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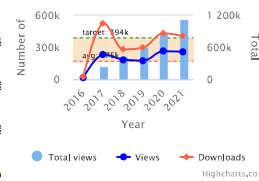
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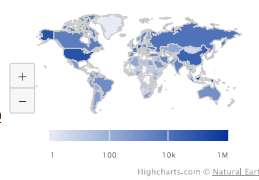
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Vol 16, No 3 (2021): September 2021

ONLINE PRICING FOR SMALL MEDIUM ENTERPRISES' PRODUCTS IN THE EX-LOCALIZATION OF DOLLY SURABAYA

[PDF](https://ejournal.undip.ac.id/index.php/jgti/article/view/37264) (<https://ejournal.undip.ac.id/index.php/jgti/article/view/37264>)

169-176

Ig. Jaka Mulyana, Ivan Gunawan, Dian Trihastuti, Yehezkiel Prakoso Putra Yunen, Dwi Agustini Nuriani Sirodj

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> Vol 15, No 3 (2020): September 2020

(<https://ejournal.undip.ac.id/index.php/jgti/issue/view/2829>)

> Vol 15, No 2 (2020): Mei 2020

(<https://ejournal.undip.ac.id/index.php/jgti/issue/view/2817>)

> Vol 15, No 1 (2020): Januari 2020

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(<https://ejournal.undip.ac.id/index.php/jgti/issue/view/2644>)

> Vol 14, No 2 (2019): Mei 2019

(<https://ejournal.undip.ac.id/index.php/jgti/issue/view/2575>)

> Vol 14, No 1 (2019): Januari 2019

(<https://ejournal.undip.ac.id/index.php/jgti/issue/view/2524>)

> Complete issues

(<https://ejournal.undip.ac.id/index.php/jgti/issue/view/8158>)

Most cited articles

> **TINGKAT PEMBERDAYAAN**

USAHA GARAM RAKYAT

(PUGAR) DITINJAU DAR

ASPEK PRODUKSI,

DISTRIBUSI, PERMINTAAN

PASAR DAN SOSIAL BUDAYA

(<https://ejournal.undip.ac.id/index.php/jgti/article/view/8158>)

> **ANALISIS PENGARUH**

TEMPERATUR LINGKUNGAN,

BERAT BADAN DAN TINGKAT

BEBAN KERJA TERHADAP

DENYUT NADI PEKERJA

GROUND HANDLING

BANDARA

(<https://ejournal.undip.ac.id/index.php/jgti/article/view/10149>)

> **PENENTUAN WAKTU**

STANDAR DAN JUMLAH

TENAGA KERJA OPTIMAL

PADA PRODUKSI BATIK CAP

(STUDI KASUS: IKM BATIK

.....

Home (<https://ejournal.undip.ac.id/index.php/jgti/index/>) / Archives (<https://ejournal.undip.ac.id/index.php/jgti/issue/archive/>) / Vol 16, No 3 (2021) (<https://ejournal.undip.ac.id/index.php/jgti/issue/view/3053>)

Vol 16, No 3 (2021): September 2021

Jurnal J@TI UNDIP (ISSN 19071434, ISSN Online 25021516) Volume 16, No. 3, September 2021

Table of Contents

Research Articles

ONLINE PRICING FOR SMALL MEDIUM ENTERPRISES' PRODUCTS IN THE EX-LOCALIZATION OF DOLLY SURABAYA

(<https://ejournal.undip.ac.id/index.php/jgti/article/view/37264>)

169

Prakoso Putra Yunen, Dwi Agustin Nuriani Sirodj

(<https://doi.org/10.14710/jati.16.3.169-176>)
Citations: ? (https://badge.dimensions.ai/details/doi/10.14710/jati.16.3.169-176?domain=https://ejournal.undip.ac.id)

| Language: EN (#) | DOI: 10.14710/jati.16.3.169-176

(<https://doi.org/10.14710/jati.16.3.169-176>)

Received: 15 Mar 2021; Published: 1 Oct 2021; Available online: 30 Sep 2021.

Case Studies

PENYADWALAN DISTRIBUSI BBM UNTUK SELF

PROPELLED OIL BARGE (SPOB) BERBASIS METODE

ANALYTICAL HIERARCHY PROCESS (AHP)

(<https://ejournal.undip.ac.id/index.php/jgti/article/view/38464>)

189

Pitarsono Yulihartanto

(<https://doi.org/10.14710/jati.16.3.189-198>)
Citations: ? (https://badge.dimensions.ai/details/doi/10.14710/jati.16.3.189-198?domain=https://ejournal.undip.ac.id)

| Language: ID (#) | DOI: 10.14710/jati.16.3.189-198

(<https://doi.org/10.14710/jati.16.3.189-198>)

Received: 19 May 2021; Published: 1 Oct 2021; Available online: 30 Sep 2021.

(<https://ejournal.undip.ac.id/index.php/jgti/issue/view/2524>)

PENGURANGAN RISIKO MUSCULOSKELETAL

DI PERUSAHAAN ROKOK MENGGUNAKAN OWAS

DAN QFD

(<https://ejournal.undip.ac.id/index.php/jgti/article/view/37369>)

177

Hery Hamdi Azwir

(<https://doi.org/10.14710/jati.16.3.177-188>)
Citations: ? (https://badge.dimensions.ai/details/doi/10.14710/jati.16.3.177-188?domain=https://ejournal.undip.ac.id)

| Language: ID (#) | DOI: 10.14710/jati.16.3.177-188

(<https://doi.org/10.14710/jati.16.3.177-188>)


Received: 20 Mar 2021; Published: 1 Oct 2021; Available online: 30 Sep 2021.

SAUD EFFENDY, LAWEYAN)
(<https://ejournal.undip.ac.id/index.php/>)
> [PERHITUNGAN NILAI OVERALL EQUIPMENT EFFECTIVENESS MESIN MIXER BANBURY 270 L DAN MESIN BIAS CUTTING LINE 2 \(STUDI KASUS PT. SURYARAYA RUBBERINDO INDUSTRIES\)](#)
(<https://ejournal.undip.ac.id/index.php/>)


> [KAJIAN PEMETAAN DAN OPTIMALISASI POTENSI PAJAK DALAM RANGKA MENINGKATKAN PENDAPATAN ASLI DAERAH \(PAD\) DI KABUPATEN JEMBER](#)
(<https://ejournal.undip.ac.id/index.php/jgti/article/view/4500>)

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[ANALISIS PENGENDALIAN PERSEDIAAN AUX RAW MATERIAL MENGGUNAKAN METODE MIN-MAX STOCK DI PT. MITSUBISHI CHEMICAL INDONESIA](#)
(<https://ejournal.undip.ac.id/index.php/jgti/article/view/34949>)



Salsabila Audina, Arfan Bakhtiar
 ? (<https://badge.dimensions.ai/details/doi/10.14710/jati.16.3.161-168?domain=https://ejournal.undip.ac.id>)
| Language: **ID (#)** | DOI: [10.14710/jati.16.3.161-168](https://doi.org/10.14710/jati.16.3.161-168)
(<https://doi.org/10.14710/jati.16.3.161-168>)
Received: 12 Dec 2020; Published: 1 Oct 2021; Available online: 30 Sep 2021.

[FUZZY FMEA APPLICATION TO IDENTIFICATION RISK IN-PROCESS PRODUCTION OF TOYOTA HI-ACE WIRING HARNESS PRODUCT](#)
(<https://ejournal.undip.ac.id/index.php/jgti/article/view/34941>)
Diah Septiyana

 ? (<https://badge.dimensions.ai/details/doi/10.14710/jati.16.3.153-160?domain=https://ejournal.undip.ac.id>)
| Language: **EN (#)** | DOI: [10.14710/jati.16.3.153-160](https://doi.org/10.14710/jati.16.3.153-160)
(<https://doi.org/10.14710/jati.16.3.153-160>)
Received: 12 Dec 2020; Published: 1 Oct 2021; Available online: 30 Sep 2021.

(<https://ejournal.undip.ac.id/index.php/jgti/article/view/34949/2>) 161

(<https://ejournal.undip.ac.id/index.php/jgti/article/view/34941/2>) 153

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ONLINE PRICING FOR SMALL MEDIUM ENTERPRISES' PRODUCTS IN THE EX-LOCALIZATION OF DOLLY SURABAYA

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Abstract

Numerous Small and Medium Enterprises (SMEs) do not have a basic method in pricing decisions. Many times, this decision comes up based on an intuitive probe instead of a detailed analysis. This could lead to marketing problems, which may result in disruptions of financial liquidity. This also applies to SMEs wishing to sell products through the online channel. They need a proper pricing strategy, considering its different marketing strategies. Sales made through both offline channels (conventional stores) and online channels are known as Dual-Channel Supply Chain (DCSC). It is argued that the pricing decision at DCSC needs to consider consumer preferences in selecting the sales channel. One assumption commonly adopted in the DCSC pricing model is that the lost value if consumers purchase products through online channels. Therefore, the pricing decision for the online channel should be cheaper than the price on the offline channel. This study aims to assist SMEs in the ex-localization of Dolly in Surabaya in determining the price of products to be sold through online channels. Three types of products: batik, chips, and leather shoes were selected as research samples to represent the product groups: craft, fashion, and processed food. This study proposes an optimal online price strategy through experiments with a mathematical model. Model parameters, namely consumer preferences in choosing sales channels, are obtained through surveys. Apart from that, surveys are also used to reveal which platforms consumers are interested in shopping online. Shopee and Instagram were chosen by respondents as the most popular marketplaces and social media for online shopping. Finally, the online prices proposed for the batik product are IDR 82,500-IDR 66,000; chips Rp7,620-Rp6,336; and leather shoes Rp.103,800-Rp82,200.

Keywords: dual-channel supply chain; mathematical model; online pricing; small medium enterprise

1. Introduction

Dolly was the largest prostitution complex or brothel in Southeast Asia, located in the city of Surabaya, East Java, Indonesia. Since 2014, the Surabaya City Government has closed the prostitution complex and transformed the area into a center for Small and Medium Enterprises (SMEs). This transformation was welcomed positively because the Surabaya City Government not only closed it arbitrarily but also introduced a solution to keep the economy of the residents in the ex-localization area moving forward. The guidance carried out by the Surabaya City Government has succeeded in encouraging the emergence of various SME products from ex-localization ranging from handicraft products, food processing, to fashion products (Dinas Komunikasi dan Informatika Provinsi Jawa Timur, 2018).

One of the common problems faced by SMEs is the pricing decision for their products (Wattimena *et al.*, 2020). The owners of SMEs often do not have a clear basis in determining the price of their products (Carson *et al.*, 1998). Careless or intuitive pricing can increase the risk of disruption to the

financial liquidity of SMEs and affect product marketing. Therefore, we need a correct pricing strategy approach to assist SMEs in the ex-localization of Dolly.

Apart from pricing issues, SMEs also experience difficulties in product marketing due to limited product marketing channels. Marketing channels currently used by SMEs are through physical stores or offline stores, with a very limited market reach. Moreover, Dolly's ex-localization location is also not a strategic place in Surabaya. SMEs need to consider a new sales channel known as an online channel (e-channel) to expand their marketing reach. Along with the increasingly massive use of the internet, sales through online channels have been able to increase average sales by up to 20% (Widodo *et al.*, 2014). Several options in developing this online channel include independent online stores, marketplaces, or social media. However, to start an independent online store requires investment costs and the ability to self-manage the website that SMEs in ex-localization do not yet have. Therefore, feasible online channels for ex-localized SMEs are through marketplaces or social media, which does not require a large investment to start. Various options of marketplaces and social media that exist today are the next problems. SMEs could not be able to manage all existing marketplaces and social media with their current resources. Therefore, it is

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necessary to identify the most popular marketplace and social media used by customers in buying products through the online channel. In this research, the questionnaire survey method was used as the means to understand the overview of what marketplaces or social media are widely used by the potential market for SME products to design an effective marketing strategy for online channels.

SMEs that have both offline and online sales channels face more complex pricing strategy problems. The concept of parallel selling via offline (conventional store) and online sales channels is known as the Dual-Channel Supply Chain (DCSC) (Widodo *et al.*, 2014). Research focuses on pricing strategy for DCSC shows a positive increasing trend. The development of business models such as financing support schemes by e-retailers (Yan *et al.*, 2020) and product-service systems (Widodo *et al.*, 2020) has become a strain of developments in pricing strategy research at DCSC. Issues faced by the industry such as disruption of demand (Huang *et al.*, 2012); disruption of production costs (Huang *et al.*, 2013); disruption of supply chain channels (Heydari *et al.*, 2020), to the impact of industrial activities on the environment (Li *et al.*, 2016; Januardi *et al.*, 2020) has also become a separate challenge in this research field. To examine the applicability of the pricing model at DCSC, Widodo (2014) compared three types of products: tickets, smartphones, and fashion that represent different levels of consumer acceptance towards their sales via online channels. Even though the development of pricing strategy research at DCSC is fast, the complexity of pricing at DCSC for SME products in Dolly's ex-localization could fill the population gap that exists in the research field. This research will involve three types of SMEs to represent SMEs in the ex-localization of Dolly. The three SMEs are an SME that produces batik to represent handicraft products, an SME that produces cassava chips to represent processed food products, and an SME that produces shoes to represent fashion products. Furthermore, this study aims to assist SMEs in the ex-localization of Dolly in determining potential online channels and setting optimal prices at DCSC. The theoretical contribution of this research is the involvement of empirical data obtained through questionnaires and interviews to verify the pricing model in the established DCSC. Eventually, the results of this study can be used directly as a recommendation for the pricing decision of SME products.

2. Methods

This research is divided into two stages. The first stage is a survey through questionnaires and interviews to obtain empirical data. It is then analyzed and used in experiments utilizing a mathematical model of pricing in DCSC to get analytical solutions.

Survey

The questionnaire survey method was used as the means to understand information related to marketplaces and social media which are widely used by potential markets in the online channel. Besides, the survey also includes questions about the sales channel preferences for each product, which then could be used as a parameter in the experiment using a mathematical model.

Questionnaires are distributed online via google form and offline by asking the respondent to fill it. The questionnaire contains 15 questions divided into three sections, which are respondent profiles, online transactions by respondents, and general information about SMEs under study. The number of respondents is determined by calculating the sample size based on proportions following equation (1) (Cochran, 2007).

$$n = \frac{Z^2 \cdot p \cdot (1 - p)}{d^2} \quad (1)$$

where:

- n = Minimum number of samples required
- Z = Confidence level
- p = The proportion of the population who ever shop online
- d = The desired level of precision

The proportion of the population who ever shop online is obtained from the results of a survey in 2017 which stated that 71% of residents of the city of Surabaya have made online shopping (Hamdi, 2017). The Z value is 1.96 for the 95% confidence interval. Thus, using equation (1), the minimum sample size is 317 people.

$$n = \frac{1.96^2 \cdot 0,53 \cdot 0,47}{0.05^2} = 316.39$$

The data obtained through a questionnaire is then visualized with an appropriate diagram and used to answer what is the proposed online sales channel for SMEs in the ex-localization of Dolly.

Experiments

The model proposed by Huang *et al.* (2013) is used for the experiment to find the best pricing scenario in DCSC. It is shown in equations (2) and (3) as follow:

Offline demand function

$$D_r = (1 - \rho)a - \alpha_1 P_r + \beta_1 P_d \quad (2)$$

Online demand function

$$D_d = \rho a - \alpha_2 P_d + \beta_2 P_r \quad (3)$$

where:

- D_r = offline (retail) channel demand
- D_d = online (direct) channel demand
- a = the forecasted potential demand if the products are free of charge
- ρ = the share of the demand goes to the online (direct) channel
- P_r = offline (retail) channel price
- P_d = online (direct) channel price
- α = the coefficients of self-price elasticity of D_r and D_d
- β = the coefficients of cross-price elasticity of D_r and D_d

This pricing model carries a customer value-based pricing strategy with the presence of a parameter ρ which indicates consumer preferences in selecting sales channels

Have you ever bought something online?



Figure 1. Percentage of Respondents Who Have Shopped Online

How often do you buy things online?

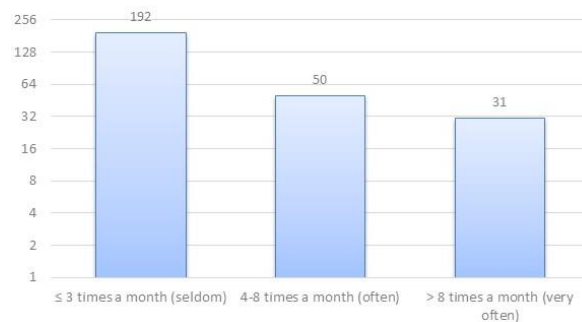


Figure 2. The Intensity of Online Shopping

What do you buy online?

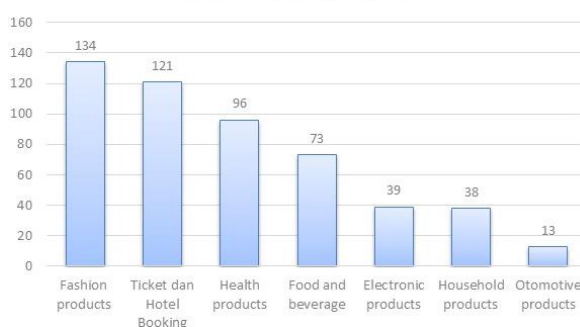


Figure 3. Items Purchased Online by Respondents

Which SME product categories have you purchased online?

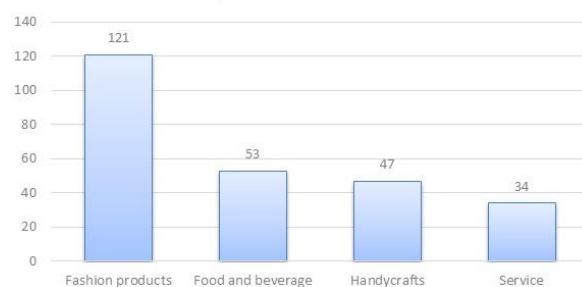


Figure 4. Type of Smes Products Bought by Respondents

based on the type of product (Hinterhuber *et al.*, 2012). Data for the model parameters were obtained through unstructured interviews with owners of SMEs and for parameter ρ obtained from questionnaires.

The pricing scenario proposed in this study is the Stackelberg leader-follower game as in Zhang *et al.* (2015). In this scenario, one channel is designated as the price leader by assuming the other channels would behave as the price followers. The price leader will determine its pricing strategy, then followed by the price follower. In this research, the existing offline channel will become the price leader. The pricing strategy for the offline channel has been set by the SME owners using the cost-based pricing strategy. Furthermore, the search for optimal solutions is carried out using Lingo 11 software. The assumption in this study is that products are always available for both channels, demand is only influenced by price, and demand is deterministic.

3. Result and Discussion

Respondent Profile

The total number of respondents involved in the survey was 326 respondents. Among them, 227 respondents filled out questionnaires online and 119 respondents filled out the paper-based questionnaire that was distributed directly. As many as 20 questionnaires that were distributed directly were not filled in completely by the respondents, so only 99 data from respondents who filled out the paper-based questionnaire were used. This number has exceeded the minimum sample size of 317 people. The profile of 326 respondents is 62.9% are female respondents and the remaining 37.1% are male. The age range of 61% of respondents was between 17-25 years old. Whereas

32.6% were over 25 years old and 6.4% of respondents were under 17 years old. The majority of respondents' occupations are 55.2% as students, 17.8% as private employees, the rest respectively are civil servants, housewives, and entrepreneurs. The results also show that 59% of respondents have a high school education background, 24% are undergraduate, the remaining 9% and 8% are diploma and junior high school. Also, 30.4% of respondents are resided in East Surabaya, 20.9% in West Surabaya, 17.2% in North Surabaya, 16% in Central Surabaya, and the remaining 15.6% in South Surabaya.

Online Shopping Behavior

Amongst 326 respondents, 84% or 273 respondents admitted to ever having shopped online. Out of 273 respondents, 192 respondents are not consumers who do online shopping regularly. Research shows that 50 respondents said that they shop online 1-2 times a week and 31 respondents shop online more than 2 times a week. As can be seen in **Figure 1** and **Figure 2**.

As can be seen in **Figure 3** and **Figure 4**, fashion products, ticket and hotel bookings, and health products are the top three product categories purchased by consumers through the online channel. Most of the fashion and food and beverage products purchased through online channels are SME products.

Figure 5 shows that 58% of online consumers actively shop online through e-commerce platforms, marketplaces, or social media. However, the number of consumers who shop through the marketplace alone is more than the number of consumers who shop through social media. The marketplace has the advantage of being able to compare the price and goods to be purchased. Moreover, the purchasing transaction through

Where do you buy things online?

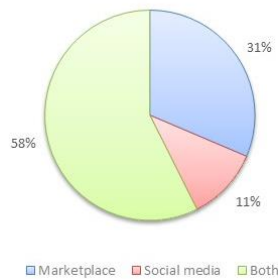


Figure 5. The Platform Chosen by Respondents to Shop Online

Marketplace

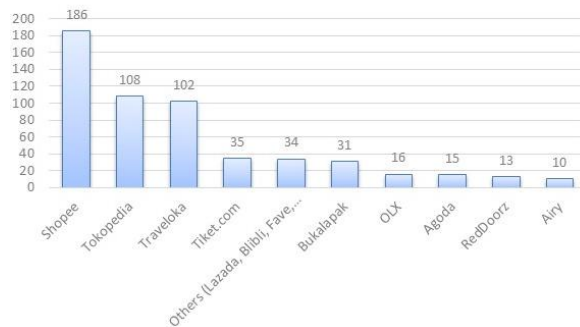


Figure 6. Marketplace Used by Respondents

Social media

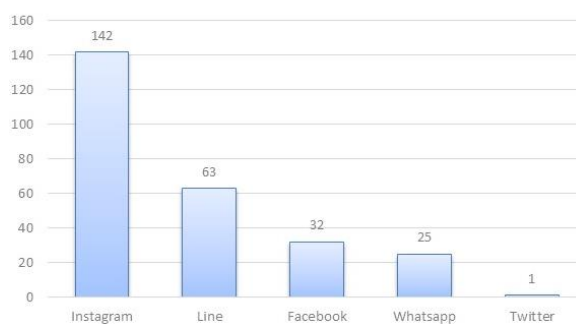


Figure 7. Social Media Selected by The Respondent

Table 1. Consumer Preference in Buying A Product Through Online Channels

	Batik	Chips	Leather shoes
ρ	0.498	0.582	0.465

Table 2. The Confidence Interval P for Each Product

	Batik	Chips	Leather shoes
ρ	0.498±0.054	0.582±0.053	0.465±0.054

the marketplace is safer than through social media Therefore, SMEs are advised to open online sales channels through both the marketplace and social media. However, considering the resource constraints, it is suggested that SMEs should begin their online channel business through the marketplace.

Shopee, Tokopedia, and Traveloka are the top 3 marketplaces that are most popular with online consumers (see **Figure 6** and **Figure 7**). Of the 273 respondents who shop online, 186 admitted to using Shopee, 108 admitted to using Tokopedia, and 102 buying tickets and booking hotels using Traveloka. Therefore, SMEs can choose to use Shopee or Tokopedia as an alternative to starting online channels through the marketplace. The social media that is considered the most favorite for online consumers is Instagram. 142 out of 153 respondents who use social media to shop online chose Instagram as the most supportive social media platform for online shopping.

The parameter ρ which will be used in the pricing model at DCSC is obtained through questionnaire questions 14 to 16 (see Appendix). The proportion of respondents who prefer online channels for the three SME products can be seen in **Table 1**. Next, the confidence interval is calculated for ρ of each product with the equation (4)

$$\rho \pm z \cdot \sqrt{\frac{\rho(1-\rho)}{n}} \quad (4)$$

With a 95% confidence level, the z value is 1.96 and the sample size (n) is 326 respondents, then the confidence interval for the value of ρ is obtained as can be seen in **Table 2**.

Pricing Strategy for three products at DCSC for SMEs in the ex-localization of Dolly

Three SMEs whose products are the subject of this research is the KBU Mampu Jaya: leather shoes, Samijali: similar chips, and Alpujabar: batik. Parameter α in this study employing information about the production capacity in one month, which is assumed to run out if the SME has two sales channels. Thus, potential demand is fulfilled based on maximum capacity production. The production cost per unit (C_u) is obtained by calculating the total production cost for one month divided by the production capacity. **Table 3** shows the parameters used in the mathematical model. The limitation in pricing strategy for SME products is that pricing does not consider interactions with the product mix produced by these SMEs.

Table 3. Model Parameters Based on Data Obtained from SME Owners

Parameter	Batik	Chips	Leather shoes
a	500 pieces	1,800 packs	1,350 pairs
P_r (Rp/unit)	150,000	12,000	200,000
C_u (Rp/unit)	59,250	5,500	111,300

Table 4. The Parameter Values $\alpha_1, \alpha_2, \beta_1,$ And β_2

Parameter	Batik	Chips	Leather shoes
α_1	0.00017	0.0008	0.0002
α_2	0.000375	0.0012	0.00036
$\beta_1 = \beta_2$	0.00025	0.001	0.00027

Table 5. The Solution of Pricing Decision of Each Product for DCSC Using the Proposed Model

	Batik	Chips	Leather shoes
Profit (Rp)	26,152,510	6,433,605	50,879,490
P_d (Rp/ unit)	74,700	6,984	93,000
Range of P_d (Rp/ unit)	82,500-66,000	7,620-6,336	103,800- 82,200

The parameters α_1 and α_2 show the price elasticity of demand on their respective channels. α_1 shows the offline price elasticity to demand on the offline channel and α_2 shows the online price elasticity on the online channel. The values of α_1 and α_2 convert the price into demand. If α_1 and α_2 show price elasticity towards their channel, β_1 and β_2 show cross-price elasticity: offline price against online demand and online price against offline demand. The assumptions in this study for the parameters β_1 and β_2 are that the effect of the cross-price is symmetrical or the effect of online prices on offline demand and the effect of offline prices on online demand is the same so that $\beta_1 = \beta_2$.

The values of $\alpha_1, \alpha_2, \beta_1,$ and β_2 in this study were obtained by conducting trial and error using a validated spreadsheet with the opinion of the SMEs owner based on their expertise in judgment. Thus, the parameter values $\alpha_1, \alpha_2, \beta_1,$ and β_2 are obtained and shown in **Table 4**.

The general profit is calculated by equation (5)

$$\text{Profit} = \text{Demand} \times (\text{Price} - \text{Cost}) \quad (5)$$

Thus, when combined with equations (2) and (3) it will become equations (6) and (7)

$$\text{Profit} = D_r \cdot (P_r - C_u) + D_d \cdot (P_d - C_u) \quad (6)$$

$$\text{Profit} = ((1 - \rho)a - \alpha_1 P_r + \beta_1 P_d)(P_r - C_u) + (\rho a - \alpha_2 P_d + \beta_2 P_r)(P_d - C_u) \quad (7)$$

The solution to the model is done by transforming equation (7) into linear programming equations to maximize profits. Therefore, the objective function is to maximize profit at DCSC as shown by equation (8).

$$\text{Max Profit} = ((1 - \rho)a - \alpha_1 P_r + \beta_1 P_d)(P_r - C_u) + (\rho a - \alpha_2 P_d + \beta_2 P_r)(P_d - C_u) \quad (8)$$

Under normal conditions, online channels can make sales if $P_r \geq \frac{P_d}{\rho}$ (Widodo *et al.*, 2011). This requirement then becomes the constraint function used in the linear programming equation in equation (10).

$$P_r \geq \frac{P_d}{\rho} \quad (9)$$

$$P_d > 0 \quad (10)$$

This constraint function mathematically shows that online sales can occur if P_d has reached its threshold value. Then, equation (10) is the nonnegative constraint. The solution of the proposed mathematical model can be seen in **Table 5**.

The mathematical model has been successful in providing solutions to proposed online pricing decisions for three products: batik, chips, and leather shoes. The range of P_d is identified by changing the proportion of sales through online channels as in **Table 2**. The difference between online prices, offline prices, and production costs can be seen in **Figure 8**, **Figure 9**, and **Figure 10**. **Figure 8**, **Figure 9**, and **Figure 10** show that the online price decision for batik and chips is still feasible because it is above the production cost. However, the online price for leather shoes is no longer feasible because it is below production costs. Therefore, SME owners must reduce production costs or increase the value of ρ so that the leather shoes become feasible to be sold through online channels. Increasing the value of ρ can be done through advertising on social media, providing or creating interesting content on social media so that consumer preferences for buying leather shoe products through online channels can increase. Based on the model, the online price for leather shoe products would be feasible if the value of ρ is above 0.57 (see **Figure 11**).

4. Conclusion

The survey results have presented several alternatives of online channels that SMEs in the ex-localization of Dolly can choose from. Marketplace: Shopee and Social media: Instagram can be used as an alternative to market their products through online channels. Furthermore, the mathematical model proposed by Huang *et al.* (2013) and Widodo *et al.* (2011) has successfully assisted SMEs in the ex-localization of Dolly in the pricing decision of products sold through the online channel. The pricing model at DCSC provides insights for SMEs to decide prices rationally. For batik, the selling price through the proposed online channel is between IDR 82,500-IDR 66,000. Whereas, for chips product, the price between Rp. 7,620 - Rp. 6,336 is feasible for sales via the online channel. However, the price for leather shoes, which is the optimal solution for the

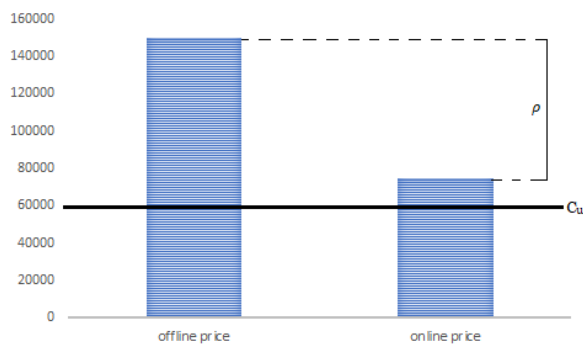


Figure 8. Comparison of Online Prices, Offline Prices, And Production Costs for Batik Products

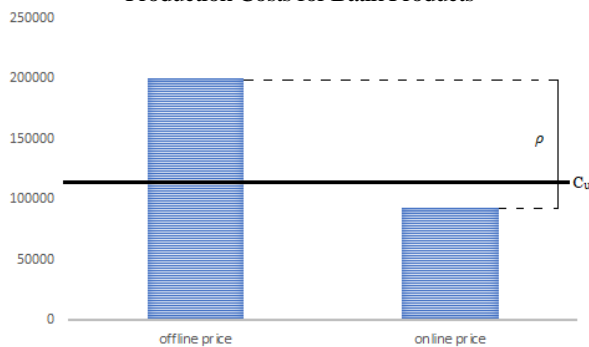


Figure 10. Comparison of Online Prices, Offline Prices, And Production Costs for Leather Shoe Products

model, turns out to be below the cost of production because consumer preferences for buying leather shoes produced by SMEs are still low. Therefore, it is proposed that SMEs need to carry out promotions through online media to increase consumer preferences for buying leather shoes through online channels.

Subsequent research proposals are to explore why consumer acceptance of the online sales channel for leather shoe products is low and how to increase consumer acceptance for the online sales channel of leather shoe products. The limitation of this research is the lack of exploration on consumer behavior on SME's products in Dolly. Further research that focuses on consumer behavior towards SMEs in Dolly should be done to enrich the field of study. In addition, the model solution has not taken into account the product mix of SMEs in Dolly. A further research proposal for the pricing model at DCSC should involve the product mix phenomenon that exists in a business.

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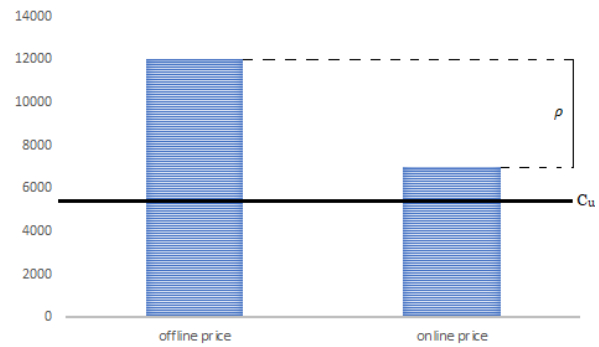


Figure 9. Comparison of Online Prices, Offline Prices, And Production Costs for Chip Products

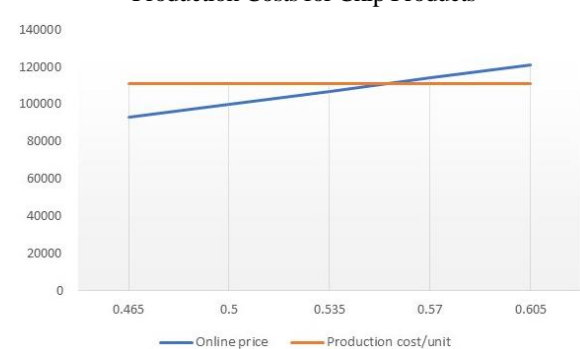


Figure 11. Sensitivity Analysis of Online Prices for Leather Shoe Products to the Value of ρ

<https://bisnis.tempo.co/read/900135/riset-google-warga-surabaya-paling-banyak-belanja-online/full&view=ok>

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Appendix

Research Questionnaire

Product Pricing for Online Market

Hello! We are currently researching pricing for products marketed online. It aimed to help SMEs in the city of Surabaya. Besides being able to assist in pricing, it is hoped that encouraging marketing products online can make the SMEs' products known by the wider community.

Hereby, we request your time to fill out the questionnaire below. All information will be kept confidential.

*** Required**

A. Questions about Yourself

Instructions for filling out: Answer the questions below correctly

1. Full Name *

2. Gender *

- Male
- Female

3. Age *

- < 17 Years
- 17-25 years old
- 26-35 years old
- 36-45 years old
- 46-55 years old
- 55 years old

4. Last Education *

- Elementary school
- Junior high school
- Senior High School
- Undergraduate
- Others: _____

5. Job *

- Civil Servants/BUMN/Military Officers
- Self-employed
- Employees/Private Employees
- Students
- Housewife
- Others: _____

6. Living Area in Surabaya City *

- Central Surabaya
- East Surabaya
- West Surabaya
- North Surabaya
- South Surabaya

B. Questions about Online Transactions

7. Have you ever shopped for products online? (if yes, continue to question no. 8-16). Otherwise you do not need to continue this questionnaire.*

- Yes
- Not

8. If yes, how often do you shop online?

- 3 times a month
- 4-8 times a month
- 8 times a month

9. When shopping online, what services do you usually use?

- Social media
- E-Commerce Application
- Both

10. What social media do you use to make transactions? (may have more than 1 choice)

- Instagram
- Facebook
- Twitter
- Line
- Others: _____

11. What e-commerce application do you use to make transactions? (may have more than 1 choice)

- Bukalapak
- Tokopedia
- Shopee
- OLX
- Tiket.com
- Agoda
- Traveloka
- RedDoorz
- Airy
- Others: _____

12. What products do you usually buy online? (may have more than 1 choice)

- Hotel Tickets and Vouchers (Airplane, Train, Bus, Hotel etc)
- Electronics (Television, Computers, etc)
- Home Appliances (Table, Fan, etc)
- Fashion (Clothing, Shoes, Bags, etc)

- Automotive (Car Wipes, Car Wash Soap, etc)
- Culinary (Snacks and the like)
- Health (Beauty Serum, Pharmacy, etc)

C. Questions about SMEs

12. Have you ever known SME's in Dolly area?

- Yes
- Not

13. What creative products from SMEs have you bought/used online? (May more than 1 choice)

- Crafts (Batik Fabrics, Handmade Bags, Home Decorations)
- Fashion (Clothes, Shoes, Pants)
- Culinary (Snacks: Chips, Dry Bread, Nuts, Milk Pie)
- Services (Design, Photos, Advertising)

14. If there are creative SME Fashion products (Shoes) you prefer to buy these products through? (assuming the online shop is cheaper)

- Offline (conventional) shop
- Online shop

15. If there are creative SME handicraft products (Batik cloth) you prefer to buy these products through? (assuming the online shop is cheaper)

- Offline (conventional) shop
- Online shop

16. If there are creative products from SMEs, snacks (chips) you prefer to buy these products through? (assuming the online shop is cheaper)

- Offline (conventional) shop
- Online shop

Thank you for your time to fill out the questionnaire.