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It is aimed at academic researchers, whether consolidated or in training, who wish to disseminate the results of their research through scientific publication. It aims to provide a service to the international scientific community by fostering a space for exchange where academic scientific production derived from research applied to social communication can be shared, promoted and disseminated.

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Digital Touchpoints Effectiveness and its Impact on Consumer Brand Engagement in Biotechnology Start-Up

Efectividad de los puntos de contacto digitales y su impacto en la participación de la marca del consumidor en la puesta en marcha de biotecnología de Lemonilo

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Abstract

Start-ups are currently in the spotlight in all countries, especially in developed countries, where they are seen as a critical driver of economic growth and a source of long-term jobs. In addition, consumers are increasingly interested in using digital touchpoints to fulfil their daily needs. Marketers of biotechnology start-ups realize that in this competitive era of commercial initiatives, it is difficult to find the point of engagement between consumer and brand to be more pleasant and smooth. This study aims to understand the effectiveness of digital touchpoints in influencing consumer brand engagement at biotechnology start-up. The methodology used factor analysis and regression analysis from an online survey. The respondents were selected by giving questionnaires to consumers who had bought one or more products from biotechnology start-up. The main finding showed digital touchpoints affected consumer brand engagement at biotechnology start-up (0.000, $p < 0.01$). However, the results with moderator variable of hedonic value (0.4235) and utilitarian value (0.5147) does not moderated digital touchpoints effectiveness on consumer brand engagement ($p > 0.05$). This study

provide a new perspective on measurement items of digital touchpoints effectiveness and provides information for marketers to pay attention to important aspects for increase the engagement of several digital touchpoints.

Keywords

Digital Touchpoints, Consumer Brand Engagement, Start-up, Biotechnology Start-up.

Resumen

Actualmente, las empresas emergentes están en el centro de atención en todos los países, especialmente en los países desarrollados, donde se las considera un motor fundamental del crecimiento económico y una fuente de empleo a largo plazo. Además, los consumidores están cada vez más interesados en utilizar puntos de contacto digitales para satisfacer sus necesidades diarias. Los especialistas en marketing de empresas emergentes de biotecnología se dan cuenta de que, en esta era competitiva de iniciativas comerciales, es difícil encontrar el punto de interacción entre el consumidor y la marca para que sea más agradable y fluido. Este estudio tiene como objetivo comprender la eficacia de los puntos de contacto digitales para influir en el compromiso de la marca del consumidor en la puesta en marcha de biotecnología. Se realizaron el análisis factorial y el análisis de regresión de una encuesta en línea. Los encuestados fueron seleccionados entregando cuestionarios a los consumidores que habían comprado uno o más productos de la nueva empresa de biotecnología Lemonilo. Los resultados mostraron que la efectividad del punto de contacto digital afectó el compromiso de la marca del consumidor. Sin embargo, el valor hedónico y el valor utilitario no afectaron al compromiso de marca del consumidor. Los resultados de esta investigación brindan una nueva perspectiva sobre los elementos de medición de la efectividad de los puntos de contacto digitales y su impacto en el compromiso de la marca del consumidor. Este estudio proporciona información para que los especialistas en marketing presten atención a aspectos importantes para aumentar la participación de varios puntos de contacto digitales.

Palabras clave

Puntos de contacto digitales; compromise; marca; start-up, biotecnología.

1. Introduction

Start-ups seen as a critical driver of economic growth and a source of long-term jobs especially in developed countries (Adler et al., 2019). Start-ups as one of the engines of global economic development, emerging from the global financial crisis more quickly than big corporations and established market economies. In addition, consumers are becoming more interested in manipulating digital touchpoints to fulfil their everyday needs as technology advances. As a result of the influx of new communication service providers into the market, the industry has become more competitive. This situation is becoming more challenging to navigate. However, this competitive environment allows businesses to be interested in using digital media to distribute their goods. This situation demonstrates the importance of digital channels in improving consumer-company relationships. (Ansari and Riasi, 2016; Ieva and Ziliani, 2018).

The experience a company gives to its consumers during a business partnership distinguishes one company from another. Regardless of the service or price provided by the company, an outstanding and exclusive consumer experience can engage consumers. As a result, businesses must enhance consumer experience, putting consumers at the forefront of their service improvement strategy. (Tafesse, 2016; Zhang et al., 2017; Thakur, 2019).

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One of the strategies for increasing the engagement of consumers is using digital touchpoints. Baldwin and von Hippel (2011) identify the era of digitalization as a paradigm shift for using digital platforms that can increase user engagement. The word "touchpoints" refers to consumer interactions with specific products that affect consumer experience and brand assessment in general (Baxendale et al., 2015; Clatworthy, 2011). When it comes to delivering cohesive consumer interactions, understanding digital touchpoints and their engagement are crucial (Hosseini et al., 2018; Li and Kannan, 2014). However, further research related to digital touchpoints on consumer brand engagement is rarely studied. Therefore, this study was conducted to see whether digital touchpoints affect consumer brand engagement.

Commercial initiatives to market biotechnology products need to be addressed for industrial start-ups that offer biotechnology products (Gilding et al., 2020). Consumers need to know everything there is to know about the commodity. They will seek out feedback on different platforms to persuade them to purchase the product. To gain consumers' interest in the goods they sell, start-ups must invest more. Only after the consumer becomes loyal and the business becomes more cost-effective is the partnership between the company and their new consumer profitable. One of the first important aspects of achieving consumer loyalty is engaging with the consumer. In addition to the advantages of marketing technologies for involving customers in mindful decisions, this engagement and better access to digital information are critical aspects for increasing quality and lowering costs (Chérrez-Ojeda et al., 2018; Sweeney et al., 2015). Consumer engagement by start-ups at initial touchpoints is becoming an increasingly important role. Initial touchpoints, especially for start-ups, might provide a competitive advantage online (Konya-Baumbach, 2019).

Research related to digital touchpoints in start-ups is still lacking, especially in developing countries. With the rise of digital platforms as marketing tools, the touchpoints has become increasingly important (Lemon and Verhoef, 2016). However, research related to digital touchpoints at start-ups is still rare. No study has yet focused on solutions for biotech start-ups. Commercial initiatives to market biotechnology products need to be addressed for industrial start-ups that offer biotechnology products (Gilding et al., 2020). In developing countries, developers of biotechnology products and services are also aware of how difficult it is for many consumers to locate their engagement and make those engagement more pleasant and smooth (Buckley and Webster, 2016). Mass advertising at multiple touchpoints plays a role in the initial phase of creating consumer awareness and engagement, then continues with the direct target search phase to sales conversions (Leeflang et al., 2014).

In addition, based on a literature review by Payne et al. (2017), research needs to suggest that the similarities and differences in hedonic value and utilitarian value for the touchpoints need to be investigated. The interactions built by brands through digital touchpoints tailored to hedonic and utilitarian purchasing needs and decision-making processes based (Kushwaha and Shankar, 2013).

Therefore, this research is needed to find out the best way to provide information about consumer brand engagement to marketers through biotechnology start-up at digital touchpoints. The research questions are as follows:

- Q1 Does digital touchpoints affect consumer brand engagement at biotechnology start-up?
- Q2 Does hedonic value moderating digital touchpoints to consumer brand engagement at biotechnology start-up?
- Q3 Does utilitarian value moderating digital touchpoints to consumer brand engagement at biotechnology start-up?

2. Theoretical Background

2.1. Biotechnology Start-Up

Biotechnology startups have enormous growth potential and will continue to play an essential role as innovative manufacturing hubs. This sector is one of the most critical sectors in increasing the global profile, especially in developing countries and contributing to economic growth (Ghagane et al., 2017). Biotechnology, which is globally recognized as a fast-growing and far-reaching technology, is aptly described as a 'technology of hope' because it promises health, food, and environmental sustainability (Lee and Bozeman, 2005). Recent and continuing advances in life science as an energy-based product and driven by new tools of biotechnology. There are many therapies, biotech drugs, and vaccines currently on the market, accounting for US \$ 40 billion and benefiting more than one hundred million people worldwide. In addition, many agricultural and industrial biotechnology products are beneficial for the community (Naik, 2015).

Biotechnology startups belong to the high-tech industry group. The industry is characterized by a broad (usually global) ecosystem. Many companies are innovating, often simultaneously at the rate of product ups and downs. So that profits made as soon as a product is launched. Therefore, information from real-time commercial and analytical data is very important. The high-tech industry relies on in-depth knowledge of how its consumers use its products and depends on its consumers for new product ideas (Kolding et al., 2018). Commercial initiatives to market biotechnology products need to be addressed for industrial start-ups that offer biotechnology products (Gilding et al., 2020). In addition, consumers need accurate information regarding products made by biotech startup companies.

The solutions to increase engagement through wide information dissemination is by analyze data across touchpoints for online sales and profits (de Haan et al., 2013). Mass advertising at several touchpoints has a role in the initial phase of creating consumer awareness and engagement, then continues with the search phase for immediate goals to sales conversions. Observations are needed to increase consumer interest in digital touchpoints based on data availability (Leeflang et al., 2014). Therefore, this research is necessary to determine the best way to provide information about consumer brand engagement to marketers through biotechnology start-up at digital touchpoints, as already noted by the authors Jiménez-Marín, Sanz-Marcos and Tobar-Pesantez (2021).

2.2. Digital Touchpoints

Touchpoints recognized as constituent elements of the consumer journey are used as additional search strings (Clatworthy, 2011). Touchpoint is an interaction directly or indirectly with a brand or company (Baxendale et al., 2015; Verhoef et al., 2015) that can be initiated by individuals, e.g., via search engines, websites, email, or social media. Digital touchpoints as a functional touchpoint, social touchpoint, or community touchpoints. Functional touchpoints include websites, emails, and search engines. A touchpoint is direct or indirect contact with a brand or business that individuals can initiate, such as search engines, blogs, email, or social media (Baxendale et al., 2015; Verhoef et al., 2015). Digital touchpoints may be used as functional, social, or group touchpoints. Websites, emails, and search engines are examples of functional touchpoints. Social touchpoints include networking sites (for example, Facebook), photo content communities (for example, Instagram), and video content communities (for example, YouTube). Discussion forums and blogs are also examples of group

touchpoints (Straker et al., 2015; Hallikainen et al., 2019). Community touchpoints did not include this study because not all biotechnology start-ups that were the object of this study had communities.

Digital platforms provide digital touchpoints for consumers and businesses to communicate and connect (Tueanrat et al., 2021). Touchpoints and platforms that have arisen in this digital era have provided consumers with more value while complicating channel management for businesses (van der Veen and van Ossenbruggen, 2015). As a result, knowing how to build holistic consumer interactions requires a comprehensive understanding of emerging communication channels (Hosseini et al., 2018; Li and Kannan, 2014).

Consumers and brands must convey consistent principles and messages from the beginning to the end of the service delivery process to facilitate the creation of brand relationships through multiple touchpoints (Vredevelde and Coulter, 2019). Consumers use various evaluation tools to process the multiple pieces of knowledge they come across (Santana et al., 2020). To avoid uncertainty and the risk losing consumers, brands must also provide detailed, concise, and reliable information (De Vries et al., 2019).

Depending on the difference between touchpoints results and consumer expectations, each point of contact will lead to a positive or negative brand assessment by the consumer (Flstad and Kvale, 2018). As a result, businesses must monitor and quantify their experiences with consumers at any touchpoint (Aichner and Gruber, 2017). Consumer preferences and responses can enhance the consistency of experiences and reinforce consumer relationships, resulting in higher consumer satisfaction (McKechnie et al., 2011). Therefore, digital touchpoints can be a bridge to increase the company's competitive advantage (Halvorsrud et al., 2016). This study examines the effectiveness of digital touchpoints.

2.3. Consumer Brand Engagement

Consumer engagement is a psychological condition that emerges as a result of engaging and creative consumer encounters with the agent/focus object (for example, a brand) in a service-focused relationship, according to Brodie et al. (2013). In the nomological networks that govern service connections, consumer interaction is crucial. It's a multifaceted term that's influenced by the context and/or stakeholder expressions of the appropriate cognitive, emotional, and behavioral components. Consumers are the 'subject of engagement' focus (e.g., relevant to some social media), according to Hollebeek et al. (2014), while certain 'objects of engagement' (i.e., brands) are made explicit in the name of the concept. So, consumer brand engagement is a consumer's positively valenced cognitive, emotional and behavioral brand-related activity related to specific consumer/brand interactions. Consumer brand engagement represents a composite concept consisting of the constituent concept of 'brands.'

Consumer brand engagement is multidimensional. First, 'cognitive processing' is defined as the level of brand-related thought processing and consumer elaboration in a particular consumer/brand interaction (i.e., the cognitive CBE dimension). Second, compassion refers to the brand's degree of brand positive influence in a particular consumer/brand interaction (i.e., the emotional CBE dimension). Third, activation is defined as a consumer's energy level, effort, and time spent on a brand in a particular consumer/brand interaction (i.e., the CBE dimension of behavior) (Hollebeek et al., 2014).

Consumer brand engagement is not only company-centered but consumer-centered in the digital platform environment. As a psychological condition, consumer brand engagement leads to transactional motives in making purchases and repeated encounters with brands. Individual levels of motivation such as consumer

brand engagement are linked to the brand and context-dependent states of mind characterized by cognitive, emotional, and behavioral levels unique to brand interaction activities. Consumer brand engagement increases consumer loyalty by encouraging consumers to create relationships with other consumers, businesses, and specific brands. Strong internal dispositions demand repeat transactions (loyalty behavior) over time, and consumer interaction is thought to be a possible antecedent. Consumer brand engagement can be characterized as a framework for collective innovation (Afifah et al., 2020; Thakur, 2019).

With the advancement of the digitalization period, the idea of consumer brand engagement is expanding. The interactive digital nature of the platform will facilitate two-way communication between the business and its consumers. Companies may use digital touchpoints to not only send out tweets but also to get direct feedback. Consumers would be more loyal to the brands operated if consumer loyalty is high (Afifah et al., 2020; Mahandy and Sanawiri, 2018; Mahayani et al., 2019; Martini and Maulana, 2019; Sugianto, 2020; Tafesse, 2016).

Companies that handle the overall consumer journey do what is suitable for individual consumers and aim to understand why consumers call, answer consumer issues, and offer input regularly to maximize interaction. Companies that can masterfully handle the entire consumer experience can reap significant rewards, including improved consumer retention, lower consumer turnover, higher sales, happier employees, and stronger consumer loyalty (Yanuardi et al., 2016). However, research related to consumer brand engagement still needs to be explored according to different engagement objects. This study takes the research gap to examine consumer brand engagement in biotechnology start-ups.

2.4. Hedonic Value

Value is described as a trade-off between the overall benefits obtained and the sacrifices made by the consumer (Olaru et al., 2008). Hedonic value has a more subjective structure than utilitarian value. Consumers who are motivated by hedonic values enjoy the experience without making a purchase, but rather the purchase results from that experience. Hedonic values can include a desire for entertainment and escape. Hedonic value also positively affects consumer brand engagement to advertising on social networks (To et al., 2007).

In addition, based on a literature review by Payne et al. (2017), research needs to show that the similarities and differences in products/services and hedonic purchases for points of contact need to be investigated. Are the interactions built by brands through digital touchpoints tailored to the needs of hedonic purchasing and decision-making processes (Kushwaha and Shankar, 2013). Therefore, this study was conducted to see whether hedonic value moderate digital touchpoints and consumer brand engagement at biotechnology start-up.

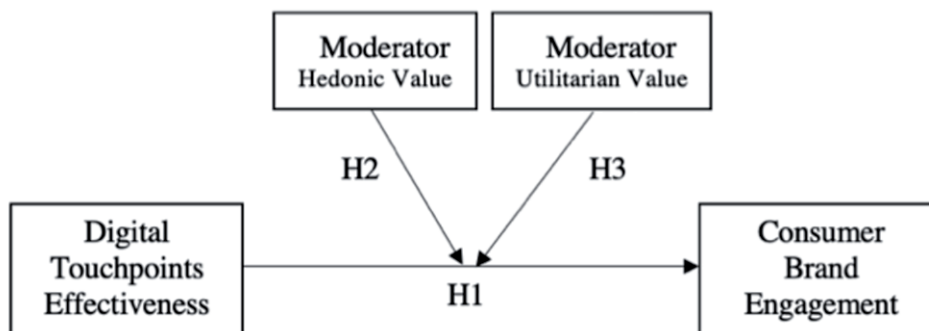
2.5. Utilitarian Value

The utilitarian is the value that comes from the desire for efficient, rational, task-oriented endeavors relevant to the purchase of a product. For example, consumers motivated by utilitarian values online can seek convenience in saving time or easy access to information (Kwon and Jain, 2009). Utilitarian value is a general evaluation of functional utility and trade-offs that take product features, services, and prices (Overby and Lee, 2006; Ozturk et al., 2016).

In addition, based on a literature review by Payne et al. (2017), research needs to show that the similarities and differences in products/services and utilitarian purchases for points of contact need to be investigated. Are the interactions built by brands through digital touchpoints tailored to the needs of utilitarian purchasing and decision-making processes (Kushwaha and Shankar, 2013). Therefore, this study was conducted to see whether utilitarian value moderate digital touchpoints and consumer brand engagement at biotechnology start-up.

Operational variables in this study are the independent variable is digital touchpoints, the moderators are hedonic value and utilitarian value, and the dependent variables are consumer brand engagement which is depicted in Figure 1 as follows.

Figure 1. Theoretical Framework



Source: Author (2022)

As the times evolve, many companies are using a variety of evolving touchpoints to improve engagement measurement (King et al., 2014; Straker et al., 2015). The use of effective channels for consumer brand engagement based on the results of research by Kushwaha and Shankar (2013) shows that consumers who prefer used touchpoints can become more involved in the buying process when they shop on various channels, such as online stores or social media that provide purchase features.

Based on research by Lee and Kim (2018), both hedonic value and utilitarian value had a direct impact on the satisfaction of high and low engagement consumers. The results also show that the level of engagement moderates the relationship between hedonic value and consumer satisfaction. The findings of Kushwaha and Shankar (2013) reveal that hedonic value and utilitarian value can be one way to increase engagement with consumers.

The literature review results show that all constructs have a confirmed relationship, but this needs to be proven in the context of digital touchpoints in biotechnology start-up. The hypothesis that is formed is as attached above.

3. Methods

The method used to identify digital touchpoints that affect consumer brand engagement and consumer loyalty intentions uses two data analyses: factor analysis and regression. Factor analysis is divided into two stages: 1) Developing a questionnaire and 2) Collecting sample data. Exploratory factor analysis (EFA) was used to validate and identify the underlying relationships between measured variables, followed by confirmatory factor analysis (CFA) to test how well the measured variables represent the number of constructs. Then a

regression analysis is carried out for the estimation of relationships between digital touchpoints and consumer brand engagement. In addition, it is also done whether the hedonic value and utilitarian value moderate the effectiveness of digital touchpoints and consumer brand engagement. Exploratory factor analysis, confirmatory factor analysis, and regression are seen as the best methods for this study.

3.1. Development of Questionnaires

The independent variable used is the effectiveness of digital touchpoints. Developing measurement items from Dahl et al. (2018), the author used six touchpoints: online video, email, website, Facebook, Instagram, and online store. Digital touchpoints were created in response to the marketing platforms used by biotechnology start-up. Consumer brand engagement is the dependent variable used. Consumer brand engagement, which involves cognition, affection, and activation, is widely agreed upon by respondents (Hollebeek et al., 2014). The mediator variable used is the hedonic value and utilitarian value based on Jahn and Kunz with seven measurement items (2012).

3.2. Data

The survey was conducted in a cross-sectional to collect data through an online questionnaire. Respondents were selected by simple random sampling, namely by giving questionnaires to consumers who had bought one or more products from Indonesia's biotechnology start-up. The questionnaire consisted of 10 questions representing each variable, using a Likert scale for answers ranging from 1-7, with one very strongly disagree and seven very strongly agree. The samples of 80 respondents were collected from the survey for the pilot test. Then proceed to take 141 respondents for the final stage of data analysis. Survey data were arranged systematically, tabulated, and analysed using the IBM SPSS Version 25.0.

4. Results

Table 4.1 below represents the profile of the respondents. Based on the table, most of the respondents came from West Java. It can also be perceived from the profile of respondents, most respondents know about biotechnology start-up. After identifying the profile of the respondents, a Cronbach alpha test was performed to analyse the reliability of 10 attributes measuring digital touchpoint effectiveness, consumer brand engagement, and moderator variable. The result with that attributes are reliable. The attributes with moderator of hedonic value have alpha score are 0.895 and utilitarian value have alpha score are 0.863. This alpha surpassed the minimum standard for an alpha, 0.7 (Tavakol and Dennick, 2010).

An exploratory factor analysis (EFA) from pilot test was used to validate and identify the underlying relationships between measured variables on digital touchpoints attributes (Appendix A and B). The Kaiser-Meyer-Olkin (KMO) is a measurement test of sampling adequacy. Bartlett's test of sphericity was used in this research because to assess the appropriateness of the factor analysis. The Kaiser-Meyer-Olkin (KMO) test is a measure of sampling adequacy that compares the squared correlation between variables to the squared partial correlation between variables. The Kaiser-Meyer-Olkin (KMO) statistic results with moderator variable of hedonic value

are 0.803 and with utilitarian value are 0.784, which is considered great according to Field (2013). According to previous research, the KMO value should be higher than the appropriate threshold of 0.50. (Field, 2013).

Tabla 1. Sample Profile (N=141)

Profile Respondents	Total (N)
Gender	
Male	48
Female	93
Age	
18 - 25 years old	91
26 - 33 years old	12
34 - 41 years old	9
42 - 50 years old	14
> 50 years old	15
Domicile	
West Java	78
Central Java	18
East Java	2
Jabodetabek	28
Bali	3
Kalimantan	3
Bangka Belitung	3
Riau	1
South Sumatra	1
Central Sumatra	1
North Sumatra	3
Education	
Senior High School	17
D1/D2/D3	4
D4/S1	98
S2	20
S3	2
Occupation	
Student	63
Housewife	3
Health worker	1
Entrepreneur	14
Jobseeker	3
Private/ BUMN employee	36
Government employee	19
Freelance	2
Income / month	
< Rp1.000.000	36
Rp1.000.001 - Rp4.000.000	48

Profile Respondents	Total (N)
Rp4.000.001 - Rp7.000.000	24
Rp7.000.001- Rp10.000.000	14
> Rp10.000.001	19

Source: Own elaboration (2022)

Another statistical measure, Bartlett's test of sphericity, highlights associations between the variables (Chan et al., 2010). It is used to determine whether or not the initial correlation matrix is an identity matrix. This test indicates no relationship between the variables, indicating that factor analysis is not acceptable. In contrast, if the test's importance is significant, the corresponding significance level is insignificant. Factor analysis is sufficient since the population correlation matrix is not an identity matrix. The Bartlett test results of this study are 0.000, which is these data do not yield an identity matrix. The results of the KMO test and Bartlett test of sphericity are excellent, so the data collected is appropriate for further analysis using CFA (Pallant, 2013).

The number of factors is extracted based on eigenvalues greater than 1.0, rotated by varimax. Cut-off for factor loadings is set to 0.40. It is perceived as a Cut-off for factor loadings. It is set to 0.40 as it is perceived to focus on the discrepancy between the primary and secondary factor loadings and retain items whose primary-secondary difference is sufficiently significant (Matsunaga, 2010).

Ten measurement items reduced resulted in three-factor groupings and explained 76% of the variance both with moderator of hedonic value and utilitarian value. Factor loadings with moderator of hedonic value ranged from 0.625 to 0.878 and utilitarian value ranged from 0.622 to 0.916, which means the correlations between the items and the factor groupings are good. Communalities of the variables with moderator of hedonic value ranged from 0.523 to 0.887 and utilitarian value ranged from 0.506 to 0.849, which means an item moderately fit well with another thing in its component.

Followed by confirmatory factor analysis (CFA) from 141 respondents to test how well the measured variables represent the number of constructs (Appendix C and D). The Kaiser-Meyer-Olkin (KMO) statistic results with moderator variable of hedonic value are 0.840 and utilitarian value are 0.784, which is considered great according to Field (2013). Ten measurement items reduced resulted in three-factor groupings and explained 81% of the variance with hedonic value and 76% of the variance with utilitarian value. Factor loadings with moderator of hedonic value ranged from 0.745 to 0.884 and utilitarian value ranged from 0.622 to 0.916, which means the correlations between the items and the factor groupings are good. Communalities of the variables with moderator of hedonic value ranged from 0.660 to 0.898 and utilitarian value ranged from 0.655 to 0.882, which means an item moderately fit well with another thing in its component.

The next data analysis performed was linear regression from digital touchpoint effectiveness to consumer brand engagement. The results showed a p-value of 0.000**. P-value < 0.01, which means that digital touchpoints effectiveness affected consumer brand engagement at biotechnology start-up. Next, the moderation test of hedonic value and utilitarian value using PROCESS v 3.5 Model 1 by Hayes. The results with moderator variable of hedonic value showed a p-value of 0.4235 and utilitarian value showed a p-value of 0.5147. P-value > 0.05 means hedonic value and utilitarian value does not moderated digital touchpoints effectiveness on consumer brand engagement at biotechnology start-up.

The result of analysis data can be seen in Figure 2.

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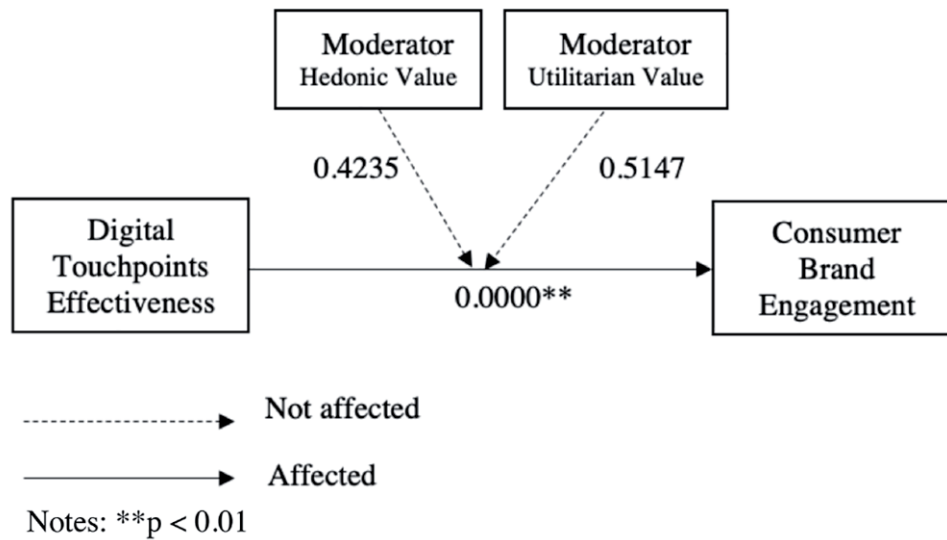
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Figure 2. Result of Theoretical Framework



Source: Author (2022)

5. Discussion

Based on factor analysis that we conducted, the results obtained from this study are the way of grouping attributes into clearly visible factors. Variables related to digital touchpoints such as website, email, and Facebook are in the same factor. Likewise, with variables that enter into hedonic value and utilitarian value, more statements about the value customers get after interacting with digital touchpoints.

Based on our review, we developed and tested a framework that contains digital touchpoint effectiveness, consumer brand engagement, hedonic value and utilitarian value in biotechnology start-up. By deploying regression analysis, we empirically tested the model.

Based on the results of this study, digital touchpoints affected consumer brand engagement at biotechnology start-up (0.000, $p < 0.01$). Digital touchpoints mediate communication and interaction between customers and companies (Tueanrat et al., 2021). This is supported by researchers (Hosseini et al., 2018; Li and Kannan, 2014) to understand that emerging engagement platforms are invaluable for companies to manage customer journeys and create holistic customer experiences. The use of online or digital touchpoints to make the most of brand engagement (Khan et al., 2019). Consumer brand engagement is considered a potential antecedent of repeat buying (loyalty behavior) demanded by strong internal dispositions over time (Afifah et al., 2020; Hollebeek et al., 2014; Thakur, 2019). Customers who interact with biotechnology start-ups will be bound cognitively, emotionally, and show engagement behavior. So, the stronger the customer engagement, the more loyal they will be to the brands used (Khan et al. 2019; Mahandy and Sanawiri, 2018; Mahayani et al., 2019; Martini and Maulana, 2019; Sugianto, 2020; Tafesse, 2016

However, in contrast to the hypothesis that has been mentioned, the results of this study indicate that hedonic value (p -value 0.4235) and utilitarian value (p -value 0.5147) does not moderated digital touchpoints effectiveness on consumer brand engagement ($p > 0.05$). This showed that hedonic value and utilitarian value do not always moderated the value brought by a product from a brand. Unlike previous studies that are more

towards social media, showing that hedonic value and utilitarian value influences engagement (Fritze et al., 2018; Sagala and Sumayana, 2020; Wu et al., 2018; Zeba et al., 2020). This can be caused by a particular object of research different from previous studies that used objects with various sectors. In addition, the variables included in the factors of consumer brand engagement is considered sufficiently representative of these factors. Consumer brand engagement as a level of individual motivation related to brand and context-dependent state of mind is characterized by brand interaction activities (Hollebeek et al., 2014). Empirical results reveal that members' brand members' sense of psychological ownership can act as a predictor of their brand engagement (Kumar et al., 2019).

This study provides a new perspective on digital touchpoint effectiveness measurement items and their impact on consumer brand engagement. For example, in this digital era, respondents feel more engaged when they often see products on website or email where customers can shop, offer feedback, share their brand-related experience or connect with the firm in real-time (Hollebeek et al., 2017). They are also likely to be interested in seeing the brand posts from Facebook. This study supports the statement from previous research related to the context of social media that can study the scale of consumer brand engagement (Obilo et al., 2020). Marketing on social media is presented as a strong and effective marketing tool to attract consumers who are increasingly demanding so that social media optimization is needed (Jiménez-Marín et al., 2021). New forms of digital touchpoints such as email, websites, and Facebook can offer a high touchpoints with customers and a wealth of information (Dahl, 2018). It can have implications for biotechnology start-ups marketers to manage and pay more attention to digital touchpoints as a series of customer journeys to increase consumer brand engagement. These theoretical implications can be applied to several sectors to see the effectiveness of digital touchpoints on consumer brand engagement for further research.

6. Conclusions

This research provides an overview of digital touchpoints effectiveness and the impact on consumer brand engagement in biotechnology start-ups, which will be a sector that continues to innovate over time. Efforts to commercialize processed products from start-up biotechnological innovations are challenges that managers need to pay attention. Consumers need accurate information about products from the results of research and development, especially using materials from other living things such as animals and plants. Therefore, this research is needed to provide important information about digital touchpoints effectiveness and their impact on consumer brand engagement. By understanding and optimizing the factors that affect consumer digital touchpoints, start-ups, especially biotechnology start-ups, will achieve sustainability to create innovations in their processed products. This research has some limitations that should be noted and that could serve as directions for future research. First, the study was conducted in a specific country and industry. Hence, generalizing the findings of this study to other business sectors or other cultures should be made with caution. Second, financial or production-related data of start-ups were not conducted in this research. Other methods in analysing marketing strategy may differ from this study. So, it is suggested that future research should explore this issue as it could further qualify the findings of this study. The expected outcome of this research is continuous development and research in the field of biotechnology start-ups and another sector.

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Appendix A

Exploratory Factor Analysis (EFA) of Digital Touchpoints, Hedonic Value, and Consumer Brand Engagement

Factor	Factor Loading	Eigenvalue	Variance Explained
Factor 1 (Hedonic Value)		4.666	46.663
The interactions the brand makes through the digital touchpoint make me feel good	.878		
The interactions the brand makes through the omnichannel touchpoint are of interest to me	.872		
The interactions the brand makes through the omnichannel touchpoint are fun for me	.855		
The interactions the brand makes through the omnichannel touchpoint are entertaining to me	.806		
Factor 2 (Consumer Brand Engagement)		1.638	16.382
Whenever I'm using the product, I usually use the brand	.900		
I tend to choose the brand on the product purchases in future	.880		
I spend a lot of time using the brand, compared to other brands	.730		
Factor 3 (Digital Touchpoints Effectiveness)		1.287	12.867
I often receive emails created by the brand	.867		
I often see a website created by the brand	.812		
I often see Facebook posts created by the brand	.625		

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Appendix B

Exploratory Factor Analysis (EFA) of Digital Touchpoints, Utilitarian Value, and Consumer Brand Engagement

Factor	Factor Loading	Eigenvalue	Variance Explained
Factor 1 (Utilitarian Value)		5.264	43.870
The interactions the brand makes through the digital touchpoint are useful for me	.888		
The interactions the brand makes through the digital touchpoint are functional for me	.905		
The interactions the brand makes through the digital touchpoint provide practical value to me	.870		
Factor 2 (Consumer Brand Engagement)		1.634	13.618
I feel good when I use the brand	.700		
I spend a lot of time using the brand, compared to other brands	.722		
Whenever I'm using the product, I usually use the brand	.916		
I tend to choose the brand on the product purchases in future	.880		
Factor 3 (Digital Touchpoints Effectiveness)		1.531	12.757
I often receive emails created by the brand	.868		
I often see a website created by the brand	.810		
I often see Facebook posts created by the brand	.622		

Appendix C

Confirmatory Factor Analysis (CFA) of Digital Touchpoints, Hedonic Value, and Consumer Brand Engagement

Factor	Factor Loading	Eigenvalue	Variance Explained
Factor 1 (Hedonic Value)		5.313	53.130
The interactions the brand makes through the digital touchpoint make me feel good	.884		
The interactions the brand makes through the omnichannel touchpoint are of interest to me	.882		
The interactions the brand makes through the omnichannel touchpoint are fun for me	.880		
The interactions the brand makes through the omnichannel touchpoint are entertaining to me	.829		
Factor 2 (Consumer Brand Engagement)		1.678	16.779
Whenever I'm using the product, I usually use the brand	.884		
I tend to choose the brand on the product purchases in future	.842		
I spend a lot of time using the brand, compared to other brands	.774		
Factor 3 (Digital Touchpoints Effectiveness)		1.133	11.330
I often receive emails created by the brand	.878		
I often see a website created by the brand	.875		
I often see Facebook posts created by the brand	.745		

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Appendix D

Confirmatory Factor Analysis (CFA) of Digital Touchpoints, Utilitarian Value, and Consumer Brand Engagement

Factor	Factor Loading	Eigenvalue	Variance Explained
Factor 1 (Consumer Brand Engagement)		4.587	45.870
Whenever I'm using the product, I usually use the brand	.916		
I tend to choose the brand on the product purchases in future	.880		
I spend a lot of time using the brand, compared to other brands	.722		
I feel good when I use the brand	.700		
Factor 1 (Utilitarian Value)		1.605	16.046
The interactions the brand makes through the digital touchpoint are functional for me	.905		
The interactions the brand makes through the digital touchpoint are functional for me	.888		
The interactions the brand makes through the digital touchpoint provide practical value to me	.870		
Factor 3 (Digital Touchpoints Effectiveness)		1.355	13.546
I often receive emails created by the brand	.868		
I often see a website created by the brand	.810		
I often see Facebook posts created by the brand	.622		

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