

The Adoption of Facial Analysis Application Innovation for Post-Pandemic Beauty Product Marketing Communication

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Abstract— Entering the post-pandemic era encouraging major changes in the product marketing communication environment. One of the things that is starting to show progress is marketing communications for beauty or body care products. More specifically in beauty products and facial skin care. Especially with the change in community communication patterns during a pandemic, the use of various technologies is something that needs to be adjusted with service providers and beauty and facial care products. One of them is by using gadgets or cellphones as a medium for building relationships with customers as well as marketing communications for beauty and facial care products or services. At this time, applications on mobile phones have started to appear that can be used as a medium for marketing these products and services. The process of adopting the face analysis application innovation in the post-pandemic period is carried out in the social system, namely social media. Much information is obtained from social media to become the main foundation in the innovation adoption process. The adoption process of the face analysis application innovation starts from the knowledge stage, then persuasion and decisions, followed by the implementation stage with trials and confirmation by looking at the user experience and user interface of a face analysis application.

Keywords— *Post-Pandemic, Marketing communication, Facial analysis applications, Beauty products and treatments, Adoption of Innovation*

I. INTRODUCTION

The impact of technological developments is increasingly being felt whether we are aware of it or not. The era of the industrial revolution 4.0, which was launched in recent years, began by directing significant changes to the marketing environment for a product or service. Business is primarily one of the sectors of the economy that is directly affected. Many commodities are competing to keep up with technological developments in order to survive and develop in today's era. This is a two-sided knife for the progress of business in Indonesia. There are those who try to keep up with technological developments by looking for various

changes in their resources, but there are those who still rely on conventional methods assuming they can remain without change.

One of the things that is starting to show progress is marketing beauty or body care products. More specifically in beauty products and facial skin care. The development of beauty products and facial skin care is currently increasing along with the development of human behavior. Attention to facial skin care is not only dominated by women, also spread to men. The need for marketing beauty and facial skin care products is increasing. This makes the cosmetic industry one of the industries with the highest growth [8], which grew by 6.35% and increased to 7.36% in 2018. This is a common concern because it means that marketing methods that can be reached by the community need to be developed. users. Marketing communication is the main key in the continuity of this business.

Changes in consumer behavior underlie the need to develop a marketing communication strategy, especially in response to the implementation of the concept of society 5.0 which will take place. According to The American Marketing Association, Peter and Oslon explained that the definition of consumer behavior is the relationship between human psychological responses in life-exchange activities. Consumer behavior is a way for each individual or group to use or buy goods or services to please their personal desires [12].

It was recorded that there were 143.26 million people in 2017 from the total population of Indonesia of 262 million people. This shows that 54.68% of Indonesia's population has used the internet. The accessibility of digital media makes companies have to plan every content in digital media to attract the attention of potential customers. [8] The internet can make it easier for companies to adjust product offerings and create relationships with their consumers [5]. So, in the current era of modernization, it is hoped that it will begin to leave conventional methods and people will look for more practical ways using digital methods and the internet.

The use of various technologies is something that needs to be adjusted with service providers and beauty and facial care products. One of them is by using gadgets or cellphones as a medium for establishing relationships with customers as well as marketing beauty or care products or services. At this time, applications on mobile phones have started to appear that can be used as a marketing medium for these products and services. The mobile-based application is a communication channel. The communication channel is a system or means that can help an innovation spread in the social system [11]. In this case the social system can be in the form of interpersonal relationships via social media or other internet suggestions. Especially in the post-pandemic era, which makes social media more effective in creating knowledge about innovation. Also spreading it for adoption.

Research on mobile applications, especially regarding marketing communications for beauty products and facial skin care is important. More deeply related to the appearance of the facial analysis feature to see the user's health condition to fit the concept of society 5.0. More in-depth regarding the appearance of the facial analysis feature to see the user's facial health condition so that it can adjust to the conditions of the community's needs during and after the pandemic. people still need social distance, especially for the use of beauty services.

II. METHOD

The research was conducted using a qualitative comparative method by observing and observing the routine use of applications as a form of innovation adoption. The comparative approach is also carried out by using a comparison on 2 things, namely: (a) Mobile Application. The applications used are TroveSkin and YouCamMakeup. The basis for selecting this application is based on the results of recommendations from previous users who have written many reviews for using the application on the Play Store and App Store. (b) Mobile Phone Specifications. The basic specifications that are distinguished are the operating system (IOS and Android) and the camera specifications as the main hardware in using the face analysis feature. The selection of these two specifications aims to see the accuracy of the facial analysis features available on mobile applications that are compatible on both operating system platforms. Two types of mobile phones used are the Iphone II Pro with 12 MP front camera specifications, $f / 2.2$, 23mm (wide), SL 3D, (depth / biometrics sensor), and Oppo F7 with front camera specifications of 25 MP, $f / 2.0$, $1 / 2.8$ ", 0.9 μ m.

Comparisons in the comparative approach are carried out to show differences in the results of the analysis of facial conditions on the same subject in 2 different applications and 2 different handphone specifications. Mobile phone specifications such as camera features both hardware and software are most likely to affect the results of facial analysis. If there are differences in the results of facial analysis, it will be the biggest problem in the initial steps of digital marketing of beauty and facial care products. This is because the results of facial analysis on the mobile application are used as a basis for recommendations for beauty products and facial treatments that can be directly purchased from the application online.

After comparisons of 2 different facial analysis applications, interviews are related to the adoption of the face analysis application innovation. The research process refers to the Five Stages Model in the decision-innovation process [11], namely: (1) Knowledge: Adopters are aware of innovations and have knowledge regarding the function of these innovations. (2) Persuasion: Adopters determine the attitude of liking or disliking existing innovations. (3) Decision: The recipient takes steps that lead to the choice of rejecting or misleading the innovation. This step is a real activity. (4) Implementation: Adopters try and implement innovations, and (5) Confirmation: Taking pictures of the results of previously made innovation decisions.

III. RESULT AND DISCUSSION

The understanding related to the innovation adoption process in the Five Stages Model in the innovation-decision process is factual [11]. The description of these stages can be described as follows:

A. Knowledge

At the knowledge stage, adopters recognize facial analysis application innovations through social media advertising. social media as a social system that is intensely experienced by adopters. this is due to the post-pandemic period that occurred.

The development of technology has made society easier in accordance with what Bryndin has stated, Society 5.0 has become a breakthrough in digital technology that can change the circle of human life [1]. Businesses are expected to be able to contribute to new social decisions as a form of business to improve quality and life interests. IoT (Internet of Things) and IoE (Internet of Everything) are developed to have the ability to produce new fields of talent, knowledge, human abilities, and new job opportunities, so that arises (AI) Augmented reality Artificial Intelligence technology (AR).

In essence, life development is a top priority for Society 5.0. The success of this system can be achieved if all institutions, communities, governments, and education can work together to complete the tasks of economic and social development. Things that are actually sought from the use of this new concept for the creation of new values from the collaboration of several different systems, standardization planning, and empowerment of human resources needed. Japan itself hopes for the development of intellectual property, international standardization, IoT technology and artificial intelligence. The main goal is none other than as a form of Japanese business in producing a "super smart society" [3].

The application of Society 5.0 began to enter digital technology with the development of applications on mobile phones that can be used to facilitate the work of the user community. In the mobile application for the communication needs of the marketing of beauty products and facial skin care, the observed use of 1 feature is expected to help the user community to recognize the condition of facial skin with the facial analysis feature. The application can be explained as follows:

1) *TroveSkin*.

This mobile application claims to be a skincare app that uses cutting edge Artificial Intelligence technology to analyze and manage the skin. With the data from the skin analysis result, TroveSkin then makes the most suitable and personalized recommendations of beauty products. This application was introduced in 2017 by Trove Technologies PTE. LTD. was incorporated on 28 January 2017 (Saturday) as a Private Company Limited by Shares in Singapore. Based on data obtained from 2 different mobile operating system platforms, it can be seen that the use of the latest version of TroveSkin 3.54 on the IOS operating system is 4.8 from a scale of 5 obtained from 7.9 thousand users, while the latest version of TroveSkin 7.4.3 on the operating system Android only 4.5 on a scale of 5 obtained from 71 thousand users who gave rating ratings. This can happen because users on the Android operating system write more reviews.

TroveSkin on iOS is an application in the Health and Fitness category which ranks number 52 into the top 100 Top Chart Apps at an age rating of 4+. Apps in this category contain no objectionable material. Whereas TroveSkin, which has been downloaded more than 1 million users on Android, is rated 3+ which means it is suitable for all age groups. Some violence in comical or fantasy contexts is acceptable, but abusive language is not permitted.

2) *YouCam MakeUp*

AI detect cam skincare for analysis and tracking. This mobile apps also receive the latest makeup tips and tutorials from the beauty community for social sharing. The AR skin diagnostic tool utilizes deep learning technology to provide users with real-time skincare analysis through accurate detection of wrinkles, spots, skin texture and dark circles. Users can then track the efficacy of their skincare routine over time using the "Skin Diary" feature. This application was released on August 7, 2014 by Perfect Mobile Corp. which is located in Taipei city, Taiwan. Based on data obtained from 2 different mobile operating system platforms it can be seen that the rating of using YouCam MakeUp version 5.65.1 on the IOS operating system is 4.8 from a scale of 5 obtained from only 2.3 thousand users, while the latest version of YouCam MakeUp 5.65.1 on Android of 4.6 on a scale of 5 obtained from 3 million users who gave rating ratings. The number of users is what determines the rating of a mobile application.

There is a clear difference in the classification of the age category of application usage. On Android YouCamMakeUp is in the 3+ category which means it is suitable for all age groups. Some violence in comical or fantasy contexts is acceptable, but abusive language is not permitted. Not on iOS which is in the 9+ age category. Apps in this category may contain mild or infrequent occurrences of cartoon, fantasy or realistic violence and infrequent or mild mature, suggestive or horror-themed content which may not be suitable for children under the age of 9. This age category should be a guide for parents to be able to restrict children from using various applications on mobile phones.

B. *Persuasion and Decision*

At the persuasion stage, the adopter begins to give a liking by considering the benefits that will be obtained. The adopter explains that the innovation of facial analysis

applications can provide benefits for them in terms of determining facial skin conditions. In fact, adopters have high expectations for the innovation capabilities of the two face analysis applications. In addition to the benefits that are assumed to be obtained, the adopter also states that the face analysis application innovation is in accordance with current conditions. Post-pandemic conditions that are being felt by the community as a whole. With the appeal of maintaining distance and not leaving the house, this facial analysis application innovation is something that meets the needs of the community.

The stages of persuasion felt by the adopter to discuss the process of testing innovation. The adopter states that the main consideration in liking this innovative facial analysis application is that it can be easily tested. this does not burden the adopter because it only requires the mobile device they already have. from here the adopter began to also observe the use of face analysis applications used by other adopters.

C. *Implementation*

The user interface refers to the system's relationship and the interaction between two users based on commands given to operate the system, inputting data, and using information on the media. Line of media using the system in various User Interfaces such as mobile phones, computers, games, digital applications, and so on. According to Joo, User Interface is a form of ease of interaction of one person with a system in a computer or communication environment that is classified as a software or hardware interface [7].

The revolution of the User Interface itself begins with using the Character User Interface which then increases using graphics. And develop again with the addition of features into a Natural User Interface composed and sound, movement, and biological signals that can understand human intentions humanly. In addition, the User Interface also has a connection with the design, it is used as a link between visual functions. As stated by Sridevi, the focus area of this Interface Design lies in the design of the display between software, between software and consumer information, and the display between the user and his computer [12].

User experience is a person's strategy in designing a product that focuses on the perspective of the user of the product. In ISO 9241-210 explains that user experience is an opinion of the use of a product, system, or service [4]. A principle in building UX is that the public has the power to determine their own level of satisfaction (customer rule). User Experience in question is a user's personal experience related to ease, efficiency, and benefit when using applications on smartphones.

Based on the User Experience experienced by the informants, the following data were obtained:

TABLE I. TROVESKIN FACIAL ANALYSIS

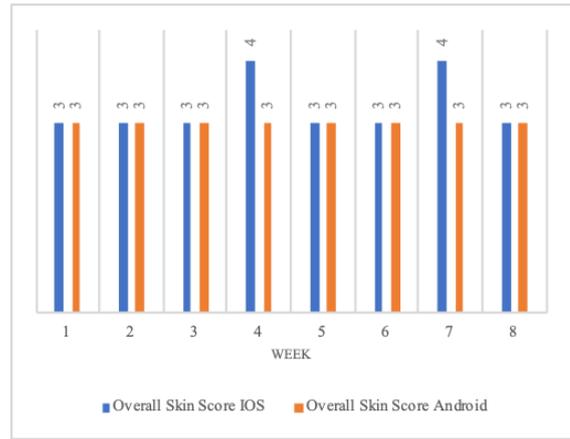
Week	Spot		Pores		Texture		Wrinkles	
	IOS	Android	IOS	Android	IOS	Android	IOS	Android
1	3	3	2	3	2	2	4	4
2	2	3	2	3	2	2	3	2
3	2	3	3	2	4	3	2	2
4	2	2	2	3	3	3	4	3
5	3	2	4	3	3	2	2	2
6	3	2	3	4	4	3	2	3
7	2	3	3	2	2	3	4	3
8	2	2	2	3	4	4	2	3

^a Note: 1. Poor, 2. Good, 3. Very Good, 4 Excellent

In table 1. The comparison results are obtained between the use of the Facial Analysis feature on the TroveSkin mobile application based on the IOS and Android operating systems. The data explains that there are 4 categories of facial skin analysis in detail. First, Spot is a point on the skin that has a darker color. Generally, spots will appear on the area around the cheeks and nose, and have a small size. Spot can be caused by exposure to sunlight (sun spot) as well as laser treatment scars, squeezed acne scars, scars, and even genetic

(dark spots). However, the TroveSkin application does not explain the possible causes of the spots. Second, Pores are small holes in the skin that release oil and sweat. Pores are divided into two, namely protruding pores on the T part of your face and sweat pores are very small. Third, Texture on the face basically explains the condition of facial skin that is ideally smooth not rough because of various things such as acne scars and others. Fourth, wrinkles usually occur on the parts of the body that are exposed to the most sun exposure, including the face, neck, back, hands and upper arms. Wrinkles don't only come when you're old. Premature aging or wrinkles can afflict young people.

Broadly speaking, the score between the use of the Facial Analysis feature on the TroveSkin mobile application based on the IOS and Android operating systems is not much different. Different results obtained will certainly cause less accuracy of the facial analysis features provided by the application. Especially if later application users will use the products recommended by the TroveSkin IOS application and those recommended by the TroveSkin Android application may be different. The marketing communication of beauty products and facial skin care that should be reliable can be less than expected.



Note: 1. Poor, 2. Good, 3. Very Good, 4 Excellent

Fig. 1. TroveSkin Overall Skin Score

In the graph above it is explained that there is no significant difference between the results of the overall face analysis score using the IOS or Android mobile operating system. It's just that, in the 4th and 7th week different results were obtained. Excellent results obtained on IOS while on Android obtained Very Good results. This can be a big possibility because of the differences in the specifications of the front camera that is quite pronounced. However, the informants were quite doubtful about the score because under the same conditions and measured together the ability of a more capable front camera specifications gave the results expected by the user (informant) because of the more detailed results of the photos obtained. This needs to be confirmed by those who really understand the condition of the informant's facial skin so that the results of the facial analysis measurements are closer to accurate.

TABLE II. YOUCAM MAKEUP FACIAL ANALYSIS

Week	Spot		Wrinkles		Texture		Dark Circles	
	IOS	Android	IOS	Android	IOS	Android	IOS	Android
1	85	86	96	84	77	76	88	84
2	85	80	85	80	70	70	81	81
3	80	80	92	80	75	62	87	80
4	84	81	87	80	68	68	82	89
5	81	80	89	87	67	67	83	90
6	82	80	88	86	74	65	82	81
7	82	82	88	85	68	68	82	83
8	84	82	89	89	76	68	80	82

^b Note: The higher score in each of the four categories mean the healthier skin

In the YouCam MakeUp mobile application basically also gives results that are almost the same as looking at 4 indicators of the condition of facial skin through the face analysis feature. The difference is that YouCam MakeUp no longer sees the condition of the face from the pores that appear, but the presence or absence of dark circles at the bottom of the eye. Dark circles occur due to genetic factors and skin color, although they can also occur due to and lack

of rest time. Dark circles that tend to be purplish or bluish due to the lack of skin thickness so that the blood vessels look more clearly. This condition is more common in pale skin, skin that lacks subcutaneous fat in the eye area.

The score results from the four categories are not much different between YouCam MakeUp with the IOS and Android operating systems. However, the scores obtained in each category indicate that the YouCam MakeUp IOS mobile application shows the results of facial analysis that have a higher score than YouCam MakeUp on Android.

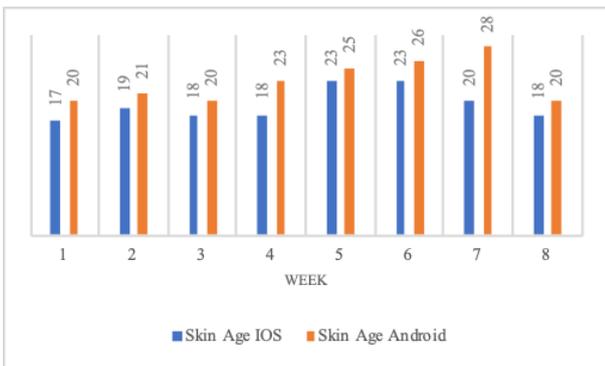


Fig. 2. YouCam MakeUp Skin Age Score

In the Skin Age chart obtained from YouCam MakeUp facial analysis the results show that the age of facial skin produced on IOS shows a younger age. This means healthier skin because there aren't many wrinkles on the face yet. This is interesting because the respondent's actual age is 28 years. Unlike the YouCam MakeUp application on android which shows the age of facial skin is almost the same as the respondent's original age. This could have happened because of the different quality of the camera.

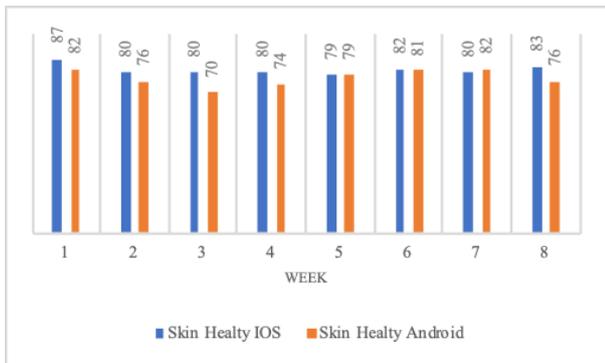


Fig. 3. YouCam MakeUp Skin Healthy Score

Seen in the healthy skin chart above, it supports the skin age data obtained that the younger the skin age, the better the health of facial skin. Evidenced by the healthy skin score produced by YouCam MakeUp's facial analysis feature on IOS is better than the score on Android.

The numbers or "scores" receive represent the skin's health compared with YouCam MakeUp's database of other people's faces. The higher score in each of the four categories mean the healthier skin. For the best results, the app suggests taking daily selfies in the same location and with the same lighting to track the skin. Seen in the healthy skin chart above, it supports the skin age data obtained that the younger

the skin age, the better the health of facial skin. Evidenced by the healthy skin score produced by YouCam MakeUp's facial analysis feature on IOS is better than the score on Android.

1) Confirmation

Furthermore, the discussion can be seen on the user interface which is a driving tool. This tool must be considered aesthetics and animation that can provide usability values of a mobile application. In producing a good User Interface, there are several things that must be considered, among others:

- Clear navigation is required. The choice of facilities must be easily found. A good user interface usually does not have too many unnecessary components and has a structural collapse. In this case TroveSkin has a user interface that is simpler and easier to access than YouCam Make Up both IOS and Android based.
- Defining the right target audience needs research and market evaluation in order to find out the actual obstacles that occur to the community and their interaction patterns with applications. With this, the level of application user involvement is increasingly high because the User Interface is tailored to the needs and desires of the community. YouCam MakeUp is more popular among the public as evidenced by the higher number of users than TroveSkin users. Similarly, users on Android are higher than IOS.
- Be consistent. This includes in terms of aesthetics such as colors, fonts, icons, and placement of application facility buttons. As much as possible stay away from drastic changes to stay away from users who feel unfamiliar. So far there are no major changes to the TroveSkin or YouCam MakeUp applications.
- Transparency of use. Providing feedback in every action taken by the user is very important. Displaying small animations or changing colors can indicate the operation of the application. TroveSkin is an application that makes it easier to notify the application operation.
- Use familiar UI components. The purpose of using components that are familiar so that users when opening applications do not need to be confused with the steps that must be taken next. Like the use of three straight lines that many people know as a 'menu' sign. Attractive display. A good UI can show the personality or criteria of the application. The choice of buttons, colors, writing style, can provide unique characteristics for the usability of the feature so that users can remember it easily. Design tailored to users. Make sure the features provided are as useful as possible for users. Calculate the errors that can occur to users and their solutions. Like when a user accidentally presses the wrong button and the application provides a 'restore' feature. The symbols used by the two applications are the same and not complicated.
- Structural application that is neat and clear. The design of the UI must be able to easily show the focal

point and in conveying the visual means of the application to its users. In this case TroveSkin is better, as a note on the free trial version of YouCam MakeUp there are still many advertisements that interfere with the application structure.

- Added features. Added features that can help ease the operation of the application. TroveSkin needs to add information on each category analyzed, making it easier for users to describe the results of their face analysis. Similarly, YouCam MakeUP still needs to be added to the information score of the analysis results that are quite numerous and varied, so that users are more able to interpret the results of facial analysis obtained.
- Use gestures as needed. This is done to avoid user errors and the ease of operation. Because, it will be confusing if one feature needs to be tapped then another feature must be done in another way. In the TroveSkin and YouCam MakeUp Applications the face analysis feature is quite easy to use. Its use is enough to expose the cellphone camera to the face to exactly follow the pattern set in the mobile application. Furthermore, the camera hardware on the handphone will do face detection or face analysis in realtime and quickly. The results can be seen immediately.

User satisfaction and comfort of a product, system, or service are things that can assess User Experience. According to Creative Business Jakarta there are 4 main strategies in shaping User Experience, namely [6]: (a) Define the value that can be given to users and explore whether the product can achieve business goals. (b) Specification of the objectives, identify every opportunity that can improve the product, and explore each phase of user interaction with the product to identify whether the product components are appropriate. (c) Plan product development and continuous improvement. (d) Define product success and the methods used to validate the success of a product.

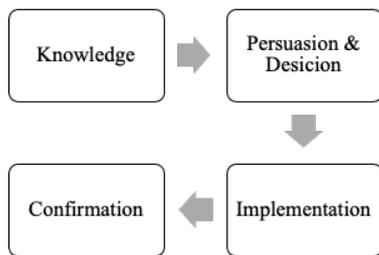


Fig. 4. Adoption of Innovation Facial Analysis Apps Process

IV. CONCLUSION

The presence of mobile applications that support the face analysis feature can answer the world's challenges of the need for quick and easy. Especially when people have started to think about personal health starting with facial skin health. But the user interface and user experience factors should not be ignored. Mobile phone specifications such as camera features both hardware and software are most likely to affect the results of facial analysis. The difference in the results of

facial analysis as a first step in digital marketing of beauty products and facial treatments is the biggest problem. This is because, the results of facial analysis on the mobile application are used as a basis for recommendations for beauty products and facial treatments that can be directly purchased from the application online.

In the process of adopting the face analysis application innovation, it begins with the knowledge stage, where the adopter gets information and understanding of the innovation from the existing social system, namely social media. social media is a social system for post-pandemic societies. The next stage is persuasion where the adopter considers the reasons for benefits, suitability and can be tested. so that this persuasion stage directly leads to the decision stage where the adopter decides to adopt the face analysis application innovation. In the next stage, adopter implementation tries to compare the two face analysis applications by themselves to be able to provide reinforcement in the decision process. The stage ends with the Confirmation stage where the adopter provides an evaluation of the face analysis application innovation by considering the user experience (UX) and the user interface (UI)

ACKNOWLEDGMENT

The authors thank those who have helped in the research planning process, data retrieval in advance for the willingness of informants to use the mobile facial analysis application. Special for TroveSkin and YouCam MakeUp as mobile applications tested in this study.

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