to Fig. 6.

The web-based contains necessary AT accessible information for donors, vendors, and AT consumers, such as location, price, type of AT, amount of AT, product descriptions/user manual, mode of delivery, payment details, and contacts. Various posts about disability and AT are also

available in the forum, plus links to partners and stakeholders in Tanzania on every issue concerning AT and disability.

Other AT and disability-related posts from the forum's social media accounts, including Facebook, Twitter, YouTube, and Instagram, are also available on the website. A WhatsApp link is provided to contact the system administrator. Aside from computers, the reliable web-based forum may also be accessed via mobile devices such as smartphones and tablets. The forum can also be accessed in Swahili. Furthermore, the reliable web-based forum includes search engine optimization (SEO) from the host, allowing it to be the priority when searched.

Donors can post various AT donations in the forum, while vendors can offer specifics to their displayed products, and consumers can see every important AT detail when they click on a certain product and keep track of their orders in the tack order button' that displays the order management page. Vendors and consumers will be able to manage their orders through the administrator, exchange contacts, and communicate with one another to conduct business, including payment method details such as bank, cash, or pesapal, and shipping methods.

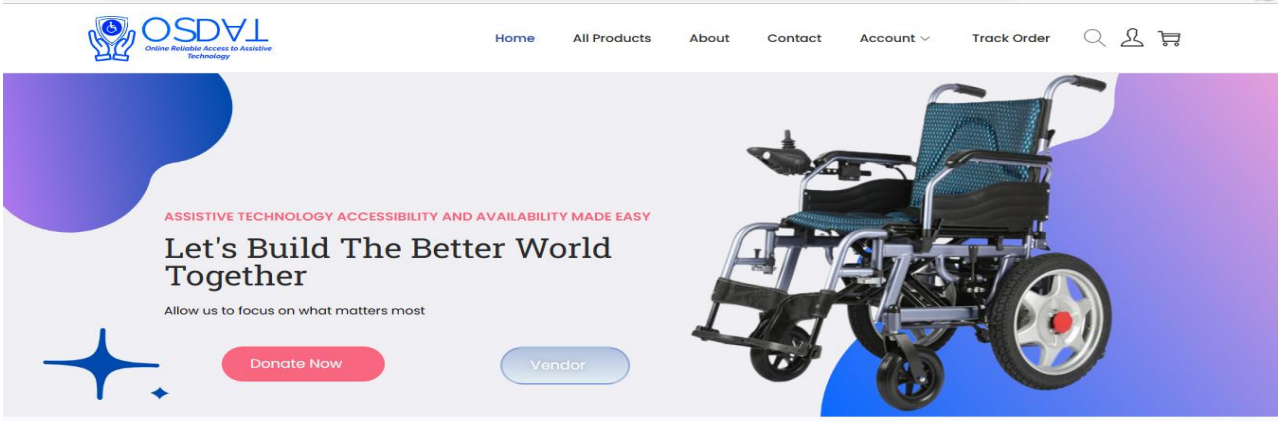

Fig. 6 Reliable web-based forum for donors, vendors and consumers of AT in Tanzania: home page

Source: Field research data, (2023)

IV. DISCUSSION

A. The Developed Web-Based Forum for Reliable Linkage among Donors Vendors and Consumers of AT

The developed reliable web-based forum is the first of its type, capable of providing real-time AT accessibility information from and to suppliers, donors, and AT consumers. It transforms traditional methods of receiving AT and bridges the accessibility gap. One of the goals of designing a new system is to address weaknesses in an existing system and satisfy users [23]. The reliable web-based forum bridges the AT accessibility gap between AT donors, vendors, and consumers by exchanging various AT accessibility information such as contacts, tracking orders, access location, type, and amount of AT, viewing product descriptions, posting an advertisement, and access shipment and payment details such as bank, cash, and pesapal.

When compared to previous modes of communication, a web-based system allows for faster communication all over the world and provides greater coverage in less time [23], [2], [7]. Furthermore, the developed web-based forum facilitates collaboration between other stakeholders of AT and disability by providing a link to their sites. Vendors, donors, and consumers of AT can obtain various information from the forum's social media links such as Twitter, Facebook, YouTube, and Instagram, and can communicate with the administrator via WhatsApp [23].

Other items from vendors are offered for free as a police to the forum in the web-based forum since a vendor is also viewed as a partner to support the

need. According to [7], in today's world when technology rules everything, an information communication technology-based approach is a better way to establish collaboration on AT and disability issues.

The developed reliable web-based forum can be easily accessible when searched in multiple browsers thanks to search engine optimization [24]. It is secure because you must join up before posting or placing orders, and it can also be viewed via smartphones and tablets. Furthermore, the forum is available in both English and Swahili. Many AT accessibility problems can be avoided if, AT donors, consumers, and vendors use a web-based forum for AT accessibility, such as middlemen and buying low-quality AT products at higher prices, because the forum provides them with secure communication and a variety of choices from different vendors and about specific products and their prices [25].

B. Limitations

The developed web-based forum is available to those with computers tablets and smartphones with stable internet connections [26]. Furthermore, for the web-based forum to be reliably accessed in phone models, some features, such as photos that hid the buttons, had to be removed or cut, but all functionalities are working properly [27], [28]. Finally, the data gathering process and forum development were confined to a few plugins because it is a free edition with limited functionality. Other more essential plugins with greater functionality are accessible in pro versions [22], [28], [29].

C. Implications

Despite these limitations, the findings of this study may have some consequences. For example, it raises awareness among donors, vendors, and AT users about the usage of more reliable methods of accessing AT, such as web-based systems. When compared to existing means such as word of mouth, brochures, and radio, the usage of a credible web-based forum that compiles all relevant AT accessibility information on one site appears to be preferred by most [23]. Furthermore, web-based forums include more links to other sites and no time constraints because they may be visited at any time [26], [25].

Although there are some costs associated with the use of web-based systems, such as internet costs, the study shows that the costs can be bearable when the benefits of using the internet in accessing AT information are considered [10], [1], [26], [2], [7].

V. CONCLUSION

The developed web-based forum can give all of the necessary AT accessibility information, such as location, product description, payment and transportation methods, time of delivery of goods, kinds of disability, the type and quantity of AT, payment methods, and price. The web-based forum allows for the posting of advertisements, order management, charting, and links from other websites and social media containing information about AT and disabilities. For the time being, the payment methods are cash on delivery and bank transfer.

VI. RECOMMENDATIONS

According to the findings of this study, there is a need for the actual implementation and use of a reliable web-based forum to bridge the AT accessibility gap among donors, vendors, and AT consumers in Tanzania. Many AT users have inadequate knowledge of AT systems; therefore, studies to enhance awareness of knowledge about how to navigate systems and access AT will be more beneficial. Furthermore, there is a created web-based forum for reliable linkage among donors, vendors, and AT users to assure steady and centralized availability of AT. Wherever possible, the web-based forum can be modified using open-source software. The study provides a low-cost technological solution for donors, vendors, and AT consumers to acquire reliable AT information.

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