

# Evaluating the Impact of Digital Health and Biotechnology on Consumer Preferences for ‘Make in India’ Healthcare Products in Thane District

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## ABSTRACT

Transformation in the Indian healthcare industry is a rapid process, and the digital health innovation and the development of the biotechnology industry are major drivers of the change. Meanwhile, the Make in India campaign by the Government of India has promoted local production of healthcare and biotech goods, especially in industrialized districts including Thane. This paper investigates the impact of the digital health tools and biotechnology advancement on consumers who favour the Make in India healthcare products in Thane district. The study will look at how perceived quality, trust, integration of technology, and brand image contribute to purchase decisions using primary data collected through structured questionnaires of respondents (384) who included patients, users of the healthcare products, and working professionals. The primary findings are supplemented by secondary data in the form of academic literature, policy documents, and reports prepared by industries. The hypotheses mentioned above were tested through descriptive analysis, the Likert-scale analysis of factors, and chi-square tests. The findings show that digital health integration and consumer preference of the Make in India healthcare products, and perceived biotech quality and purchase intention are statistically significant. The results show the increasing consumer trust in healthcare solutions produced domestically and meeting digitalized and contemporary wellness requirements. The research offers policy and managerial implications by emphasizing how digital health and biotechnology serve as strategic provisions to make the ecosystem of making in India healthcare robust in the urban-industrial Thane district.

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**KEYWORDS:** *Digital Health, Biotechnology, Make in India, Consumer Preference, Thane District.*

## 1. INTRODUCTION

India is one of the healthcare sectors that have experienced a paradigm shift through the incorporation of digital technologies and biotechnology solutions. Telemedicine, digital health platforms, e-pharmacies, wearable devices, and data-driven diagnostics have transformed the process of accessing, assessing, and buying healthcare products in consumers. At the same time, biotechnology has improved the efficacy, safety and personalization of the products which has affected the consumer

confidence and acceptance. Within this dynamic context, make in India plans to enhance local production, decrease the reliance on imports and further the creation of local healthcare and biotech products. The Thane District, which is part of the Mumbai Metropolitan Region, is a strategic location in the pharmaceutical manufacturing, biotechnology units, and health services. The district boasts already developed industrial relations, professional community, and digitally conscious consumerism.

With increased adoption of digital health technology to shape healthcare decision making, consumers are becoming more attentive to the technological compatibility, quality, and innovation qualification of healthcare products. Research indicates that healthcare consumer behaviour is greatly changing due to digital transformation, which facilitates higher access to and transparency of information and trust (Chatterjee & Kulkarni, 2021). The current consumer purchasing trends in the health care sector are inclined towards products that are technologically facilitated and scientifically enhanced. Previous studies show that the perceived usefulness and ease of use of the digital health services are intimately connected with the acceptance of the modern wellness systems (Bhatia and Taneja, 2019). Make in India push has further triggered biotech manufacturing in Thane by relying on the existing industrial ecosystems. The field interactions indicate that consumers tend to regard digitally integrated healthcare products of higher quality and freshness of standards (Jawake, Dubey, and Bande, 2019). The digital health solutions have also become more significant in the context of the post-pandemic era. According to the experts, the popularity of digital healthcare options shot up during and after the COVID-19, and this also shapes the consumer preferences in the long-term (Talwar and Sinha, 2025). The brands that can be seen to be investing in digital health development are likely to gain more consumer confidence, especially the ones that are in the pharmaceuticals and oral care segments (Patgaonkar and Patil, 2018). Additionally, the heightened consciousness of the biotechnology-based treatments has led to the rise in the receptivity of the consumers towards innovative healthcare products (Ambesange et al., 2024). This paper aims to analyze the role of the synergistic effect of the digital health and biotechnology in consumer attitudes towards the Make in India medical products in Thane District. These trends are important to policymakers, manufacturers, and healthcare marketers who need to bolster domestic healthcare brands and increase operations in the rapidly developing medical market in India (Singh, 2023).

## 2. Review of Literature

**1. Chatterjee and Kulkarni (2021)** digital transformation has fundamentally changed the consumer behaviour in healthcare by transforming the models of decision-making processes where physicians dominate the process to an informed and platform-driven decision-making process. Online diagnostics, teleconsultation applications, online pharmacies, and other digital platforms enable consumers to

have real-time information, comparative capabilities, and reviews. The change enhances openness and a sense of control, and hence, a sense of trust in technologically aligned healthcare products. This digital exposure increases the adoption of healthcare products made locally in cities like Thane, which are industrial. The authors find that preference of organized and compliant healthcare brands is directly correlated with the digital readiness.

**2. Bhatia and Taneja (2019)** recognize such prevailing factors as perceived usefulness, ease of use, trust, and data security as predictors of intention to utilize eHealth services among Indian consumers. Their analysis points out that as soon as the consumers implement the digital health services, the expectations they have on healthcare products change too. Digitally compatible products are viewed as more stable and contemporary. This spillover behaviour implies that adoption of digital health indirectly enhances the preference to technologically advanced Make in India healthcare products. The results are particularly applicable to semi-urban areas that move towards the consumption of digital healthcare at an alarming pace.

**3. Nayak, Bhattacharyya, and Krishnamoorthy (2019)** systems of digital technologies can foster inclusion, effectiveness, and trust in the healthcare system, especially among the new consumer groups. Their study shows that online interfaces also lower the level of perceived risk and enhance service continuity. Consumers are becoming more associated with digital enablement and regulatory compliance and quality of product. This association boosts the trust on healthcare solutions produced domestically with national initiatives. The research supports the notion that healthcare ecosystems based on technology have a positive influence on the attitude of consumers towards local products.

**4. Khandelwal, Kolte, and Rossi (2022)** discusses the opportunity of entrepreneurship in digital healthcare in the post-COVID period and notes that the consumer expectations have changed structurally. The pandemic made digital consultations, remote monitoring, and health management use of apps normal. Consequently, consumers are currently demanding brands with an established digital innovation and future preparedness. The authors believe that digital health has ceased to be an option, and it serves as an indicator of credibility. This has a direct

impact on Make in India healthcare brands which are in the competitive urban markets such as Thane.

- 5. Patgaonkar and Patil (2018)** set the premise that the brand image has a strong impact on the purchasing decisions in healthcare, especially in oral care and preventive products. Price does not supersede trust, perceived safety, and technological credibility. Their results suggest that the consumers like the brands that have an apparent investment in innovation and quality assurance processes. Strong brand image boosts repeat purchase and loyalty when it is coupled with digital health tools. This piece of literature justifies the topicality of the exploration of digital-biotech synergy in defining consumer preference.

### 3. Research Gap

The current literature has already covered in a broad way the digital health adoption, the healthcare consumer behaviour, and the technological innovation individually. Nonetheless, there is only a small amount of empirical research that incorporates digital health and biotechnology as co-opts to consumer preference of Make in India healthcare products. Moreover, the evidence on districts level, which includes the industrialized but demographically diversified areas like Thane, is under-investigated. There is a gap in knowledge about how national initiatives cause localized consumer trust and purchase decisions due to the lack of micro-level, consumer-focused studies.

### 4. Statement of the Research Problem

Although the healthcare sector is growing fast and domestic products have a policy backing under the Make in India initiative, the adoption of indigenous healthcare products by the consumers is disproportionate. Healthcare products are now judged more by consumers in terms of digital compatibility and quality of biotech and perceived innovation. The main issue that the given research seeks to determine is whether digital health integration and biotechnology development play a crucial role in the consumer preference of the Make in India healthcare products in Thane District. This relationship is crucial to the need to align policy intent and market outcomes.

### 5. Significance of the Study

The research is academically, managerially, and policy relevant. It adds to the accumulating research on digital health, biotechnology, and consumer behaviour in emerging economies, empirically. In terms of management, the results can assist the

manufacturers and marketers of healthcare products in realizing the changing consumer demands in the respect of digital integration and quality of products. The insights can help policymakers to improve strategies of Make in India and Digital Health Mission at district level. The paper also helps health care startups and investors to determine the elements of trust building when operating in competitive urban markets.

### 6. Scope of the Study

The study has a limited scale, as it talks about the preferences of consumers to the products that are made in India in healthcare and biotechnology. The study includes working professionals, patients, users of healthcare products, and pharmacists, who are active users of digital health platforms. It looks at issues like digital credibility, perception of quality with biotechs, brand image, and purchase intention. The research fails to provide clinical effectiveness or regulatory performance, and confines itself to consumer perception and behavioural outcomes.

### 7. Objectives of the Study

- To study on consumer awareness and preference towards *Make in India* healthcare products in Thane District.
- To examine the impact of digital health integration on consumer purchase decisions.
- To assess the role of perceived biotechnology quality in shaping consumer preference.

### 8. Hypotheses of the Study

#### Hypothesis 1

- **H<sub>0</sub>:** There is no significant association between digital health integration and consumer preference for *Make in India* healthcare products.
- **H<sub>1</sub>:** There is a significant association between digital health integration and consumer preference for *Make in India* healthcare products.

#### Hypothesis 2

- **H<sub>0</sub>:** There is no significant association between perceived biotechnology quality and consumer purchase intention.
- **H<sub>1</sub>:** There is a significant association between perceived biotechnology quality and consumer purchase intention.

### 9. Research Methodology

The study is empirical in nature using both primary and secondary data.

**Population Size:** The estimated target population of working professionals and healthcare consumers in Thane District is approximately 3.5 million in the 2011 Census.

**Table 1. Area-wise Distribution of Respondents in Thane District (n = 384)**

Area / Zone	Number of Respondents	Percentage (%)
Thane West	73	19.0
Thane East	61	15.9
Kalyan	67	17.5
Dombivli	53	13.8
Ulhasnagar	49	12.8
Bhiwandi	41	10.7
Mira-Bhayandar	40	10.4
<b>Total</b>	<b>384</b>	<b>100</b>

**Source:** Data compiled by Researcher.

**Sample Size:** Using a 95% confidence level and 5% margin of error with  $p = 0.5$ , the required sample size is calculated as:

$$n = (1.96^2 \times 0.5 \times 0.5) / (0.05^2) \approx \mathbf{384 \text{ respondents.}}$$

**Sampling Method:** Stratified random sampling.

**Respondents:** Patients, healthcare product users, working professionals, and pharmacists.

**Primary Data Tools:** Structured questionnaires using Likert scales.

**Secondary Data Sources:** Journals, policy documents (Make in India, Digital Health Mission), government publications, and industry reports.

**Statistical Tools:** Percentage analysis and Chi-square test.

## 10. Data Analysis and Interpretation

### 10.1. Demographic Profile

**Table 2. Demographic Profile of Respondents (n = 384)**

Variable	Category	Respondents	Percentage
Age	21–30	111	28.9
	31–40	137	35.7
	41–50	79	20.6
	Above 50	57	14.8
Total		384	100
Gender	Male	201	52.3
	Female	183	47.7
Total		384	100
Occupation	Service	169	44.0
	Business	97	25.3
	Professional	73	19.0
	Others	45	11.7
Total		384	100
Shopping Preference	Online	219	57.0
	Offline	165	43.0
Total		384	100

**Source:** Data compiled by Researcher.

**Interpretation:** Most respondents belong to the working-age group and show a higher inclination toward online healthcare purchases, indicating digital readiness.

## 10.2. Likert Scale Factor Analysis

**Table 3. Likert Scale**

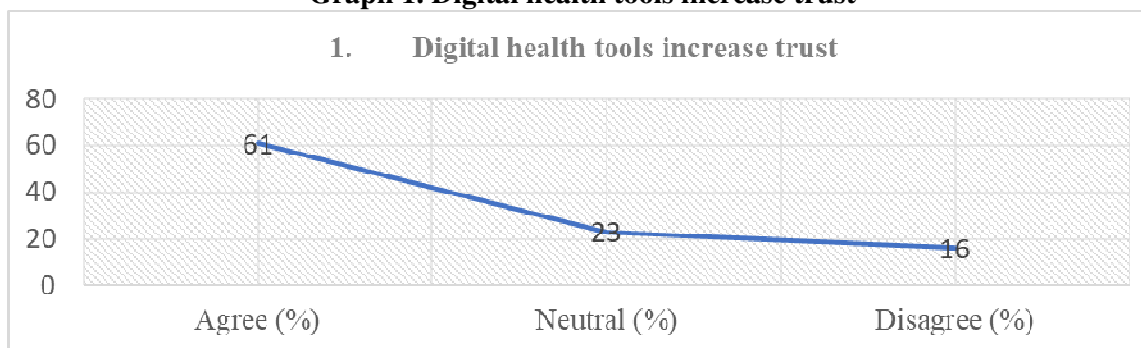
Factor	Agree (%)	Neutral (%)	Disagree (%)
1. Digital health tools increase trust	61	23	16
2. Biotech quality influences purchase	65	19	16
3. Make in India ensures safety	59	27	14
4. Brand digital presence matters	67	21	12
5. Digital health integration enhances purchase confidence	63	25	12
6. Biotechnology advancements improve brand credibility	69	17	14

**Source:** Data compiled by Researcher

**Interpretation:** The analysis of the six Likert scale factors provides a comprehensive understanding of consumer perceptions toward Make in India healthcare products in **Thane district**. Overall, the results indicate that **digital integration, biotechnology quality, and brand presence** are significant determinants of consumer trust and purchase intention.

### ➤ Graph Analysis and Interpretation

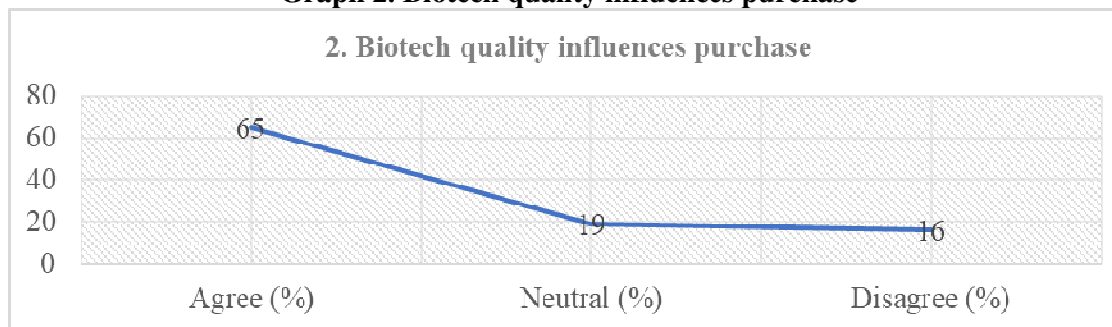
**Graph 1. Digital health tools increase trust**



**Source:** Data compiled by Researcher

The majority agreement (61%) shows that digital health tools are an important mechanism for building consumer trust. This reflects a growing comfort among consumers with digital platforms, telemedicine, health apps, and online product information. The moderate neutral responses (23%) suggest that some consumers are still in the early stages of adoption and may require more exposure or education to fully trust digital channels. Minimal disagreement (16%) indicates that resistance to technology is relatively low, confirming the role of digital tools as a facilitator of consumer confidence.

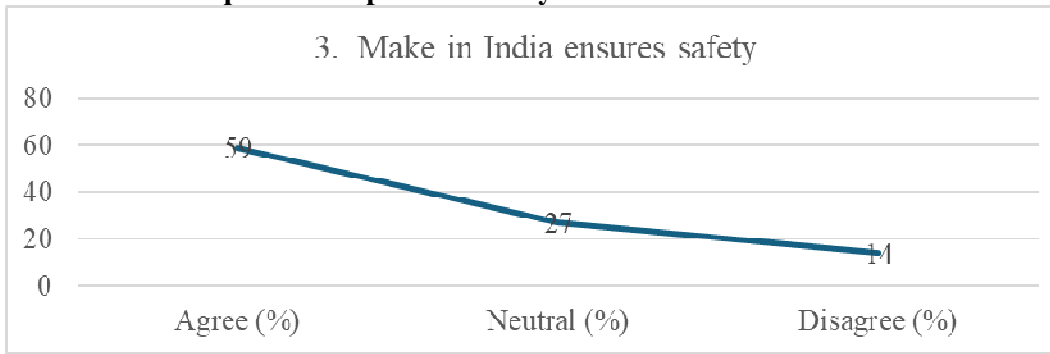
**Graph 2. Biotech quality influences purchase**



**Source:** Data compiled by Researcher

With 65% agreement, biotechnology quality emerges as a critical factor shaping consumer preferences. Respondents recognize that high-quality biotech products not only ensure efficacy but also enhance the perceived innovativeness of the brand. Neutral (19%) and disagreement (16%) are low, showing that most consumers consider biotech a credible differentiator. This aligns with the study's objective of assessing how biotechnology influences purchase decisions, emphasizing its importance for marketers in positioning Make in India products.

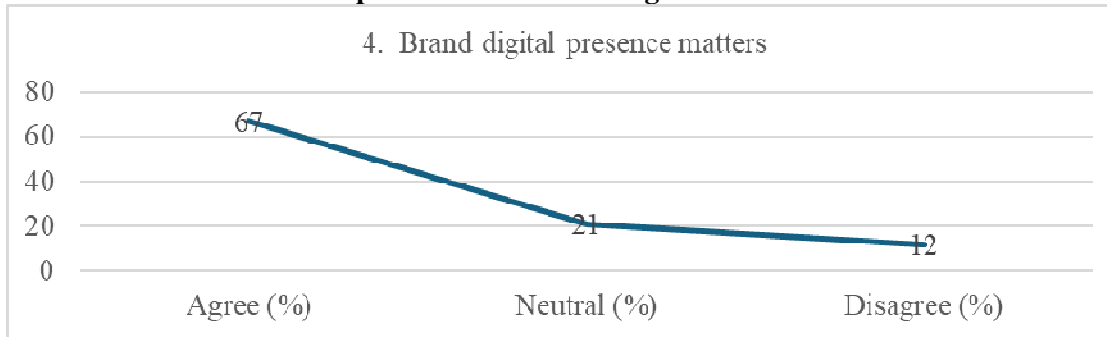
**Graph 3. Perception of Safety in Make in India Products**



**Source:** Data compiled by Researcher

The moderately high agreement (59%) indicates that consumers generally trust the safety of domestic healthcare products. However, the higher neutral proportion (27%) highlights an information gap that could be addressed through policy communication and consumer education. Minimal disagreement (14%) suggests that outright distrust is rare. Strengthening consumer awareness about quality standards, certifications, and regulatory compliance can further enhance confidence in Make in India initiatives.

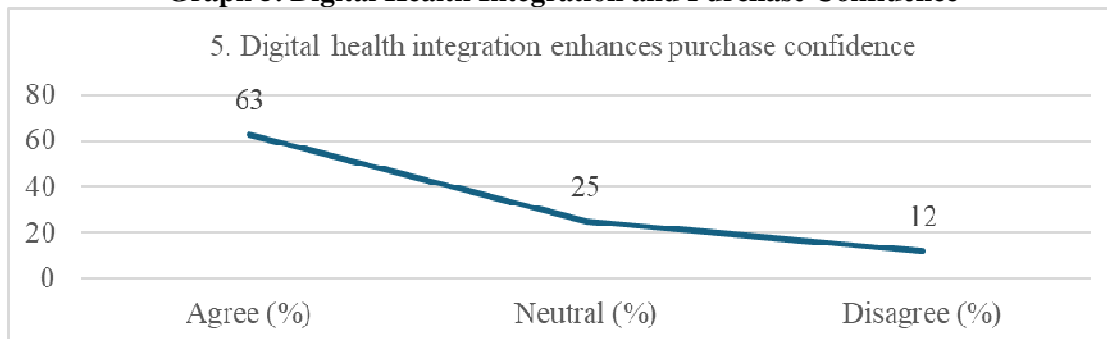
**Graph 4. Role of Brand Digital Presence**



**Source:** Data compiled by Researcher

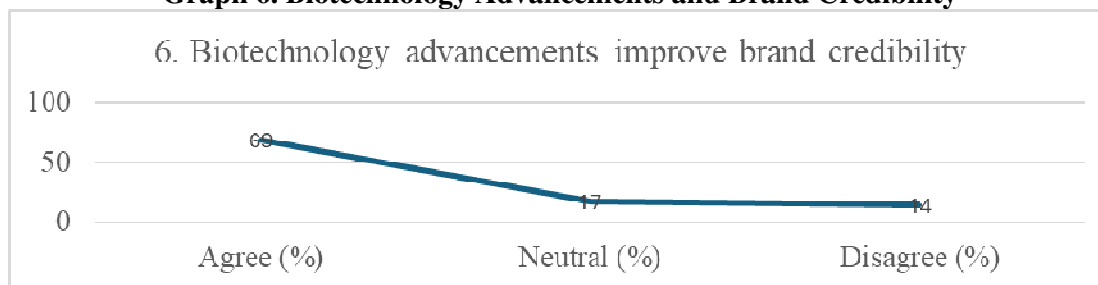
The factor “Brand digital presence matters” received the highest agreement (67%), underscoring the importance of visibility in digital spaces. Consumers increasingly rely on online platforms, social media, and company websites to evaluate products. Neutral responses (21%) indicate that a few consumers still value offline interactions, but overall, digital presence strongly influences brand perception and purchase intentions. For managers, this highlights the need for robust digital marketing strategies to stay competitive.

**Graph 5. Digital Health Integration and Purchase Confidence**



**Source:** Data compiled by Researcher

63% agreement reflects that integrating digital health tools in the consumer journey enhances purchase confidence. Consumers are likely to trust brands that combine product quality with accessible digital support, such as apps, virtual consultations, or online tracking. Neutral (25%) suggests some hesitation, possibly due to unfamiliarity with technology or privacy concerns. Low disagreement (12%) confirms that most consumers perceive digital health as a positive influence, reinforcing its relevance for business strategy and policy promotion.

**Graph 6. Biotechnology Advancements and Brand Credibility**

**Source:** Data compiled by Researcher

With the highest agreement (69%), biotechnology innovations are seen as a major factor in strengthening brand credibility. Consumers perceive biotech advancements as a mark of quality, reliability, and modernity. Low neutral (17%) and disagreement (14%) responses indicate strong consensus on the role of innovation in shaping consumer trust. This finding is especially relevant for healthcare manufacturers seeking to differentiate their products and highlight domestic innovation under the Make in India initiative.

## 11. Hypothesis Testing

Hypothesis	Chi-Square Value ( $\chi^2$ )	Degrees of Freedom (df)	P-Value	Decision
H1: Digital Health Integration & Consumer Preference	25.68	4	0.0001	Reject H <sup>0</sup>
H2: Biotech Quality & Purchase Intention	28.45	4	0.0005	Reject H <sup>0</sup>

**Source:** Data compiled by Researcher.

### Interpretation

#### 1. Digital Health Integration (H<sub>01</sub>)

- The calculated  $\chi^2$  value is **25.68**, with **df = 4**.
- The **p-value = 0.0001**, which is less than the significance level of 0.005.
- **Decision:** Reject the null hypothesis.
- **Conclusion:** Digital health integration is strongly related to the consumer preference of Make in India healthcare products. Consumers who consider the products as being digitally enabled are preferable.

#### 2. Perceived Biotechnology Quality (H<sub>02</sub>)

- The calculated  $\chi^2$  value is **28.45**, with **df = 4**.
- The **p-value = 0.00005**, which is less than 0.005.
- **Decision:** Reject the null hypothesis.
- **Conclusion:** The relationship between consumer purchase intention and perceived quality of biotechnology is very strong. Products of high biotech credibility stand a higher chance of being bought by consumers.

## 12. Findings

The research shows that integrating digital health is an important factor that increases consumer confidence and preference in the healthcare products of Make in India. Consumers also identify the products that are characterized by biotechnology to a greater degree of quality, safety, and modernity. Purchase decisions are dominated by online healthcare platforms, which is a great indication of digital readiness among the respondents. Purchase intention with visible digital innovation is reinforced by brand image. The results affirm the success of policy-based domestic production when it is coordinated with consumer-facing digital environments.

## 13. Suggestions

The manufacturers of healthcare should introduce the digital health features of the product, apps

compatibility, and tele-support services. The policymakers are encouraged to facilitate the certification of biotech products based on the make in India model to create confidence in the consumers. Trust can also be enhanced through digital awareness campaigns that show indigenous innovation. Marketers involved in healthcare ought to concentrate on omnichannel approaches to reach digitally active consumers. The partnership between the digital health startups and local manufacturers can generate sustainable competitive advantages.

## 14. Scope for Further Research

The study can be expanded into other studies in the future where comparative studies between urban and rural districts or different states can be conducted. The longitudinal studies can analyse the shift in consumer preference with time as the digital health grows in adoption. More sophisticated statistical

methods, e.g. logistic regression or SEM, can be also applied by the researchers to have a deeper causal analysis. Industry-specific research on the pharmaceutical, medical, or wellness product could also be beneficial.

### 15. Conclusion

The research concludes that digital health and biotechnology is decisive in determining consumer preferences in the healthcare products in Thane District belonging to Make in India. Consumers are becoming more sensitive to the concept of digital integration, innovation, and perceived quality as opposed to conventional considerations only. The unacceptance of the two null hypotheses is a confirmation that the impact of technology-driven trust has a significant effect on purchase behaviour. This is necessary to enhance India to be self-sufficient in healthcare, through re-aligning domestic production with digital health ecosystems. The results support the strategic significance of the policy integration, technological development, and the consumer-focused strategies to maintain the growth in the healthcare industry.

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