



Navigating the Evolution: A Comprehensive Analysis of Awareness in Contemporary TV Display Technologies

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CC License CC-BY-NC-SA 4.0	<p style="text-align: center;">Abstract</p> <p>A display serves as a projecting mechanism that presents video content to the user through technologies such as cathode ray tube (CRT), liquid crystal display (LCD), light-emitting diode (LED), Organic light-emitting diode (OLED), or other projection methods. The global demand for intelligent displays has witnessed a substantial rise, primarily fueled by the increasing popularity of OLED-based devices and technology. Concurrently, the worldwide digital TV subscriptions surpassed one billion in 2017. In our investigation, we aimed to assess the awareness levels among individuals in both rural and urban areas regarding TV display technology. The findings reveal that approximately 79% of urban residents and 44% of rural inhabitants utilize a TV display compatible with their TV subscription.</p> <p>Keywords: <i>CRT display, OLED display, HD subscription</i></p>
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1. Introduction:

Display screens for product presentation are output devices designed to showcase data or information. They find application in various electronic devices such as mobile phones, televisions, and computers. In the past, cathode ray tubes (CRTs) were the primary display technology in televisions. However, through research and the integration of different technologies, a variety of display types have been introduced, including light-emitting diodes (LEDs), liquid crystal displays (LCDs), and more recently, organic light-emitting diode displays (OLED). These advancements in display technologies have contributed to the development of larger and thinner screens [1]. Most HD and 4K televisions nowadays feature OLED displays. An OLED, or organic light-emitting diode, is a type of LED that incorporates an emissive electroluminescent layer composed of a chemical compound film. This film emits light when an electrical current is applied. OLEDs are utilized in the creation of digital displays for television screens, employing organic carbon-based films positioned between two charged electrodes—a metallic cathode and a transparent anode, typically made of glass. OLED displays can adopt either passive-matrix or active-matrix addressing schemes [2]. Currently, televisions are equipped with full high-definition (HD) resolution and have a thickness of around 25mm, featuring additional functionalities such as Wi-Fi support, voice recognition, a 3D sound system, and other appealing features. Simultaneously, there has been a growing inclination among consumers in India towards Direct-to-Home (DTH) services, influenced by advancements in display technology. DTH facilitates direct communication between broadcasters and consumers, eliminating the need for local cable operators. It involves the reception

of satellite programming through personal dishes at individual homes, offering a wireless digital audio-video service.

DTH signals are received directly on the consumer's television through a set-up box (STB), which decodes the signals and enables subscribers to access pay channels. This device also monitors the channels' viewership, tracking the number and duration of channels viewed by subscribers. Notable players in the broadcasting industry as of 2023 include Dish TV of the ZEE group, Tata Sky, Reliance BIG TV, Airtel digital TV, and Videocon d2h. The positive response from customers underscores the significance of consumer preferences, beliefs, and perceptions in shaping the inception, growth, and sustainability of DTH services [3]. Various manufacturing processes for OLEDs offer several advantages over flat-panel displays produced with LCD technology. In the future, OLEDs could be printed onto any suitable substrate using methods like inkjet printing or screen printing, potentially leading to lower production costs compared to LCD or plasma displays. However, the fabrication of OLED substrates is currently more expensive than that of TFT LCD, with the potential for cost reduction as production methods become more scalable. OLED displays can be produced on lightweight and flexible plastic substrates, opening up possibilities for the creation of flexible organic light-emitting diodes or innovative applications such as roll-up displays embedded in fabrics or clothing. Unlike LCDs, which filter light emitted from a backlight, OLEDs offer the advantage of a faster response time compared to standard LCD screens [4]. Additionally, OLED displays do not experience motion lag or motion blur, common issues with LCD displays. Furthermore, OLED display technology stands out as the most energy-efficient TV technology ever developed [5]. Utilizing its rapid response time, OLED technology is ideal for creating engaging animations. While LCDs can achieve a reaction time as low as 1ms for their quickest color transitions, OLEDs surpass them significantly with time intervals that are 1000 times faster, resulting in an impressive 10 microseconds of response time [6]. Reducing the current running through OLED extends its lifespan. This enhancement in longevity broadens the range of applications for the technology and enhances the overall durability of products [7]. Digital multimedia broadcasting is poised to usher in a new era for cultural and educational opportunities [8]. In 2008, among 134 million TV households, 83 million had chosen cable connections, while 15 million had opted for DTH connections [9]. The primary goal of this survey initiative is to assess the level of awareness among rural residents regarding display technology. Over the past two decades, significant transformations have occurred in TV broadcasting, transitioning from space wave propagation to satellite communication. Consequently, signal transmission systems have undergone digitization, resulting in high-quality signals through amplification. To effectively receive and view these superior signals, displays supporting digital signals such as LCD, LED, and OLED have replaced CRT displays. Through this survey project, we aim to determine the extent to which these global technological advancements have permeated both urban and rural areas within our country.

2. Methodology:

In this current investigation, the survey focused on both rural and urban locales within Navi Mumbai. Through random sampling, data was gathered from numerous households across different regions. Approximately 100 survey forms were collected from each area, and respondents provided answers to various questions.

3. Results and Discussion:

People now engage in consuming television content on a daily basis, akin to their routine intake of food. Just as we prefer flavorful meals, the quality of TV content should also be of high standard. In achieving this, the role of TV displays becomes crucial. Our survey reveals that 63% of individuals in rural areas showed a positive response to TV displays such as LCD, LED, and OLED. Furthermore, a 82% of people from urban region exhibited awareness and responsiveness towards the latest TV displays, including OLED, HD, and 4K (Fig. 1).

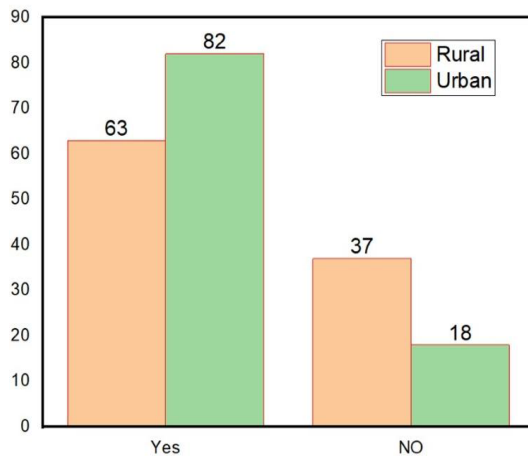


Fig. 1 Awareness about display technology

Approximately 38% of individuals residing in rural areas are aware of OLED TVs, with only 7% possessing knowledge about 4K TVs (Fig. 2). The survey conducted in the chosen areas also sheds light on the prevalent TV subscription preferences among the residents. In rural regions, a mere 18% of the population utilizes Dish HD TV, and 7% opt for cable HD TV. In contrast, urban areas exhibit a higher adoption of Dish HD TV, with 45% of individuals subscribing to it, and 13% opting for cable HD TV as their television subscription (Fig. 3).

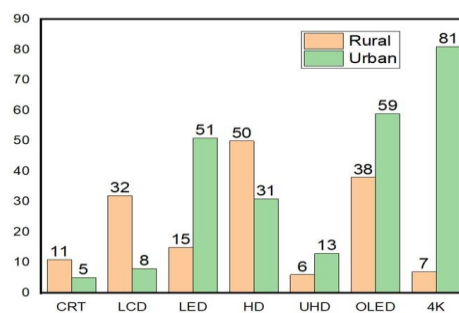


Fig. 2 Knowledge about various display devices

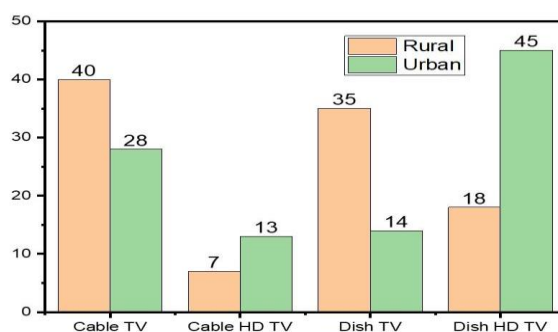


Fig. 3 Use of TV subscription

In rural areas, 44% of individuals opt for standard definition (SD) subscriptions on LED TV displays, while in urban regions, 79% of the population prefers high definition (HD) subscriptions on LED TV displays. This suggests that in the urban areas, a higher percentage of people embrace the latest TV broadcasting technology, as their TV displays are well-suited for their chosen TV subscriptions. Our survey reveals divergent priorities in television purchases between rural and urban populations. In urban areas, individuals prioritize display

quality as the foremost factor in buying a television, followed by cost and then brand. Conversely, in rural regions, people prioritize price as their primary consideration, followed by display quality (fig. 4).

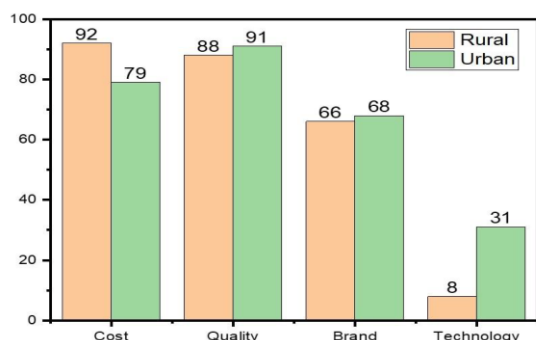


Fig. 4 Priorities in purchasing TV sets

4. Conclusion:

The research indicates that urban residents are actively engaging with TV broadcasting technology, and their television displays are compatible with their subscriptions. Conversely, in rural areas, approximately 56% of individuals possess HD TV subscriptions but use conventional TV displays such as CRT or LCD. This suggests a lack of awareness or adoption of modern digitized TV broadcasting systems in rural regions. Notably, OLED displays offer a significant advantage in terms of energy efficiency, contributing to lower electrical power consumption. The survey highlights that individuals in rural areas prioritize price when purchasing a TV, leading to the prevalent use of conventional displays like CRT or LCD. Consequently, many people in rural areas are not taking advantage of the available modern digitized communication systems.

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